ENHANCED NATIONALLY DETERMINED CONTRIBUTION

REPUBLIC OF INDONESIA

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SUMMARY

Indonesia submitted Intended Nationally Determined Contribution (INDC) to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat prior to COP-21. Under Decision 1/CP. 21, Party who has submitted its INDC before joining the Paris Agreement shall be considered to have communicated its 1st NDC unless the Party decides otherwise. Indonesia decided to strengthen its INDC by enhancing clarity, transparency, and understanding both for national and international interests, and submitted to the UNFCCC Secretariat the NDC document prior to COP-22.

The NDC reflects the progression beyond the earlier pledge in INDC in terms of: (a) the national Business as Usual (BAU) scenario used – BAU of NDC is slightly lower than BAU of INDC (from 2.881 $GtCO_2$-eq in INDC to 2.869 $GtCO_2$-eq in NDC), and (b) clarity of sectoral BAU and emission reduction target allocation, and assumption used for BAU projection and target allocation. The NDC has set an ambitious mitigation target for forest and land use and energy sectors which account for about 97% of the total national commitment.

The Updated NDC submitted in 2021, reflects the progression beyond the existing NDC particularly in the following standpoints:

1. Enhanced ambition on adaptation as elaborated in the programs, strategies and actions to achieve economic, social and livelihood, and ecosystem and landscape resilience, as depicted in Annex 2.
2. Enhanced clarity on mitigation by adopting the Paris Agreement rule book (Katowice Package) on information to be provided in NDC, as well as updated policies which potentially contribute to additional achievement of NDC target.
3. National context that relates the existing condition, milestones along with national development for the period of 2020-2024, and indicative pathways towards long-term vision (Visi Indonesia 2045 and the Long-Term Strategy on Low Carbon and Climate Resilient Development 2050).
4. Translating the Paris Agreement Rule Book (Katowice Package) into Indonesia's context with a view to enhance effectiveness and efficiency in implementing the agreement and in communicating its progress and achievement as part of the responsibility of the party to the agreement. This includes elaborated chapters on transparency framework at the national level (National Registry System as the backbone of transparency framework), and means of implementation (finance, technology development and transfer, and capacity building).

As mandated by Decision 1/CMA 3, Parties are requested to revisit and strengthen their NDC- 2030 target, to align with the Paris Agreement temperature goal by the end of 2022. Responding to this mandate, Indonesia submits Enhanced NDC to the UNFCCC Secretariat by 23 September 2022 with increased emission reduction target from 29% in First NDC and Updated NDC to 31.89% unconditionally and from 41% in the Updated NDC to 43.20% conditionally. This Enhanced NDC is the transition towards Indonesia's Second NDC which will be aligned with the Long-Term Low Carbon and Climate Resilience Strategy (LTS-LCCR) 2050 with a vision to achieve net-zero emission by 2060 or sooner.

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I. NATIONAL CONTEXT

1.1. GENERAL POLICIES

Indonesia is a nascent yet stable democracy and the fourth most populous country in the world. Despite continuous, multi-decade economic growth, approximately 11% of Indonesia's population is living below the poverty line in 2014. To lift people out of poverty, the Government of Indonesia (GOI) is promoting economic development projected to average at least 5% per year in order to reduce the poverty rate to below 4% by 2025. Indonesia also anticipates both opportunities and challenges with projected population growth of 0.74 percent from 2015 to 2045, as mandated by the Indonesian Constitution, inter alia, that "every person shall have the right to enjoy a good and healthy environment". As climate change becomes a reality, Indonesia continues to seek a balance between its current and future development and poverty reduction priorities.

In 2015 the Government of Indonesia pledged to reduce emissions from 2020-2030 by 29% (unconditional) up to 41% (conditional) against the 2030 business as usual scenario, an increased unconditional commitment compared to 2010 pledge of 26%. In the first term of President Joko Widodo administration, priority actions within the national Nawa Cita (Nine Priority Agendas) framework were determined and implemented, which includes protecting Indonesia's citizens, encouraging rural and regional development, improving the quality of life, and improving productivity and global competitiveness. These core missions are consistent with the national commitment towards a low carbon and climate-resilient development path, in which climate change adaptation and mitigation constitute an integrated and cross-cutting priority of the National Medium-Term Development Plan (RPJMN).

In the second term of President Joko Widodo administration, the goal of achieving a prosperous Indonesia has been defined. The RPJMN 2020-2024 is directed to transform Indonesia to a high middle class income country with a fair and sustainable development through following seven agenda : (a) Enhancing economic resilience for quality growth, (b) Strengthening regional development to address inequality among regions, (c) Enhancing human resource quality and competitiveness, (d) Building nation values and character of citizens, (e) Advancing infrastructure to support economic development and provision of basic services, (f) Enhancing the environment and resilience to natural disaster and climate change impacts, and (g) Strengthening stability in politic, law, national security and defense and public service transformation.

Indonesia is recognised its role to play in combatting global climate change in view of its extensive tropical rainforests with high biodiversity, high carbon stock values, as well as energy and mineral resources. Its geographic position in the global ocean conveyor belt (thermohaline circulation), the largest archipelagic country with total areas of 7.81 million square kilometers where marine area occupies about 74.3% of the country areas, Indonesia is vulnerable to natural disaster that will likely be exacerbated by climate change, especially in low-lying areas throughout the archipelago. Furthermore, Indonesia's position in the ring of fires with recurrent natural calamity, and in some cases at a high intensity of incidence which requires vast amount of contingency resources to manage - including for rehabilitation and reconstruction, has affected national capacity

in providing resources for climate change adaptation. Therefore, Indonesia views a comprehensive land and ocean-based climate change mitigation and adaptation efforts as a critical strategic consideration in achieving climate resilience in food, water and energy.

Indonesia has taken significant steps in land use sector to reduce emissions by instituting a moratorium of new permits and improvement of governance of primary natural forests and peatlands and by reducing deforestation and forest degradation, restoring ecosystem functions, as well as sustainable management of forest. The efforts include social forestry through active participation of the sub national governments, private sector, small and medium enterprises, civil society organisations, local communities and *adat* communities (Indonesia: Masyarakat Hukum Adat), and women – in both the planning and implementation stages. A landscape-scale and ecosystem management approach, emphasising the role of sub-national jurisdictions, is seen as critical to ensure greater and more enduring benefits from these initiatives.

The strategic approach of Indonesia's NDC is predicated on the following foundational principles:

1) Employing a landscape approach: Recognising that climate change adaptation and mitigation efforts are inherently multi-sectoral in nature, Indonesia takes an integrated, landscape-scale approach covering terrestrial, coastal and marine ecosystems.
2) Highlighting existing best practices: recognising significant strides in multi-stakeholder efforts in combating climate change, Indonesia intends to scale up the diversity of traditional wisdom as well as innovative climate change mitigation and adaptation efforts by the government, private sector, and communities.
3) Mainstreaming climate agenda into development planning: recognising the needs to integrate climate change into development and spatial planning and budgeting process, Indonesia includes key climate change indicators in formulating its development program's targets.
4) Promoting climate resilience in food, water and energy: recognising the importance of fulfilling the needs of a growing young population for food, water and energy, Indonesia will improve its management of natural resources to enhance climate resilience by protecting and restoring key terrestrial, coastal and marine ecosystems.

In line with the Paris Agreement, Indonesia respects, promotes and considers its obligation on human rights, the right to health, the right of adat communities (Indonesia: *Masyarakat Hukum Adat*), local communities, migrants, children, youth, elders, persons with different abilities, and people in vulnerable situations; as well as the right to development, including gender equality, empowerment of women and intergenerational equalities. Engagement of non-party stakeholders, such as local government, private sectors, and civil societies will continuously be enhanced.

Indonesia's Nationally Determined Contribution (NDC) outlines the country's transition to a low carbon and climate resilience future. The NDC describes the enhanced actions and the necessary enabling environment during the 2015-2019 period that has laid-the foundation for more ambitious goals beyond 2020, contributing to the concerted effort to prevent 2^{o}C increase in global average temperature and to pursue efforts to limit the temperature increase to 1.5^{o}C above pre-industrial levels.

By 2030, Indonesia envisions achieving archipelagic climate resilience as a result of comprehensive mitigation and adaptation and disaster risk reduction strategies. Indonesia has set ambitious goals for sustainability related to production and consumption of food, water, and energy. These goals will be achieved by supporting empowerment and capacity building, improved provision of basic services in health and education, technological innovation, and sustainable natural resource management, in compliance with principles of good governance. Beyond 2030 NDC target, Indonesia has committed to progress towards the transformation to *long-term low carbon and climate resilience development strategy.*

The Government of Indonesia has promulgated Presidential Regulation No. 98 year 2021 concerning the Implementation of Carbon Pricing to Achieve the Nationally Determined Contribution Target and Control Over Greenhouse Gas Emissions in the National Development. The Regulation serves as legal framework to implement NDC towards low carbon and climate resilience. It also prescribes carbon pricing, including arrangements for carbon trading, carbon levies and result based payments.

In order to achieve the 2030 NDC target and expedite the transformational changes towards low carbon and climate resilience development, Indonesia has developed a strategy for NDC implementation, consisting of nine following programs:

1. Building ownership and commitment among Ministries and other governmental Institutions, sub-national governments, private sectors, civil societies, and financial institutions (Party and Non-Party Stakeholders).
2. Capacity building to enhance capacity of institutions and human resources at all levels, covering all aspects of climate change, particularly on mitigation and adaptation actions, implementation of transparency framework, and climate finance.
3. Creating enabling environment to engage wider stakeholders in mitigation and adaptation as well as in resource mobilisation, through appropriate regulatory framework, policy and measures.
4. Developing framework and network for coordination and building synergy among sectors, regions and actors/stakeholders.
5. One GHGs-data policy to support the implementation of transparency framework at the national level.
6. Developing policies, planning and intervention program for NDC implementation, including integrating mitigation in five category sectors (forestry, energy, IPPU, waste, agriculture) and adaptation (sectoral and regions) into development planning, to secure financial support (public fund) and facilitate resource mobilisation (domestic sources and international supports).
7. Developing guidance for NDC implementation to facilitate Ministries and other governmental institutions, sub-national governments and other non-party stakeholders in implementing Program No. 6.
8. NDC implementation refers to implementation of policies, planning and intervention programs (Program No.6), taking into account guidance developed under Program No. 7.
9. Monitoring and review of NDC to track progress of NDC implementation, review of NDC and adjust the NDC whenever necessary. Inter-ministerial team has been established to monitor progress and achievement of NDC implementation.

1.2. LONG -TERM STRATEGY ON LOW CARBON AND CLIMATE RESILIENCE

As mandated by Article 4.19 of the Paris Agreement, Indonesia formulates a long-term low greenhouse gas emission development strategy (LTS) which defines pathways in achieving low emission development until 2050 and is expected to guide the implementation and development of the subsequent nationally determined contributions (NDCs). The Indonesia's LTS proposes innovative pathways towards the common goal to imperatively take ambitious actions to address climate change challenges, not only through a deeper GHG emission reduction towards net-zero emissions but also through the element of climate resilience pathway, along with the commitment of NDC.

Successful mitigation actions will reduce adaptation cost and allow Indonesia to better deal with loss and damage associated with climate change impacts. Hence, the LTS will play a central role in aligning the climate goals and targets with national, sub-national and international objectives including sustainable development goals (SDGs), engaging non-party stakeholders, enhancing opportunities for innovation, and enabling communities to earn the benefits of early actions.

The LTS will strengthen the vision of One Hundred Years Indonesia (Visi Indonesia 2045) towards prosperous Indonesia based on its four following pillars: (a) human resource development and science and technology advancement, (b) sustainable economic development, (c) equitable development, and (d) strengthening national resilience and public sector governance. "Visi Indonesia 2045" has ambitious target on poverty reduction, human resource development, economic and social transformation. Therefore, Indonesia's LTS is designed by taking into consideration the need to balance between emission reduction and economic development, and putting emission reduction, economic growth, a fair opportunity and climate resilient development as an integral part of the LTS' goal. Conducive environment for investment, structural reform to support growth, and well-designed climate policy as prerequisites for a successful LTS have been addressed during the development process of LTS.

Under the scenario compatible with 1.5 ^{0}C goals (LCCP), greenhouse gas emissions will peak in 2030 at 1.24 $GtCO_{2}$-eq of CO_{2}-eq and then decline and continue to decline to reach 0.54 $GtCO_{2}$-eq in 2050. It is expected that net zero emissions (NZE) will be achieved by 2060 or sooner.

Indonesia considers the importance of just transition of the workforce and the creation of decent work and quality jobs for an effective and inclusive transition to low greenhouse gas emission and climate resilient development. Creation of employment opportunities for this transition will be carried out in synergy with ongoing transition towards prosperous Indonesia. The following efforts will be the critical parts of the transition:

a) addressing challenges faced by sectors, cities and regions in transitioning to low carbon development and in ensuring a decent future for workers affected by the transition.
b) promoting low greenhouse gas emission and sustainable economic activities that will create quality jobs in cities and regions.

c) enhancing capacity of workforces to facilitate access to decent work and quality jobs, taking into account gender and inter-generational equalities, as well as the needs of vulnerable groups.

d) enhancing participatory public dialogue to foster high employment rates, adequate social protection, labour standards and wellbeing of workers and their communities.

On gender issues, Indonesia has an advanced policy relating to gender equality and gender balance. Mapping gender issues in climate change in all development sectors will be crucial in implementing the policy. Enhancing role of women in development and strengthening women's capacity and leadership in climate change have been initiated and will be continued as part of the NDC implementation and development of LTS.

II. MITIGATION

According to Indonesia's Second National Communication of 2010, national greenhouse gas (GHG) emissions were estimated to be 1.8 $GtCO_2$-eq in 2005. This represents an increase of 0.4 $GtCO_2$-eq compared to 2000. Most emissions (63%) are the result of land use change and peat and forest fires, with combustion of fossil fuels contributing approximately 19% of total emissions. Based on Indonesia's First Biennial Update Report (BUR) submitted to UNFCCC in January 2016, national greenhouse gas (GHG) emissions was 1.453 $GtCO_2$-eq in 2012 which represent an increase of 0.452 $GtCO_2$-eq from 2000 emissions. The main contributing sectors were LUCF including peat fires (47.8%) and energy (34.9%). The 2nd BUR reported a slight increase in emission level to 1.457 $GtCO_2$-eq in 2016, which was dominated by emissions from LUCF including peat fires (43.59%) and energy (36.91%), respectively. The 3rd BUR reported increase in emission level to 1.845 $GtCO_2$-eq in 2019, which was dominated by emissions from LUCF including peat fires (50.13%) followed by energy (34.49%), waste (6.52%) and IPPU (3.15%).

Post 2020, Indonesia envisions a progression beyond its existing commitment to emission reductions. Based on the country's emissions level assessment in Third National Communication (TNC), Indonesia has set unconditional reduction target of 29% and conditional reduction target up to 41% of the business as usual scenario by 2030. These targets in emission reduction are considered as an ambitious step, taking into consideration its development challenges in eradicating poverty, as well as creating a better quality of life for its citizens as stipulated by 1945 Indonesia Constitution. Indonesia will continue to intensify the efforts to reduce emissions, of which 97.2% comes from forest-and-land and energy sectors.

In forestry sector, Indonesia has set up an ambitious target by 2030 in peat lands restoration of 2 million ha and rehabilitation of degraded land of 12 million ha. Indonesia will continue to work on Article 5 of the Paris Agreement that sends clear political signal on the recognition of the roles of forest and REDD+, in which remains as an important component of the NDC target from land use sector. Existing COP decisions has provided sufficient guidance to implement and support REDD+ implementation. As policy approaches and positive incentives, REDD+ should be able to support the achievement of Indonesia's emission reduction target in forestry sector.

Indonesia has gradually progressed in REDD+ implementation from readiness, transition, and has entered the full implementation for some years. REDD+ National Strategy guides the implementation of REDD+ in the context of achieving NDC target and FOLU net-sink 2030, with intended users both national stakeholders as well as international partners supporting REDD+, taking into account relevant COP decisions on REDD+ (including Warsaw Framework) and the Paris Agreement. With this Strategy, it is expected that REDD+ implementation will be able to generate both national and global benefits. Furthermore, REDD+ should also be used as a vehicle to safeguard the consistency among climate-related initiatives within the sector and with other related sectors

As the guidance for both national stakeholders and international partners providing REDD+ supports, the National Strategy consists of substantive elements from historical background, vision and missions to be achieved, strategy pillars and directions for the strategy implementation. The strategy pillars which comprise of strengthening REDD+ architecture and institution, managing REDD+ implementation, paradigm shift, and

stakeholder engagement and benefit sharing, are the basis for determining directions for the strategy implementation.

The First Forest Reference Emission Level (FREL) for REDD+ was submitted to the UNFCCC Secretariat in December 2015, covering deforestation and forest degradation and peat decomposition. The FREL was set at 0.568 $GtCO_2$-eq $yr.^{-1}$ (AGB), using reference period of 1990-2012 and is used as the benchmark against actual emission starting from 2013 to 2020. These figures should be used as benchmark for evaluating REDD+ performance during the implementation period (up to 2020).The 2nd FREL was submitted in January 2022 with significant improvements in a number of elements, including reference period, scope of activities, carbon pools, emission factor and method to calculate uncertainty. Currently the 2nd FREL is under assessment process by UNFCCC.

FOLU Net Sink 2030 target (-140 $MtCO_2$ emission level) will be achieved through the following policy measures: reducing emissions from deforestation and forest degradation, increasing carbon sequestration capacity of natural forests, increasing carbon sequestration of land systems, reducing emissions from fires and peat decomposition, and law enforcement

In energy sector, Indonesia has embarked on a mixed energy use policy. Indonesia has also established the development of clean energy sources as a national policy directive. Collectively, these policies will eventually put Indonesia on the path to de-carbonisation. Government Regulation No. 79/2014 on National Energy Policy, set out the ambition to transform, by 2025 and 2050, the primary energy supply mix with shares as follows:

a) new and renewable energy at least 23% in 2025 and at least 31% in 2050;
b) oil should be less than 25% in 2025 and less than 20% in 2050;
c) coal should be minimum 30% in 2025 and minimum 25% in 2050; and
d) gas should be minimum 22% in 2025 and minimum 24% in 2050.

The Government also promulgated Presidential Regulation No. 22/2017 on National Energy Grand Plan which mandates the target of 23% New Renewable Energy (NRE) in national energy mix by 2025 and 1% reduction in energy intensity per year.

Moreover, the effort in achieving emission reduction target is also supported by the implementation of regulations on Electricity Supply Business Plan (Rencana Usaha Penyediaan Tenaga Listrik, RUPTL) that prioritizes development of NRE (Green RUPTL), implementation of minimum energy performance standards (MEPS) for appliances, as well as the development of NRE in Indonesia.

As the 14th largest economy, Indonesia is one of the pioneer countries for fossil fuel subsidy reform policy. It has succeeded in removing fossil fuel subsidies to create fiscal space for education, health, social assistance and infrastructure, including renewable energy projects and public transports.

Indonesia has stipulated a national mandatory biodiesel policy of B20 through Minister of Energy and Mineral Resources Regulation No.12 Year 2015 on Provision, Utilisation and Trading of Biofuels as Other Fuels), and enhance it to B30 in 2020 — ten-years earlier than 1st NDC target. Another direct command from President Joko Widodo to reduce the imported oil as well as to enhance domestic oil production by constructing additional oil refineries, will be a new shift for Indonesia as part of national goals on

"Visi Indonesia 2045". Moving forward, Indonesia is developing green refineries to produce various drop-in green fuels from bio-resources and partly mixed with existing fuels in order to increase biofuel content and reduce fossil fuel consumption. The Government of Indonesia has launched aggressive biofuel program, targeting 100% utilisation of biodiesel B-40 in 2030.

As part of the transformation towards sustainable energy transition, Indonesia has put into effect the Presidential Decree No 55 Year 2019 on Acceleration of the Battery Electric Vehicle Program for Road Transportation. The Presidential Regulation mandated Ministry of Industry to issue the Minister of Industry Decree No. 27 Year 2020 on Specifications, Development of Roadmaps, and Provisions to Calculate the Domestic Component Standards for Domestic Motor Vehicles Battery Electric Vehicle (BEV), in which stated that based on the roadmap, 4-wheel BEV in 2030 will be 750,000 units, while 2-wheel BEV will be 2,450,000 units.

For waste management sector, the Government of Indonesia is committed to develop a comprehensive strategy to improve policy and institutional capacity at the local level, enhance management capacity of urban waste water, reduce landfill waste by promoting the "Reduce, Reuse, Recycle" approach, and the utilisation of waste and garbage into energy production. The Government of Indonesia is committed to further reduce emissions from the waste management sector by 2020 and beyond, through comprehensive and coherent policy development, institutional strengthening, improved financial and funding mechanisms, technology innovation, and socio-cultural approaches.

Indonesia's current policy on municipal waste management has been constituted by Presidential Decree Number 97/2017 on National Policy and Strategy on Solid Waste Management, which promulgated its policies, strategies, programs, and waste reduction target by 2025, as well as under the Presidential Regulation Number 35/2018 on Acceleration of Construction of Thermal Generation Facilities for Converting Waste into Electricity Energy with Environmental Sound Technology.

The mitigation actions in industrial solid waste handling include utilisation of WWTP sludge and industrial solid waste through composting, reuse as raw material, use as energy. In industrial liquid waste handling, mitigation actions include wastewater treatment in palm oil, pulp and paper, fruits/vegetables and juices processing, and other industries and to implement methane capture and utilisation (biogas). With such actions, the previous NDC emission reduction target of 3 million ton CO_{2}-eq is enhanced up to 26 million ton CO_{2}-eq (equivalent to 1.2 million ton CH_4 recovery)

The projected BAU and both unconditional and conditional emission reduction targets are depicted in Table 1 with more elaboration for each sector in Annex 1.

III. ADAPTATION

Climate change presents significant risks for Indonesia's natural resources that will, in turn, impact the production and distribution of food, water, and energy. Therefore, the GOI considers climate adaptation and mitigation efforts as an integrated concept that is essential for building resilience in safeguarding food, water and energy resources. The GOI has made significant efforts towards developing and implementing a National Action Plan on Climate Change Adaptation which provides a framework for adaptation initiatives that has been mainstreamed into the National Development Plan.

The GOI will continue to implement enhanced actions to study and map regional vulnerabilities as the basis data for adaptation information system, and to strengthen institutional capacity and promulgation of climate change sensitive policies and regulations. Development of nationwide climate vulnerability index data information system, built on the existing system known as *SIDIK* (Vulnerability Index Data Information System), which allows public access to the information in the online system, will be strengthened. Likewise, the implementation of Ministerial Regulation No P.7/2018 on Guideline for Assessing Vulnerability, Risk and Impact of Climate Change and P.33/2016 on Guideline for Development of Adaptation Actions, which allows national and sub-national government to assess, formulate and implement their own adaptation actions, will be further enforced.

The goal of Indonesia's climate change adaptation is to reduce risks, enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change on all development sectors. This goal will be achieved through inter alia, enhanced climate literacy, local capacity strengthening, improved knowledge management, convergent policy on climate change adaptation and disaster risks reduction, and application of adaptive technology.

In achieving the adaptation goal, Indonesia focuses on three areas of resilience, namely: economic resilience, social and livelihood resilience, and ecosystem and landscape resilience. These three areas of resilience have been elaborated in the NDC Adaptation Road Map, which is operationally prioritised into several fields, namely food, water, energy, health, and ecosystems. Ideally, NDC achievement is measured in terms of reduction of potential losses of national GDP due to climate change, decrease of vulnerability, and increase of adaptive capacity and resilience. For this reason, the enabling conditions needs to be strengthened which include: policy instruments for climate change adaptation and disaster risk reduction; integration into development planning and financial mechanisms; improved climate literacy on vulnerability and risk; landscape-based approaches, such as spatial planning, investment; strengthening local capacity on best practices; improved knowledge management systems, including reporting, monitoring and evaluation; stakeholder participation; and application of adaptive technology.

Strengthening of enabling conditions is carried out based on capacity and needs referring to key programs, strategies and actions for each area of resilience have been identified and reflected in Annex 2. In order to elaborate Annex 2 for implementation, Indonesia formulated the NDC Adaptation Road Map which is used as one of references in national development planning. The National Medium-Term Development Planning (RPJMN 2020-2024) includes adaptation under the 6th development agenda (Enhancing the environment and resilience to natural disaster and climate change impacts), focusing

on water, agriculture, health, and coastal and marine ecosystem.

In general, the key programs, strategies and actions on adaptation in Annex 2 aim at:
a) reducing drivers of vulnerability to climate change impacts,
b) responding to climate change impacts and managing risks,
c) enhancing capacity of communities and sustainability of ecosystem services,
d) enhancing engagement of stakeholders at all levels in building climate resilience.

The key programs and strategy to achieve adaptation goals in NDC are elaborated into actions which contain a high national dimension, have strong linkages with international conventions/agreements, including Rio Conventions, which open opportunity for Indonesia to build synergy between the implementation of the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC) and these conventions/ agreements.

Referring to Article 7 of the Paris Agreement, the Global Goal on Adaptation (GGA) of enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal. Indonesia has developed SIDIK (Vulnerability Index Data Information System) as a tool for adaptation planning processes. SIDIK helps integrate climate change adaptation into development planning so that it is oriented towards increasing adaptive capacity and resilience, and reducing vulnerability.

SIDIK shows two of the three elements of the GGA, namely adaptive capacity and level of vulnerability. It is used as one of the considerations in strengthening climate resilience. SIDIK provides information on vulnerability based-on administrative areas as input in determining appropriate adaptation policies, programs and activities (adequate adaptation responses).

Indonesia translates the mandate of the Paris Agreement and Glasgow Climate Pact related to non-party stakeholders' engagement into the national context through joint adaptation mitigation program through the implementation of the Climate Village Programme (Program Kampung Iklim or ProKlim). In the adaptation context, ProKlim has been able to assess adaptation through three aspects consisting of determining adaptation needs, measuring adaptation implementation process, and assessing effectiveness of adaptation. With 3,270 locations of established ProKlim in 2021, Indonesia is targeting to achieve 20,000 ProKlim locations in 2024.

ProKlim was launched in 2012 and has been transformed into a national movement since 2016. The program encourages and facilitate active participation of multi-stakeholders, collaboration and partnership among governments, local communities, local businesses, NGOs, private companies, academia and financial institutions to increase community resilience and reduce GHG emissions.

Indonesia commitment under Convention on Biological Diversity (CBD), Convention to Combat Land Degradation and Desertification (UNCCD), RAMSAR convention, and Sendai Framework on Disaster Risk Reduction (SFDRR), as well as the 2030 Agenda of Sustainable Development Goals (SDGs) were considered to have significant potential for synergy with NDC - adaptation. For example:

a) increasing conservation areas under CBD commitment has a strong linkage with adaptation efforts particularly in achieving ecosystem and landscape resilience which will affect positively to economic resilience and social and livelihood resilience.

b) implementation of UNCCD 2018-2030 Strategic Framework that by 2030 combat desertification, restore degraded land and soil including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world and other interrelated SDGs, are closely linked with adaptation efforts in achieving social and livelihood, and positively affect economic resilience and ecosystem and landscape resilience.
c) RAMSAR convention has a strong connection with adaptation in terms of conserving and managing wetland as well as addressing the drivers of wetland loss and degradation.
d) implementation of SFDRR has strong synergy with adaptation efforts in reduction of risks and loss caused by natural disasters, through enhanced climate literacy, risks management, and disaster preparedness.
e) As the 13th goal of SDGs, implementation of climate change convention (from UNFCCC to the Paris Agreement) address all aspects of the SDGs.

IV. INFORMATION TO FACILITATE CLARITY, TRANSPARENCY AND UNDERSTANDING

4.1. QUANTIFIABLE INFORMATION ON THE REFERENCE POINT AND TIME FRAMES AND / OR PERIODS FOR IMPLEMENTATION

(a) Unconditional Reduction	Indonesia in its 1st NDC committed to reduce unconditionally 29% of its greenhouse gasses emissions against the business as usual scenario by the year of 2030. The BAU scenario was projected approximately 2.869 $GtCO_2$-eq in 2030 which was updated from the BAU scenario on the INDC along with energy policy development particularly in coal fired power plant. The Enhanced NDC increases unconditional emission reduction target of 31.89%, compared to 29% in the 1st NDC. The commitment will be implemented through effective land use and spatial planning, sustainable forest management which include social forestry program, restoring functions of degraded ecosystems including wetland ecosystems, improved agriculture productivity, energy conservation and the promotion of clean and renewable energy sources, and improved waste management.
(b) Conditional Reduction	Indonesia can increase its contribution up to 43.20% reduction of emissions in 2030 conditionally, compared to 41% in the 1st NDC, subject to availability of international support for finance, technology transfer and development and capacity building.

4.2 . SCOPE AND COVERAGE

Type	Emission reduction relative to Business As Usual (BAU) baseline.
Baseline	BAU scenarios of emission projection started in 2010.
Scope	Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O)
Coverage	Nationwide with a landscape and ecosystem management approaches in both adaptation and mitigation efforts by building and strengthening sub-national jurisdictional capacity

4.3 . PLANNING PROCESSES

The Government of Indonesia has demonstrated its strong commitment to institutional development by establishing the Directorate General of Climate Change, under the Ministry of Environment and Forestry. Established by Presidential Regulation No. 16 of 2015, the Directorate General serves as the National Focal Point for the United Nations Framework Convention on Climate Change to effectively facilitate ongoing relevant programs and processes being implemented by variety of government sectors and stakeholders. Since climate change has local to national and international dimensions, coordination and synergy will continuously be enhanced among the Ministry of Environment and Forestry, National Development Planning Agency (BAPPENAS) and Ministry of Finance in the context of climate change, national development and finance, Ministry of Foreign Affairs in the context of climate change and international negotiation, and Ministry of Home Affairs in the context of NDC implementation by sub national.

In the preparation of the Enhanced NDC, the GOI has conducted consultations with various stakeholders representing Ministries and other government institutions, academia, scientists, private sector, and civil society organisations; these consultations have included workshops and consultations organised at both the national and provincial levels, as well as bilateral meetings with key sectors.

The preparation of the NDC has taken into account the Sustainable Development Goals (SDGs) particularly on taking urgent action to combat climate change and its impacts, promoting food security and sustainable agriculture, achieving gender equality, ensuring the availability and sustainable management of water, access to affordable, reliable, and renewable energy for all, sustained, inclusive and sustainable economic growth, resilient infrastructure, sustainable consumption and production patterns, conservation and sustainable use of the oceans, seas and marine resources, and protecting, restoring and promoting sustainable forest management and sustainable use of terrestrial ecosystems, promoting land degradation neutrality, as well as protection conservation and sustainable use of biodiversity).

4.4. ASSUMPTIONS AND METHODOLOGICAL APPROACHES

Metric Applied	Global Warming Potential (GWP) on a 100-year timescale in accordance with the IPCC's 2nd Assessment Report.
Methodology for Estimating Emissions	Model for estimating emission: ▪ Dashboard AFOLU for land-based sector; ▪ ExSS (*Extended Snapshot*) using GAMS (*General Algebraic Modelling System*) and CGE (Dynamic CGE) for energy sector; ▪ Mitigation Action Road Map for Cement Industry (Ministry of Industry) for IPPU sector; ▪ *First Order Decay*-FOD (IPCC-2006) and existing regulation for waste sector.
Coverage of Emission Reduction	With the baseline and assumption used for projection and policy scenario 2020-2030, the projected BAU and emission reduction for both unconditional (CM1) and conditional (CM2) reduction are as in the Table 1 with more elaborated assumptions for each sector can be seen in the Annex 1.

Table 1. Projected BAU and emission reduction from each sector category

Sector	GHG Emission Level 2010* (MTon CO_2-eq)	GHG Emission Level 2030			GHG Emission Reduction				Annual Average Growth BAU (2010-2030)	Average Growth 2000-2012
		MTon CO_2-eq			MTon CO_2-eq		% of Total BaU			
		BaU	CM1	CM2	CM1	CM2	CM1	CM2		
1. Energy*	453.2	1,669	1,311	1,223	358	446	12.5%	15.5%	6.7%	4.50%
2. Waste	88	296	256	253	40	43.5	1.4%	1.5%	6.3%	4.00%
3. IPPU	36	69.6	63	61	7	9	0.2%	0.3%	3.4%	0.10%
4. Agriculture	110.5	119.66	110	108	10	12	0.3%	0.4%	0.4%	1.30%
5. Forestry and Other Land Uses (FOLU)**	647	714	214	-15	500	729	17.4%	25.4%	0.5%	2.70%
TOTAL	**1,334**	**2,869**	**1,953**	**1,632**	**915**	**1,240**	**31.89%**	**43.20%**	**3.9%**	**3.20%**

Notes: **CM1**= Counter Measure 1 (*unconditional mitigation scenario*)
CM2= Counter Measure 2 (*conditional mitigation scenario*)

*) Including fugitive.
**) Including emission from estate and timber plantations.

4.5. FAIR AND AMBITIOUS IN THE LIGHT OF NATIONAL CIRCUMSTANCES

Indonesia GDP growth rate has slowed down between 2010-2015, from 6.2-6.5% per annum to only 4.0% (first quarter 2015). Indonesia's population has increased at an average rate of 1.49% during the period of 2000-2010, posing challenges for Indonesia in fulfilling energy demand, ensuring food security, and fulfilling livelihood needs. At the same time, poverty alleviation remains a challenge for Indonesia, with 10.96% of the population living in poverty in 2014, and the unemployment rate at 5.9%.

The above data was used as a basis in setting up the Indonesia's target for reducing greenhouse gas emission under the unconditional- and conditional-scenarios (CM1- and CM2-scenarios).

There has been an increase on average growth rate of GDP during period of 2015-2019 of 5.03% compared to 4.0% at the first quarter 2015, with the highest growth rate of 5.17% in 2018 and the lowest one of 4.88% in 2015. The 2019 GDP growth rate was also high (5.02%) although slightly lower than the growth rate in 2018. However, the COVID-19 pandemic which has brought about global crisis not only on health, but also on social and economic aspects, has negatively affected Indonesia's economy. During the COVID-19 pandemic, Indonesia has experienced economic contraction with GDP growth rate of minus 5.3% at the second quarter 2020. During COVID-19 pandemic, the anthropogenic activities were in general lower than that in previous years, resulting in lower GHG emission levels in 2020 and 2021. In the coming years the Indonesia will recover its economic growth. It is projected that in the near term between 2022-2030, its economic growth will be around 5%-6%; for the longer term the growth will be slightly decrease to 5% in 2030-2050 and 4% in 2050-2060.

Despite current progress in development and challenges, particularly caused by the COVID-19 pandemic, Indonesia is committed to transform its current development pathway towards low carbon and climate resilience in a phased-approach. The pathway towards decarbonisation of the economy has been integrated into Indonesia's long-term low greenhouse gas emission and climate resilient development strategy.

4.6. INDONESIA'S NDC CONTRIBUTES TOWARDS ACHIEVING THE OBJECTIVE OF THE CONVENTION AS SET OUT IN ITS ARTICLE 2

The Indonesia's NDC will contributes towards achieving the objective of the United Nations Framework Convention on Climate Change as set out in its Article 2 through its climate change related policies by reducing greenhouse gas emission and enhancing climate resilience which will lead to sustainable economic development.

Climate change policies will align with sustainable economic development through reduced GHGs emission and enhanced climate resilience. Sustainable economic development needs conducive environment for investment, fair international trade, and industrial-based economic growth. Climate change policies requires low carbon and climate resilient development, supported by domestic and international resources.

Indonesia has worked on finding the peaking time of national GHGs emissions necessary to meet the national sustainable development objectives while contributing to the global efforts to fight against the dangerous impacts of climate change by limiting temperature increase to 2ºC and pursuing the limitation to 1.5ºC. Through low carbon scenario compatible with the Paris Agreement target (LCCP), Indonesia foresees to reach the peaking of GHGs emissions with net sink in forestry and land uses (FOLU) in 2030, and to progress towards net-zero emission by 2060 or sooner.

V. NATIONAL REGISTRY SYSTEM AS THE BACKBONE OF TRANSPARENCY FRAMEWORK

As part of the implementation of Article 13 of the Paris Agreement, Indonesia applies an Integrated National Transparency framework, through: (a) National Registry System (Id. *Sistem Registry Nasional*/SRN) for mitigation, adaptation and means of implementation both from national and international sources; (b) National GHGs Inventory System (SIGN-SMART); (c) MRV system for mitigation including REDD+, (d) Safeguards Information System for REDD+ (SIS-REDD+); and (e) Information Systems on Vulnerability (SIDIK) and joint adaptation and mitigation at the Village level (ProKlim).

The National Registry System (SRN) was established in 2016 as a web-based system for managing data and information on mitigation, adaptation, carbon economic value and means of implementation (finance, capacity building, and technology transfer and development). Public access through website allows stakeholders to obtain data and information on mitigation, adaptation, and means of implementation registered in the system.

In general SRN has the following functions:

a) registration of mitigation and adaptation actions, achievement and resources to support actions (finance, capacity, technology);

b) provision of information for awarding government recognition to mitigation and adaptation contribution of various actors;

c) provision of public access to data and information on actions and resources;

d) data base management to support policy analysis and formulation; and

e) carbon registry to support the implementation of Presidential Regulation No 98 year 2021.

f) avoiding double counting of mitigation achievement and safeguarding carbon transfer.

Indonesia recognizes the need to improve the National Registry System (NRS/SRN) over time to enable the system optimally functioning to support climate change actions, resource mobilisation and the implementation of carbon economic value. Hence, Indonesia will use domestic funding and mobilize international funding sources, including opportunities under capacity building initiatives for transparency framework mandated by Decision 1/CP. 21 and the Paris Agreement.

As part of implementation strategy of NDC mandated by Presidential Regulation No. 98 year 2021, Indonesia is pursuing 'One GHGs Data Policy'. The SRN will play a strategic role in the implementation of this policy as well as other strategies. Therefore, SRN will be further enhanced, taking into account outcomes of the review of SRN design, experience and lessons drawn from operationalisation of SRN, and international development in transparency framework.

VI. MEANS OF IMPLEMENTATION

Article 3 of the Paris Agreement stated that as nationally determined contributions to the global response to climate change, all Parties are to undertake and communicate ambitious efforts as defined in Articles 4, 7, 9, 10, 11 and 13 with the view to achieving the purpose of this Agreement as set out in Article 2. The efforts of all Parties will represent a progression over time, while recognising the need to support developing country Parties for the effective implementation of this Agreement.

Article 9, 10 and 11 of the Paris Agreement specifically refers to Means of Implementation. The key elements of the Means of Implementation -- finance, technology development and transfer, and capacity building -- are integral part of the Agreement. To enhance the effectiveness and efficiency of means of implementation, finance, technology and capacity building should be coherently provided through cooperative and coordinated linkages among relevant entities.

6.1 . FINANCE

Consistent with Article 9 of the Paris Agreement, developed country parties are requested to provide financial resources to assist mitigation and adaptation in developing countries, and taking the lead in mobilising climate finance from a variety of sources, instruments and channels.

Indonesia's unconditional and conditional commitment in achieving quantified target of GHGs emission reduction reflects the need for domestic and international sources of finance.

National Development Planning Agency (BAPPENAS) reported that for the period of 2015 to 2019, Indonesia provides funding for the implementation of climate change actions and plans, including allocating a total of USD 55.01 billion. Indonesia will continue to set aside significant national funding for the implementation of mitigation and adaptation actions for the period of 2020-2030.

Indonesia also receives international support through multilateral channels (such as GEF, World Bank, GCF, Adaptation Fund, and other financial institutions) and bilateral channels (Norway, Germany, Japan, USA, and others). During the reporting period of 2015-2016, Indonesia recorded to have received support of USD 1,237.41million in the form of loan and grant through bilateral and multilateral channels.

Considerable challenge has been encountered in estimating investment needs for climate mitigation and adaptation. Budget tagging for climate change as the first attempt to address the challenge has been carried out since 2015. The first budget tagging focusing on mitigation was done to 2015 state budget, by clustering activities into two categories: first category includes activities which could deliver emission reduction and the second category covered supporting activities.

The Ministry of Finance recorded in its Climate Mitigation and Adaptation Budget Report (Laporan Anggaran Mitigasi dan Adaptasi Perubahan Iklim 2018-2020) that there has been an increase in amount of budget allocation for activities categorised as mitigation from IDR 146.8 trillion (~ USD 10.49 billion) in 2017 to IDR196.3 trillion (~ USD 14.02 billion) in 2018. On adaptation, the Ministry of Finance recorded USD 227.4 million budget

allocation, based on budget tagging for adaptation in 2018. Results of the budget tagging has helped government in identifying activities in annual budget which can deliver mitigation and adaptation results. However, a lot of improvements need to be done to enable the budget tagging results to be used as the basis for estimating finance needs for NDC implementation.

Furthermore, Indonesia welcomes bilateral, regional and international cooperation in the NDC implementation as recognised under Article 6 of the Paris Agreement, that facilitate and expedite technology development and transfer, payment for performance, technical cooperation, and access to financial resources to support Indonesia's climate mitigation and adaptation efforts towards a climate resilient future.

Projection of needs as a basis for developing financing strategy for the whole period of NDC implementation remains challenging. For example, Indonesia communicated through its 2nd Biennial Update Report (2nd BUR - 2018) an initial estimated finance needs from 2018-2030 of about USD 247 billion. In 2019, Indonesia carried out another estimation of finance needs of about IDR 4,520 trillion (~ USD 322.86 billion) for the implementation of mitigation actions in the NDC roadmap. The later estimated finance needs covered only mitigation actions (actions which directly generate emission reduction, it has not included the costs for creating enabling environments). The 3rd BUR (2021) estimated financial needs for conditional target from 2018-2030 about USD 285 billion and for unconditional target about USD 281 billion.

Constrains has also been faced in estimating support needs, in particular in relation to methodological approach used to assess finance needs for mitigation and adaptation, data availability and reliability, and diverse perceptions of stakeholders on NDC financing.

Despite challenges faced in projecting finance needs for NDC implementation, Indonesia has developed a number of innovative green financing, which may contribute positively to NDC implementation, for example, green sukuk, green bond, and public-private partnership through SDGs-One Indonesia Platform.

In order to strengthen climate financing, Indonesia has established Indonesia Environmental Fund Management Agency (IEF/BPDLH). BPDLH is mandated to manage and mobilize finance for environment and allowed to mobilize climate finance from various sources both national and international sources, private and public sources, bilateral and multilateral channels. Since its establishment in October 2019, BPDLH has managed reforestation fund from domestic sources about/of USD 143.86 million (forest levy paid by private sectors) and initiated REDD+ result-based payment of USD 103 million and energy sector of USD 1.76 million from international sources.

6.2 . TECHNOLOGY DEVELOPMENT AND TRANSFER

Indonesia acknowledges the central role of science, innovation, and technology in tackling climate change. Together with human resource development, science and technology advancement has been set as one of the four pillars of "Visi Indonesia 2045". Climate technology development will be aligned with this vision and guided by Law on National System for Science and Technology (Law No. 11/2019).

Article 10 of the Paris Agreement recognizes the importance of technology for the implementation of mitigation and adaptation, and the needs of developing country for support, including for strengthening cooperation on technology development and transfer at different stages of the technology cycle.

Needs Assessment is an integral part of technology development and transfer. Indonesia embarked on First Technology Needs Assessment (TNA) in 2010 focusing on mitigation, then followed by the 2nd TNA in 2012 covering both mitigation and adaptation. The outcomes of ongoing TNA that has been carried out since 2019 will provide guidance for technology development and transfer to support NDC implementation.

The role of endogenous technology, local wisdom and best practices will continue to be strengthened. Indonesia also calls for international support and collaboration in research, development and demonstration (RD & D) of innovative technologies. International support on technology development and transfer will also be directed to address possible risks of the selected technology and constraints in the implementation process of technology transfer and collaboration.

6.3 . CAPACITY BUILDING

Capacity building on climate change has been carried out for many years by government institutions, international organisations, NGOs, and private sectors. Nevertheless, collecting data and information on the areas of capacity building and its progress, experiences and lessons remains challenging, and that gaps and overlaps in capacity building activities have been unavoidable. The main challenges in capacity building, include:

a) diversity in regional circumstances, progress in development, culture and literacy which need considerable process both in tailoring program and approach in implementation,
b) Insufficient coordination among capacity building programs and activities, including the ones with international supports.
c) Inconsistency of data and information on capacity building programs and implementation, and that difficult to draw experiences and lessons as well as gaps and overlaps.

Capacity building program on climate change will be aligned with Indonesia vision on education which will focus on: (a) human resources development to build strong character, (b) regulatory reform to increase effectiveness and efficiency of capacity building programs and activities, (c) Increase investment in human resource development, including revitalisation of vocational education, (d) creation of employment and business opportunities, and (e) use of technology to increase efficiency in capacity building.

Capacity building program and activities on climate change is one among a number of approaches to address just transition and decent work issues in mitigation and adaptation, including gender and inter-generational needs as well as the needs of vulnerable groups. A preliminary assessment on capacity building needs was done in 2018-2019 as part of national capacity building and technology needs assessment (CBTNA), which can be enhanced as part of the capacity building road map.

Two interrelated instruments of capacity building will be used to support NDC implementation. The first instrument (General Instrument) will focus on integrating climate change into the national system on education, training, and other forms of capacity building, while the second instrument (Technical Instrument) will focus on capacity building programs for various actors in mitigation and adaptation.

The General Instrument covers, inter alia, the following efforts:

a) Increase public awareness through outreach and campaign.
b) Improve provision of information accessible for public with different level of knowledge on climate change.
c) Enhance stakeholder engagement in climate policy formulation and actions.
d) Enhance collaboration and network at the local, national and international levels.

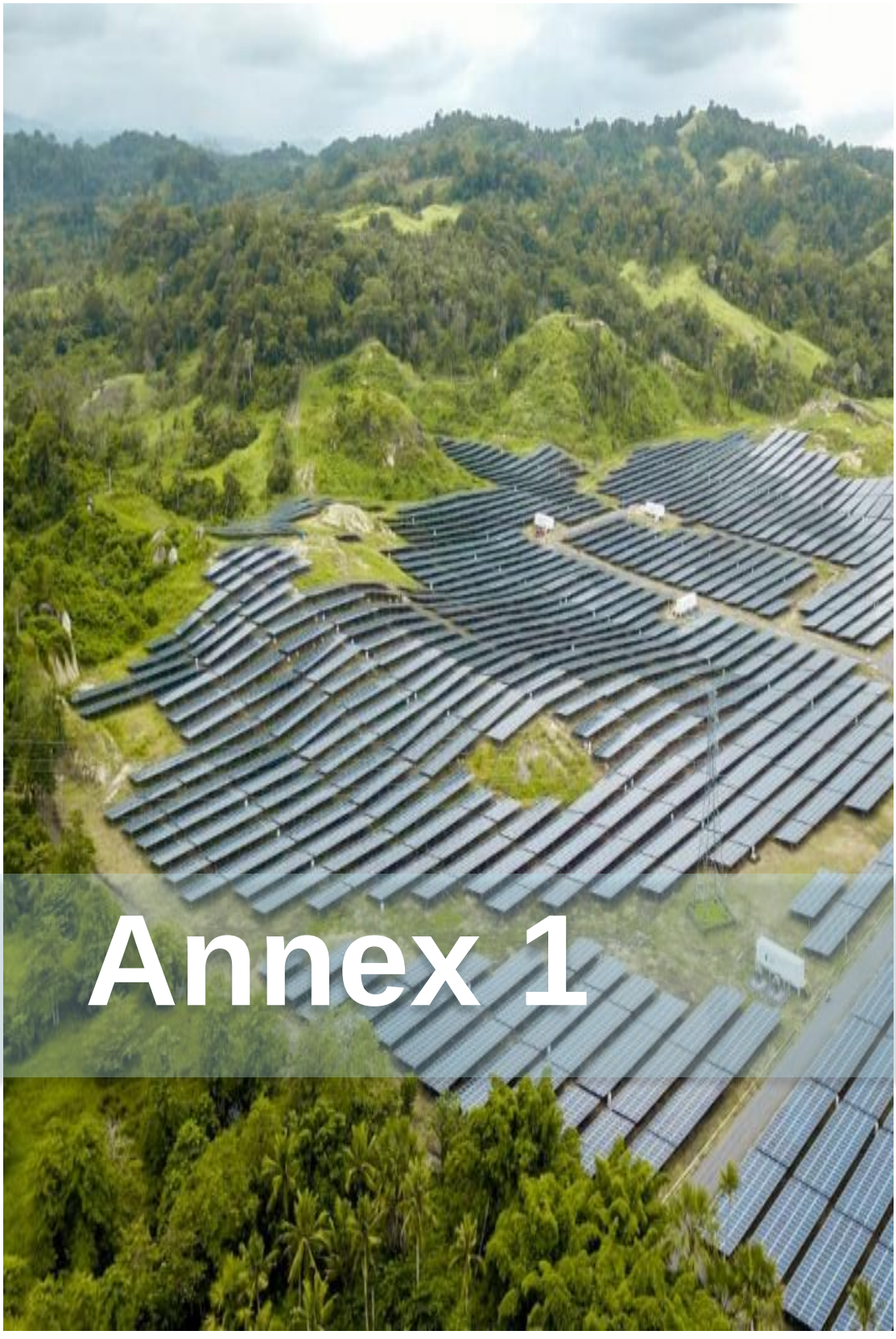
The Technical Instrument specifically deals with capacity building programs for both institutions carrying out capacity building on climate change and actors (state and non-state) implementing climate change mitigation and adaptation. Depending on the target groups of capacity building, the program aims at capacity enhancement at least in planning and implementation of mitigation and adaptation including climate financing strategy, access to finance and technology, GHGs inventory, and MRV of actions and supports or in a broader scope for the implementation of the transparency framework mandated by Article 13 of the Paris Agreement.

Article 11 of the Paris Agreement encourages collaboration in capacity enhancement of developing country in implementing the agreement, with developed country parties provides support for the capacity building. The Paris Agreement and its relevant decisions also emphasize the needs of developing country for capacity building in implementing transparency framework. Indonesia will use domestic resources and mobilize international support to enhance its capacity to support NDC implementation, including for further development of national system on transparency framework and to progress with transformational changes in capacity building.

Indonesia has received support to strengthen institutional capacity to comply with transparency requirement of the Paris Agreement. The support covers 3 following areas: institutional capacity strengthening for climate transparency, development of robust systems for GHG inventory, MRV of GHG emission reduction, and strengthened NDC implementation and tracking progress.

VII. REVIEW AND ADJUSTMENT

The NDC reflects the most recent data and information, analysis, and scenario for possible future, by the Government of Indonesia. As a developing country, Indonesia will likely experience dynamic changes due to national and global economic changes. In this regard, the NDC will be reviewed and adjusted, as necessary, considering national circumstances, capacity and capability, and the provision under the Paris Agreement.



Annex 1

Annex 1

Enhanced Nationally Determined Contribution (NDC)
Republic of Indonesia
MITIGATION
Assumptions used for projected BAU and emission reduction
(unconditional/CM1 and conditional/CM2 reduction)
for all sector categories (Energy, Waste, IPPU, Agriculture, and FOLU)

SECTOR: ENERGY				
No.	Mitigation Actions	2030		
		BaU	CM1	CM2
1	**Renewable Energy (RE)**			
	- Additional RE in Power according to RUPTL	no additional RE PP since 2010	Installed RE 20,923 MW	Similar actions with CM1 but with further enhanced/ expanded utilisation of RE
	- Solar rooftop, PV *Wilus and Hydro *Wilus, Off grid RE	no solar roof top program	Installed RE 15,483 MW	
	- Biofuel	400,000 KL FAME in B-10	18 million KL FAME in B-40	
	- Cofiring	no-cofiring program	Biomass utilisation 9 Mton	
	- Direct Utilisation of Biomass and Biogas for off-grid power generation	no-direct utilisation program	333,776 BOE	
2	**Energy Efficiency**			
	- Enhanced Energy Management Mandatory	Oil fuel saving in 2010 will remain constant until 2030	oil fuel saving 71 million BOE	Similar actions with CM1 but with further enhanced/ expanded mitigation in energy efficiency measures
	- Energy Efficiency Improvement of Equipment	no EE improvement program	electricity saving 15,187 GWh	
	- Electric Vehicle (EV)	no EV Program	15,197,000 units	
	- Street lighting with efficient lamp	no EE program for street lighting	energy saving 1,31 million BOE	
	- Induction Electric Stove	no induction electric stove program	18,170,000 units	
3	**Low Carbon Emitting Fuels**			
	- Oil Fuel Switching (from RON 88 to Higher RON)	No Oil Fuel Switching Program since 2010	4,050,000 KL	Similar actions with CM1, with further enhanced/ expanded mitigation through use of low carbon emitting fuels
	- Kerosene to LPG Conversion	Kerosene Use in 2010	8,247,000 Ton	
	- CNG for public transport	No additional CNG for public transport program since 2010	1,029 MMSCFD	
	- Gas Pipeline Network Expansion	No Additional Expansion Program Since 2010	10 million connections	
4	**Clean Coal Technology and Gas Power Plant**	No Additional Clean Coal Technology and Gas Power Plant Since 2010	27,487 MW	Further enhanced/ expanded clean coal and gas power plant
5	**Post Mine Reclamation**	No Additional Post Mine Reclamation Since 2010	81,069 Ha	Further expansion of post mine reclamation

Note: *Wilus = electricity business region

Notes:

1. Energy Efficiency:
   Energy efficiency measures to be carried out by all energy consuming sectors (industry, commercial, transport, residential) through improvement of device efficiency and energy system efficiency including implementation of electric vehicle and its ecosystem.
2. Implementation of clean coal technologies in power plants:
   Clean coal technologies such as supercritical and ultra-supercritical coal-fired power plants and other technologies that will be implemented after they are commercially available.
3. Renewable energy in electricity production:
   Renewable power plants to be developed includes geothermal, hydropower, solar PV, wind turbine, biomass, and biofuel. Solar rooftop in residential, commercial and industry sectors
4. Implementation of biofuel in transportation sector:
   The main feedstock for the biofuel production will be palm oil.
5. Additional gas distribution lines (Gas pipeline for residential and commercial sectors):
   Construction of additional natural gas pipeline is intended to substitute the use of kerosene for cooking in residential and commercial sectors.
6. Compressed Natural Gas consumption (CNG fueling station):
   CNG consumption is intended to increase gas consumption in transportation sector

SECTOR : A G R I C U L T U R E			
	BAU	CM1	CM2
1. The use of low-emission crops.	No mitigation actions.	Total use of land for low emission crops up to 902,000 hectares in 2030*.	Total use of land for low emission crops up to 932,000 hectares in 2030*.
2. Implementation of water-efficient concept in water management.	No mitigation actions.	Implementation of water efficiency up to 2,583,000 hectares in 2030*.	Implementation of water efficiency up to 3,376,000 hectares in 2030*.
3. Organic fertilizers	No mitigation actions	Application of organic fertilizer up to 1,287,000 ton in 2030**	Application of organic fertilizer up to 1,368,000 ton in 2030**
4. Manure management for biogas.	No mitigation actions.	Manure used for biogas will come from 166,000 cattle in 2030***.	Manure used for biogas will come from 249,000 cattle in 2030***
5. Feed supplement for cattle.	No mitigation actions.	Up to 6,942.000 of ruminants in 2030 will be supplied by feed supplement****	Up to 8,075.000 of ruminants in 2030 will be supplied by feed supplement****

Note:

* The use of best available technology will increase crop productivity and lead to the decrease of land use change for agricultural purposes.

** The application of synthetic nitrogen fertilizer will reduce by 0.15 ton for every one-ton organic fertilizer

*** With assumption that government's subsidy will continue taking into consideration its high cost of investment).

**** For CM1, it is about 27.4% of big ruminant population and 20% of small ruminant population and for CM2 it is about 37.4% of big ruminant population and 20% 20% of small ruminant population.

A. The index for paddy in and outside Java in 2030 will reach 2.2 and 1.7 respectively. It is assumed that most of paddy fields outside Java Island has been facilitated with irrigation system, while in Java most of irrigation system is working optimally (currently only 60-70% working optimally).
B. Assumption used for crop index: for seasonal crop, the cropping Intensity or crop index is a ratio between the area of harvesting and the area of crop planted. Hence, the IP is 2 when the areas biannual planting cycle. For perennial crop, the crop index refers to crop fraction that harvestable (under productive ages).
C. Assumption used for population/GDP and livestock: all projection scenarios for GDP employ the same livestock population. The set target for self-supporting meat is difficult to reach, and even the demand for meat would not be easily met. The livestock population growth follows historical data, which is lower than the rate of the meat demands.

SECTOR: FORESTRY AND OTHER LAND USES (FOLU)

A. Deforestation rate

- Deforestation rate under BAU scenario for 2013-2020 is in line with the 1st FREL for REDD+, which is about 0.920 million ha/year, and consist of planned and unplanned deforestation. The rate for planned deforestation was calculated under existing development scenario.
- For both CM1 and CM2 scenarios, it is assumed that the rate of unplanned deforestation is low and the total of planned and unplanned deforestation would not exceed 0.450 million ha.
- Rate of deforestation for BAU 2021-2030 assumed to be 0.820 million ha/year, with scenario of CM1 comes into 0.359 and 0.175 for CM2 million ha, respectively.

	BAU	CM1	CM2	Note
Total (000 ha)	2013-'20: 920 2020-'30: 820	2013-'20: 459 2020-'30: 359	2013-'20: 300 2020-'30: 175	The total rates of deforestation are inputs and unplanned deforestation is calculated as (Total Deforestation-Planned Deforestation)
1. Unplanned Deforestation	2013-'20: 387 2020-'30: 235	2013-'20: 209 2020-'30: 146	2013-'20: 68 2021-'30: 57	
2. Planned Deforestation (from the model)	2011-'30: result from model	2011-'30: result from model	2011-'30: result from model	

Forest Degradation

Avoiding degradation of natural forest through controlling the illegal logging and increasing the production of timber plantation by accelerating the establishment of timber plantation and productivity.

Assumption for wood production:

1. Some literatures recorded that the rate of wood extraction from sustainable natural forest ranges from 20 to 35 m^3/ha. This work took an assumption of 50 m3ha for wood extraction in 2010 (the difference between literature and assumption taken is from illegal logging. Rate of sustainable extraction is assumed to be 30 m^3/ha
2. Target for wood production from natural forest under CM1 and CM2 scenarios follow Long-Term National Forestry Planning (*Rencana Kehutanan Tingkat Nasional*/RKTN) (MoF, 2011), while the BAU is higher, using data from the Association for Indonesian Forest Concessionaire (APHI).
3. The rate for establishing industrial forest plantation under BAU follows the historical data, with the percentage of feasible areas for planting is about 63% (Assumption from APHI, 2007)
4. It is assumed that all forests cleared would leave zero waste, and all woods from these areas would be useable.
5. Utilisation of wood from oil palm and rubber trees at the end of its cycle is at medium rate or about a half of the total production.

Assumption for annual growth rate of natural forest:

1. Annual growth rate of plants in ton C/ha/year for natural forest was calculated based on the diameter growth in m3/ha/year with conversion factor of:
   a. Biomass Expansion Factor (BEF): 1.4
   b. Wood density for natural forest: 0.7 t/m^3

2. The estimated annual growth rate of natural forest based on the above assumption is 0.3 tC/ha/year to 0.33, representing the BAU rate. Under the CM1 and CM2, the rate is increased to 0.52 tC/ha/year and 0.98 tC/ha respectively.

3. The estimated growth rate for natural forest is lower than other published articles and also IPCC default ranged from 1 tC/ha/year and 3.5 tC/ha/year for logged forest >20 years and <20 years respectively. By adjusting or increasing the growth rate of natural forest through enrichment planting, capacity of Indonesian forest in sequestering carbon will increase significantly, thereby increasing emission reduction.

B. Land Rehabilitation (afforestation/reforestation/timber plantation)

1. Increasing carbon sequestration in CM1 and CM2 from the BAU is conducted by increasing land rehabilitation program (afforestation and reforestation) and accelerating the establishment of timber plantation in unproductive lands (about 11.5 million ha in total)
2. The annual planting rate of timber plantation in CM1 and CM2 will reach 320 thousand ha per year (in total 6.4 million ha by 2030)
3. The annual planting rate for land rehabilitation will reach 280 thousand hectare per year (in total 5.6 million ha by 2030)

Assumption for growth rate of timber plantation:

1. The rate of Industrial Plantation Forest (HTI) in ton C/ha/year was calculated based on data of measurable wood production volume in m3/ha, with BAU, CM1 and CM 2 in 2010 about 120 m3/ha and has been increased respectively to 134, 140 and 144 m^3/ha in 2030 with the role of technology intervention. The intensification is in every 10 year and correction factors are as follows:
    a. BEF: 1.67 (IPCC Default)
    b. Wood density for HTI: 0.4 t/m^3
2. Rotation of six years and survival rate of more than 85%.

C. Peat water management

Improvement of water management in peatland, i.e. by increasing water level up to 50 cm from the surface will reduce the decomposition of the peatland, The implementation of improved water management are in palm oil and timber plantation. It is targeted that in 2030 its implementation in palm oil plantation under CM1 and CM2 will reach 892,000 ha respectively while in timber plantation it will reach 329,000 ha and 548,000 ha respectively.

D. Peatland Restoration

Reducing emission from degraded peatland are carried out through rewetting and revegetation (peatland restoration). Under the BAU, it is assumed no restoration activities. Under CM1 and CM2, peat restoration will reach 2 million ha by 2030.

Assumption for peatland restoration

Rate of peat decomposition is assumed to be zero in the restored peatland as the peat condition will be the same as/closed to natural condition. Successful rate of peatland restoration is assumed to be 90% for both CM1 and CM2.

SECTOR : WASTE

SUB-SECTOR: DOMESTIC SOLID WASTE			
	BAU	**CM1**	**CM2**
1. LFG recovery and utilisation	No LFG Recovery	The implementation of Landfill Gas (LFG) recovery which is supported with the rehabilitation of an open dumping TPA into a sanitary landfill and equipped with methane gas utilisation. 1.5 million ton CO_2-eq reduction comes from LFG utilisation for >5,900 household and >45 MW LFG power.	**The application of Landfill Gas (LFG) recovery which is supported with the rehabilitation of an open dumping TPA into a sanitary landfill and equipped with methane gas utilisation.** **1.5 million ton CO_2-eq reduction comes from LFG utilisation for >5,900 household and >45 MW LFG power.**
2. Waste utilisation by composting and 3R (paper).	No additional activities or enforcement on composting and 3R	Treatment of waste by composting 3.7 million ton MSW and 3R paper to reuse/recycle paper up to 3.7 million ton. The facilities include: - Waste bank 762 unit - TPST 2857 unit (1469 unit is integrated with composting) - TPS3R 3018 (1703 unit is integrated with composting) The target is to eliminate 4.8 million ton CO_2-eq	**Treatment of waste by composting 3.7 million ton MSW and 3R paper to reuse/recycle paper up to 3.7 million ton.** **The facilities include:** - **Waste bank 762 unit** - **TPST 2857 unit (1469 unit is integrated with composting)** - **TPS3R 3018 (1703 unit is integrated with composting)** **The target is to eliminate 4.8 million ton CO_2-eq**
3. PLTSa/RDF (Refuse Derived Fuel) implementation **Note: PLTSa = Pembangkit Listrik Tenaga Sampah**	No effort on waste-to-energy	Utilisation of waste by converting to energy through RDF (in industry) or as renewable energy source in PLTSa; The PLTSa/RDF facilities is to treat 4.6 million ton MSW to avoid 1.9 million ton CO_2-eq	**Utilisation of waste by converting to energy through RDF (in industry) or as renewable energy source in PLTSa;** **The PLTSa/RDF facilities is to treat 4.6 million ton MSW to avoid 1.9 million ton CO_2-eq**
4. Utilisation of waste to switch from landfill disposal to zero landfill disposal in 2060	**No direction on zero landfill disposal**	**Utilisation of waste is further enhanced with additional waste-to-energy or MSW recovery & utilisation facilities that treat 10,2 million ton MSW in 2030 to avoid 6.2 million ton CO_2-eq**	**Utilisation of waste is further enhanced with additional waste-to-energy or MSW recovery & utilisation facilities that treat 10,2 million ton MSW in 2030 to avoid 6.2 million ton CO_2-eq**

SUB-SECTOR: DOMESTIC LIQUID WASTE			
Management of domestic liquid waste.	**No mitigation actions.**	**Centralised / Integrated IPAL (city /communal/region scale) operated using aerobic system IPLT to treat sludge removal from septic system Biodigester and utilisation of biogas**	**Centralised / Integrated IPAL (city /communal/region scale) operated using aerobic system IPLT to treat sludge removal from septic system Biodigester and utilisation of biogas**

SUB-SECTOR: INDUSTRIAL WASTE			
	BAU	**CM1**	**CM2**
Management of industrial waste.	No mitigation actions.	Utilisation of WWTP sludge and industrial solid waste through composting, reuse as raw material, use as energy, etc	**Utilisation of WWTP sludge and industrial solid waste through composting, reuse as raw material, use as energy, etc**
		Wastewater treatment in palm oil, pulp & paper, fruits/vegetables & juices processing, and other industries: to implement methane capture & utilisation (biogas).	**Wastewater treatment in palm oil, pulp & paper, fruits/vegetables & juices processing, and other industries: to implement methane capture & utilisation (biogas).**
		The previous target of 3 million ton CO_2-eq is enhanced up to 26 million ton CO_2-eq (equivalent to 1.2 million ton CH_4 recovery)	**The previous target of 18 million ton CO_2-eq is enhanced up to 28 million ton CO_2-eq (equivalent to 1.3 million ton CH_4 recovery)**

SECTOR: IPPU				
No.	**Mitigation Actions**	**2030**		
		BaU	**CM1**	**CM2**
1	**Cement Industry**		GHG emission reduction target is 2.75 Mton CO_2	GHG emission reduction target is 3.25 Mton CO_2
	Increase blended cement by increasing the portion of alternative material for reducing clinker to cement ratio[1]	81% clinker to cement ratio	70% clinker to cement ratio	65% clinker to cement ratio
2	**Ammonia Plant**		GHG emission reduction target is 3.95 Mton CO_2	GHG emissions reduction target is 4.65 Mton CO_2
	Projects for ammonia plant revitalisation to reduce natural gas consumption intensity	no renewal or plant improvement (specific natural gas consumption 45 GJ/ton NH_3)	Construction of 3 new plants[2] to replace old plants (specific natural gas consumption decreases from 45 to 40 GJ/ton NH_3 in 2030)	Further plant improvement, with specific natural gas consumption 35 GJ/ton NH_3 in 2030
	Revamping of ammonia plants (increase plant efficiency & reduce IPPU emissions)	no revamping	Revamping of several ammonia plants	Additional plants for revamping
	CO_2 utilisation	no CO_2 emissions utilisation	CO_2 utilisation as feedstock for Na_2CO_3 production	Further enhancement in the CO_2 utilisation
3	**Aluminum Industry**	CWPB (center work pre-bake cell tech.)	Maintain improved plants operation (automation of feeding system / hardware improvement from CWPB to bar-brake tech). GHG emissions reduction target is 0.1 Mton CO_2-eq	-
4	**Nitric acids industry**	no mitigation for N_2O and continue using existing technology used since 2010 (with EF 10-19 Kg N_2O per ton HNO_3)	Technology improvement (with EF 8 - 9 Kg N_2O/ton HNO3) and installation non-selective catalyst reduction (NSCR) for N_2O destruction (EF 2.5 Kg N2O/ton HNO3). GHG emissions reduction target is 0.1 Mton CO_2-eq)	Additional Installation of catalyst for N_2O destruction. GHG emissions reduction target is 0.2 Mton CO_2-eq)
5	**Iron and Steel Industry**	no mitigation	Improvement of smelter processes and scrap utilisation. Both will result in low GHG emissions intensity. The GHG emissions reduction target is 0.6 Mton CO_2-eq)	Further mitigation activities in process improvement of smelter and scrap utilisation. Both will result in further GHG emissions reduction. The GHG emissions reduction target is 0.9 Mton CO_2-eq)
	Total IPPU Emissions Reduction, Mton CO_2		7 Mton CO_2-eq	9 Mton CO_2-eq

Notes :

1. Green Industry Standard for Cement Industry require industry to reach clinker to cement ratio of 65%
2. The replacement of three old plants with the new ones had been carried out from 2015 to 2020. It should be noted that current world BPT (best practice technology) has natural gas consumption rate of 32 GJ/ton NH3 while the European best available technology (BAT) has 31.8 GJ/ton NH3, the world BAT has 28 GJ/ton NH3 (IEA, 2015), some of ammonia plants in Indonesia have 33-35 GJ/ton NH3
3. Computerisation process for automatic feeding system to reduce PFC and CO_2 emissions losses through system software and hardware improvements and incorporating new algorithms in the control system that can reduce AE frequency, duration, and over voltage.

REFERENCES

ENERGY SECTOR

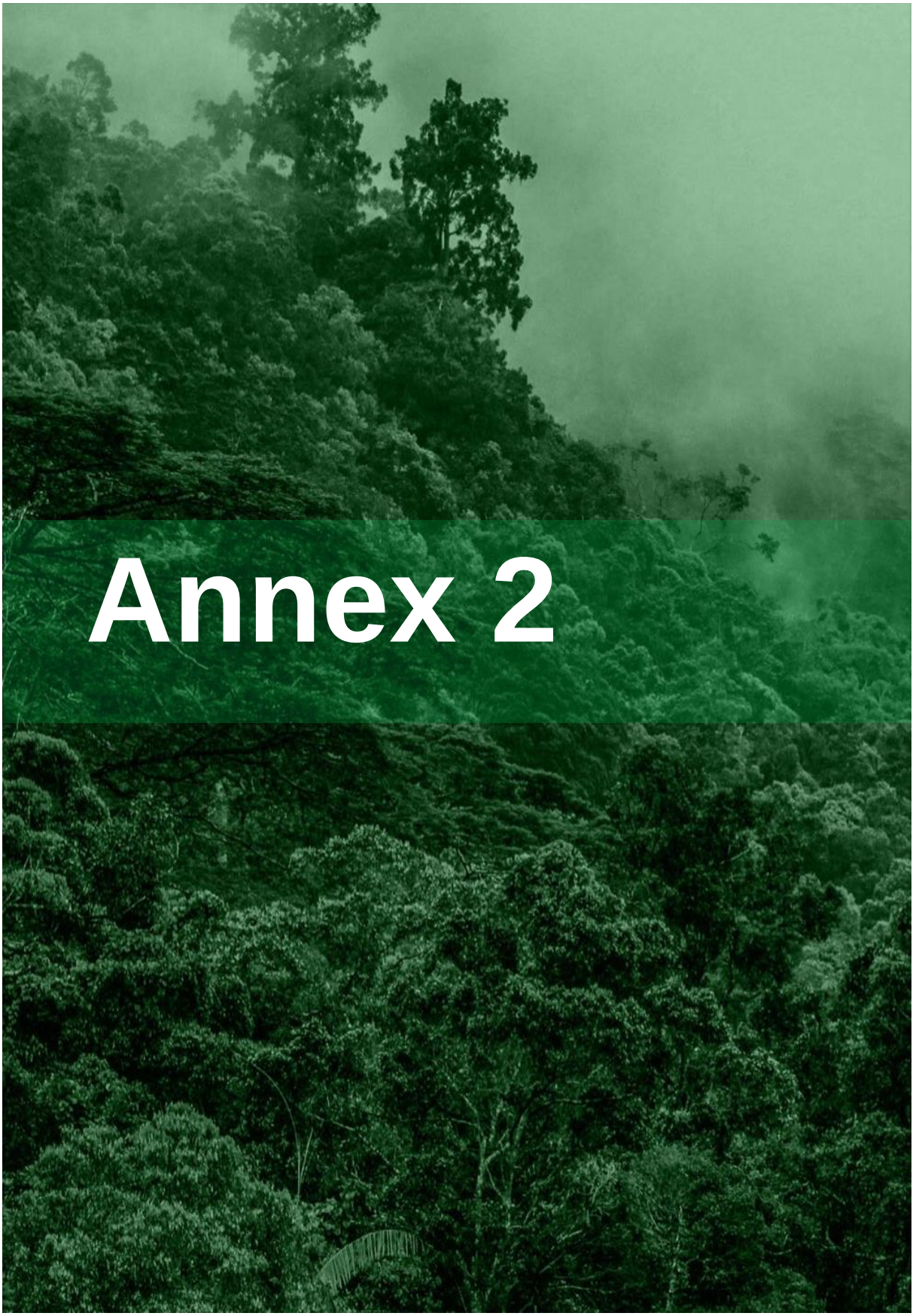
- National Energy Policy (KEN) 2014,
- Electricity Supply Business Plan (RUPTL) 2016-2025,
- National Energy Plan (RUEN) 2016.

AFOLU SECTOR

- RKTN (*Rencana Kehutanan Tingkat Nasional* 2011-2030/Long-Term National Forestry Plan 2011-2030),
- *Industri Minyak Sawit Indonesia Menuju 100 Tahun NKRI*/Indonesian Oil Palm Industry toward 100year (GAPKI),
- The Roadmap of Indonesia's Forest Business Association (APHI) 2050,
- Strategic Plan for Plantation/estate crops (including scenario for livestock),
- Introduction Study on RPJMN 2015-2019 (BAPPENAS, 2013).

WASTE SECTOR

- Act No. 18/2008 regarding Solid Waste Management,
- Government Regulation No. 81/2012 regarding Management of Domestic Solid Waste.



Annex 2

Annex 2

Enhanced Nationally Determined Contribution (NDC)
Republic of Indonesia
ADAPTATION

Key programs, Strategies, and Actions to achieve climate resilience targets
(economic, social and livelihood, and ecosystem and landscape)

Economic Resilience

Climate change presents significant risks for Indonesia's natural resources that will in turn affect the production and distribution of food, water and energy. As the population grows, there will be increasing pressures on Indonesia's already limited resources. As a response, Indonesia plans to transform to low carbon economy and build resilience into its food, water and energy systems through the following key programs, strategies, and actions:

KEY PROGRAM	STRATEGY	ACTION	PRIORITY FIELD	NOTE
Sustainable agriculture and plantations	• Mainstreaming / integrating climate change adaptation into agricultural sector, especially for strategic commodities.	• Identification, development and implementation of best practices for farmers' economic empowerment. • Enhancing management and provision of ecosystem services in agricultural sector. • Development of financing scheme for agriculture.	Food Food, ecosystem Food	• Potential synergy with implementation of UNCCD • Potential co-benefit to mitigation in AFOLU
	• Development and implementation of climate adaptive technologies for sustainable production of agricultural crops and plantations.	• Improve agricultural crops protection from pests and diseases. • R & D to produce high quality (genetically improved) seeds and cultural techniques to increase productivity. • Improved water management systems for increasing resilience to climate change. • Application of integrated cropping calendar	Food Food Food, ecosystem Food	
Integrated watershed management	• Enhancing synergy across sectors and regions in watershed management.	• Implementation of integrated upstream and downstream approach in forest rehabilitation and restoration, watershed management planning, and protection of terrestrial water resources.	Water, ecosystem	Potential synergy with implementation of UNCCD

KEY PROGRAM	STRATEGY	ACTION	PRIORITY FIELD	NOTE
	• Mainstreaming/Integrating climate change adaptation in watershed management to reduce risks/loss as a result of climate-related natural disasters.	• Creating enabling environment for integrating of Natural Disaster Risk Management into business models and practices • Development of ecosystem services in watershed management. • Identification, development and implementation of best practices in watershed management. • Integrating watershed management into Local Spatial Planning	Water, ecosystem, disaster Water, ecosystem Water Water, ecosystem	
Reduction of deforestation and forest degradation	• Mainstreaming/Integrating climate change adaptation in forest management to support mitigation actions and enhancement of economic resilience of communities living in/surrounding forests. • Development and implementation of environmentally friendly technologies (EFT) in production forest management.	• Strengthening implementation of deforestation reduction efforts, • Sustainable utilisation of non-wood products by local and adat communities. • Identification, development and implementation of best practices and local wisdom in utilisation of natural forest resources. • Creating enabling environment for EFT. • Facilitate, oversight, enforcement and compliance on the implementation of EFT.	Ecosystem Ecosystem Ecosystem Ecosystem Ecosystem	Potential co-benefit to mitigation in AFOLU

KEY PROGRAM	STRATEGY	ACTION	PRIORITY FIELD	NOTE
Land conservation	• Avoiding conversion of productive lands for other uses. • Development and implementation of climate adaptive technologies to support sustainable land management practices.	• Integrated rehabilitation of degraded land and soil and water conservation. • Facilitate, oversight, enforcement and compliance to spatial plan. • Strengthening implementation of regulations relating to Spatial Planning • Application of soil and water conservation technology using mechanic and vegetation methods. • Identification, development and implementation of best practices in land utilisation and management.	Water, ecosystem Ecosystem Ecosystem Water, ecosystem Ecosystem	Potential synergy with implementation of UNCCD
Utilisation of degraded land for renewable energy	• Integrated program on rehabilitation of degraded land and development of biomass energy	• Rehabilitation of degraded land with species suitable for energy. • R & D to support sustainable biomass energy plantations and the bio-energy industries.	Energy, ecosystem Energy, ecosystem	• Potential synergy with implementation of UNCCD • Potential co-benefit to mitigation in AFOLU
Improved energy efficiency and consumption patterns	• Enhance awareness of all stakeholders on the adaptation benefits of mitigation through improved energy efficiency and consumption patterns	• Energy efficiency campaign.	Energy	

Social and livelihood resilience

Climate change also affects the day-to-day lives of all Indonesians, but most severely Indonesia's most vulnerable populations. Climate change-induced natural disasters will impact a greater number of people living below the poverty line, preventing asset accumulation. Rising food, water and energy prices, which often follow drought, floods, and other disasters, will drive the poor further into poverty. Socio-economic disparity will potentially contribute to political instability in regions most affected by climate change. To prevent further disparity, Indonesia plans to build social and livelihood resilience through the following key programs, strategies, and actions:

KEY PROGRAM	STRATEGY	ACTION	PRIORITY FIELD	NOTE
Enhancement of adaptive capacity.	• Reducing vulnerability through improved capacity on social-economy and livelihood.	• Development of Early Warning System (EWS).	Disaster	Potential synergy with implementation of SFDRR
		• Capacity enhancement for all stakeholders in responding EWS.	Disaster	
		• Awareness campaign, education and training	Disaster	
	• Responding to climate change impacts and managing risks including health.	• Addressing drivers of vulnerability to climate change impacts.	Health	
		• Enhance stakeholder participation at all levels in building climate resilience, including in health protection and waste management	Health	
	–	• Enhance Community capacity in reducing Climate Change impact on health	Health	
Development of community capacity and participation in local planning processes, to secure access to key natural resources;	• Enhancing community capacity in natural resource management as a source of income, including capacity in risk management and sustainable utilisation of natural resources.	• Awareness campaign, education and training.	Ecosystem	Potential Sinergy with implementation of CBD, UNCCD, and SFDRR
		• Identification, development and implementation of best practices	Ecosystem, disaster	
	• Strengthening community engagement in development planning process at all levels, taking into account gender participation, gender equity and gender balance and vulnerable groups , cross inter-generational needs	• Development and implementation of appropriate mechanisms for community participation, taking into account gender participation, gender equity and gender balance and vulnerable groups (diffable, children and elders), and cross intergenerational needs	Ecosystem	

KEY PROGRAM	STRATEGY	ACTION	PRIORITY FIELD	NOTE
		• Facilitate and oversight to ensure community interests, including gender, are accommodated in development plan.	Ecosystem	
Ramping up disaster preparedness programs for natural disaster risk reduction;	• Increase effectiveness of natural disaster preparedness and post disaster recovery program. • Empowering communities in natural disaster preparedness and post disaster recovery.	• Development and maintenance of natural disaster control infrastructures. • Revitalisation of climate related natural disaster control infrastructures based on climate change analysis. • Protection of cultural and historical sites • Awareness campaign, education and training	Disaster Disaster Disaster Disaster	Potential sinergy with SFDRR
Identification of highly vulnerable areas in local spatial and land use planning efforts.	• Development and utilisation of information system and data provision on vulnerability, risks, and impacts of climate change.	• Strengthening Information System on vulnerability index (Id. Sistem Informasi Data Indeks Kerentanan/ SIDIK) • Integration SIDIK with other related systems regarding vulnerability , risk and impacts of climate change	Ecosystem, disaster Ecosystem, disaster	Potential synergy with Sendai Framework DRR and UNCCD
Improvement of human settlements, provision of basic services, and climate resilient infrastructure development.	• Mainstreaming adaptation into spatial planning and strengthening compliance in the implementation of spatial plan. • Integrating adaptation in infrastructure development and maintenance.	• Climate awareness campaign, standard enforcement and oversight in human settlement development, including building and environmental health. • Increase compliance to carrying capacity related regulations in infrastructure development. • Improve water resource management including soil water, measures to deal with disaster emergency.	Health, ecosystem, disaster Energy, disaster Water, ecosystem	Potential synergy with SFDRR
Conflict prevention and resolution.	• Strengthening coordination and communication in policy formulation and implementation.	• Implementation of complain and redress mechanisms.	Disaster	

Ecosystem and Landscape Resilience

provide various environmental services such as watershed protection, carbon sequestration and conservation, and disaster risk reduction. In order to build climate resilience, Indonesia protects and sustain these environmental services by taking an integrated, landscape-based approach in managing its terrestrial, coastal and marine ecosystems through the following key programs, strategies, and actions:

KEY PROGRAM	STRATEGY	ACTION	PRIORITY FIELD	NOTE
Social forestry	• Enhance engagement of local and adat communities in social forestry development process.	• Awareness campaign on the important role of forest and forest areas in ecosystem resilience.	Ecosystem	Potential synergy with CBD and UNCCD
	• Strengthening implementation of landscape approach in social forestry	• Facilitate, oversight and compliance to sustainable principles applied to each scheme of social forestry	Ecosystem	
	• Implementation of EFT in social forestry.	• Creating enabling environment for EFT. • Identification, development and implementation of best practices applicable for social forestry	Ecosystem Ecosystem	
Coastal zone protection	• Mainstreaming adaptation into policies and programs on coastal zone and ocean.	• Implementation of ecosystem-based adaptation in coastal zone development. • Implementation of integrated management of mangrove ecosystem. • Enhance coastal zone and ocean pollution control, including marine litter and plastic debris.	Ecosystem Ecosystem Ecosystem	Potential synergy with implementation of Ramsar Convention, CBD, SFDRR, and UNCCD
	• Development of climate resilient coastal zone.	• Increase communication, Education and Public Awareness (CEPA)on the important role of coastal ecosystem protection in natural disaster impact reduction	Ecosystem, disaster	

KEY PROGRAM	STRATEGY	ACTION	PRIORITY FIELD	NOTE
		• Restoration of degraded coastal zone as essential ecosystem. • Improve livelihood of communities living in or depending on coastal areas.	Ecosystem Ecosystem	
Ecosystem conservation and restoration	• Enhance ecosystem, species and genetic conservation. • Improve functionality of integrated ecosystem to ensure improvement of essential services.	• Development and implementation of in situ and ex situ conservation. • Prevention and eradication of invasive alien species. • Protection of existing and development of new marine protected areas. • Restoration of degraded mangroves and peatland • Enhance conservation education, including engaging adat communities for indigenous knowledge and local wisdom.	Ecosystem Ecosystem Ecosystem Ecosystem, water Ecosystem	Potential synergy with implementation of Ramsar Convention, CBD, SFDRR, and UNCCD
Integrated watershed management	• Developing climate resilient watershed ecosystem management.	• Improve watershed management planning by taking into account climate vulnerability, risks and impacts. • Developing policy instruments and tools to assess climate vulnerability, risks, and impacts to national priority watersheds.	Water, ecosystem, disaster Water, ecosystem, disaster	Potential synergy with implementation of Ramsar Convention, CBD, SFDRR, and UNCCD
Climate resilient cities.	• Promote development of climate proof cities.	• Awareness campaign on the importance of integrating climate vulnerability, risks and impacts in city planning and development. • Capacity building and institutional strengthening	Ecosystem, disaster Disaster energy	

KEY PROGRAM	STRATEGY	ACTION	PRIORITY FIELD	NOTE
		• Revitalisation of city infrastructure to increase adaptive capacity and resilience to climate change impacts. • Increase urban forest area and other green open spaces	Ecosystem, disaster Disaster energy	

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