Dynamic conditions of global and Indonesia climate change: Efforts and policies

Ukar Wijaya Soelistijo¹, La Ode Aswandi², Marwan Zam Mili³

¹University of Islam Bandung (UNISBA), Institute of Technology Bandung (ITB), Mineral and Coal Technology R&D Center (MCTRDC), Center for Education and Training of Mineral and Coal (CETMC), Bandung, Indonesia
²Institute of Technology Bandung (ITB), PT Tambang Sejahtera Indonesia, Bandung, Indonesia
³Institute of Technology Bandung (ITB), University of Halu Oleo (UHO), Kendari, Indonesia

Email address
ukar@tekmira.esdm.go.id, ukarws@gmail.com, ukarws@yahoo.com (U. W. Soelistijo), wandyxx@gmail.com, wandyxx@yahoo.com (L.O. Aswandi), marwanzammili@yahoo.com (M. Zam Mili)

To cite this article

Abstract
Within the last 50 years since early of 1970s, the various international parties be aware that climate change happened causing the global warming. It means that the temperature of the earth atmosphere has significantly increased and the increasing temperature is felt. The international awareness and efforts on climate change are initiated by the Conference of Environmental Anniversary celebrated in Stockholm and the more intensive efforts through the establishment of UNFCC COP in Rio de Janeiro in 1992, COP-13 in Bali, COP-14 in Poznan COP-15 in Copenhagen, COP-16 in Cancun Mexico and the last COP-19 in Warsaw Poland in 2013 as well. Based on the awareness that climate change is as the integral part of the economic development, it is necessarily overcome by the international funding with the special anticipation on the developing countries in the condition of their burden on economic development in addition with new mission of climate change, led by the developed countries. It is expected that those matters would be solved beyond the year of 2012 after the Kyoto Protocol terminated, in which the US did not actually sign it. Indonesia has tried to formulate down to earth policy and programs in line with the international climate change guideline as part of the economic development in the related prime sectors such as forestry, manufacturing industries, land use, etc. achieving the global target of overcoming global warming with estimate target below 2°C and reducing carbon dioxide (CO₂) emission of 26% up to 41% by 2050 and its concentrations are expected to reach does not exceed 650 ppm by 2030 to meet the principle that the carrying capacity of the nature should be able to overcome the population pressure as well. This study is carried out based on the observation and descriptive analysis method over times.

Keywords
Climate Change, Global, Indonesia, Policy Efforts

1. Introduction
This paper is intended to conduct an observations of what is experienced and future efforts by the world community of climate change, with the result of global warming which everyone felt it. Climate change is perceived progress in the last 50 years. As the author felt in the 60's in Bandung if home tuition in the evening need to wear a jacket because it was cold in the body, then at this present time even at night when sleeping rarely wear the heat blanket because it feels warm enough at night. Global warming has implications for climate change on Earth. To minimize the climate change, efforts are needed to reduce greenhouse gas (GHG) that is caused by emissions mainly by CO₂ (carbon dioxide) and other gases (CH₄(methane), CFC (Chlor Fluor Carbon), NOx (nitrogen oxides group), SOx (sulfur oxides group), etc.) by the result of human activity. GHGs are primarily caused by deforestation, forest degradation, land use, peat, industrial and transportation (burning fossil fuels), buildings, commercial.
With efforts to reduce emissions of these gases, especially CO₂, will affect logging and industry that will directly affect the rate of development in each country, both developed and developing countries. The implications will be felt particularly by developing countries to develop their related countries in order to reduce and alleviate poverty. It required a specific mechanism in the presence of some sort of international fund to compensate developing countries that need to be led by the developed countries. For the realization of joint movement is needed so that the world’s global development policy jointly bear the causes and effects of climate change caused by global warming ahead with targeted, among others, the level of CO₂ (Carbon Dioxide) levels aligned to produce a temperature rise in the Earth’s atmosphere does not exceed 2 degrees Celsius by year 2030. Those various efforts were discussed in the various international meetings either at the level of UN (UNFCCC) or in the other international bodies within the last two decades since in the UNFCCC COP-3 in 1997 (http://www.UNFCCC COP-3 1997) with the Kyoto Protocol up to COP-15 in Copenhagen in 2009 then continued in COP-16 in Cancun Mexico, and finally COP-19 in Warsaw. Continuously in series of meetings, COP-13 in Bali with the Bali Action Program (BAP), COP-14 in Poznan Poland with the interest in emphasizing the urgency of technical assistance to the developing countries to overcoming their economic and environmental development in particular on climate change. Then COP-15 in Copenhagen with the Copenhagen Accord releasing the concept of how to overcome the climate change in the context of development with the more specific views, and in COP-16 in Cancun (2010) up to COP-19 in Warsaw (2013) that has reflected the balancing level between politics in mitigation, commitment of the developed countries to support the developing countries in the forms of finance (global/green climate finance/GCF), technology, capacity building and their firm position in adaptation (Figure 1). By looking to the expiration of the Kyoto Protocol mechanisms in 2012 that the U.S. Government does not participate postscript sign it, then the world efforts against climate change will have certain mechanisms in a variety of activities, especially the presence of more international funding programs commit in a more tangible action. It is expected that the results of these negotiations will be implemented before 2015, or at least after the Kyoto Protocol expires in 2012, where the U.S. is not signatory. Apparently, implied the U.S. Government would determine the outcome of negotiations enactment of various world implementation in the field of climate change. It is expected that there would be a great progress in the COP-20 held in Bonn in 2014. About the importance of environment, even much earlier in 1972 UNEP conference held in Stockholm in the framework of World Environment Day (http://www.UNEP 1972), has alerted the world about his understanding of environment and attention to developing countries. Followed UNED Conference 1992 in Rio de Janeiro with a "declaration on environment and development" and that "Human being is the center of concern in sustainable development", as well as the Agenda for the 21st Century: "Programme upon to manage the environment and development programme" (http://www.UNED 1992) [10].

**Figure 1. Linkages with International Effort Global Warming and Indonesia**
2. Discussion

2.1. Methodology

The study was conducted with the observation methodology based on historical data and information of international activities in the field of the environment, reading literature about the environment as well as keeping on track of the various activities concerning the subject of the environment and historical trend chronologically from the 1960s to the present with the variety of international agencies such as the United Nations and its activities namely UNCCC COP-16 in Cancun in 2010 up to the last one COP-19 in Warsaw in 2013, as well as with global and national scenarios ahead.

2.2. Library Studies: Global climate change condition by the presence of Greenhouse Gases (GHGs)

Greenhouse Gas (GHG) or Green House Gases (GHGs) play a vital role in the earth's atmosphere, and it is essential to keep an eye on them as they can cause significant changes in the climate. The main cause of greenhouse gases is human activity, and the primary greenhouse gas is carbon dioxide (CO₂). Other greenhouse gases include methane (CH₄), nitrous oxide (N₂O), and fluorinated gases.

Figure 2. Green House Gases (GHGs) effect on climate change by the consequent emission of the gases CO₂, methane (CH₄), CFCs from air conditioning, NOx, and others which enter into the atmosphere from day to day by the presence of various causes (Figure 2).

From Figure 2 it is known that the scheme is derived from CO₂ GHG taking the lion's share of around 50%. The rest is other gases e.g. CFC (chloro fluor carbon), methane, NOx (group of nitrogen gas compounds), ozone and other gases generated by the activities of human life. By the presence of greenhouse gases causes the temperature of the earth's atmosphere increased from time to time, which need to be addressed by the world community. Therefore, the efforts of the world in addressing GHG focused on efforts to address how to push a product that CO₂ can not be sucked back to life on earth and into the atmosphere, of course, an attempt to overcome against the other gases.

From the results of various studies are concluded that the largest CO₂ is generated from deforestation and forest degradation, later followed by the manufacturing industry sector, then transportation, households and others.

2.3. Chronology and Configuration of Climate Change and Global Warming

Chronologically, the UN and various international institutions such as the IPCC, Gleneagles and MEF (Major Economies Forum Energy and Climate Change) are rushing action to remind the world of the existence of climate change and global warming, which if not anticipated quickly and accurately will result in fatalities are catastrophic for human life. Be warned about the handling of systematic, planned and directed program against the major sectors that causes climate change such as forests, land use, peat, manufacturing, transportation and households in the utilization of land and use of energy, especially fossil fuels. Indonesia has taken into action in the forms of developing Central Climate Change Team under the Ministry of Finance in cooperation with international bodies such as World Bank to perform down-
to-earth sectoral action program in the fields of low carbon study, REDD plus, transportation study etc. (Figure 3).

UNFCCC in 2004 has warned that the world needs to comply with the general obligations and warned that climate change is caused primarily by human activity itself. Moreover, human growth fell short follow exponential trends, will be followed by the emergence of development issues including environmental issues that will grow exponentially as well, for example the growth of CO₂ emissions.

Club of Rome in 1972 in his book "The Limits to Growth" has reminded the world that by the result of the exponential growth in the number of people (Figure 4), the need for productive land also grows exponentially as well (Figure 5).

\[\text{Climate Change}\]

\[\text{Global Warming: Estimate target below } 2^\circ\text{C} \text{, emission of } 26\% < 2020; \text{towards - emission} \text{ of} 41\%\]

\[\text{Developing Countries needs: finance, capacity, technology transfer, lead by Developed Countries}\]

- Chronological Global Actions: UNFCCC COP - UNEP 1972; 1992 UNCED Rio de Janeiro; UNFCCC 1997 COP 3 Kyoto Protocol; COP-13 in 2007 Bali Action Plan; 2008 Poznan COP-14; COP-15, 2009 Copenhagen Agreement, COP-16 Cancun, up to COP-17 (Durban), COP-18 (Doha) and COP-19 Warsaw (2013); that has reflected the balancing level between politics in mitigation, commitment of the developed countries to support the developing countries in the forms of finance (global climate finance/GCF), technology, capacity building and their firm position in adaptation.

- Indonesian Climate Change Central Action Plan

\[\text{Indonesia:}\]

- Down To Earth Programs following the International climate change guidelines

\[\text{Required macroeconomic management, fiscal policy planning, alternative income generation; insurance market; long-term investment options.}\]

\[\text{- CDI.}\]

\[\text{Transportation: REDD + (Extended REDD)}\]

\[\text{Institutional / Regulatory Effort:}\]

- CO₂ utilization

- ex. Waste Power Plant, Briquette, biomass, etc.

\[\text{International Finance Institution:}\]

- Asian Development Bank (ADB), World Bank (WB), etc.

- JICA (Japan International Cooperation Agency), Australia Treasury

- NGO (Non Government Organization)

\[\text{Treasury Department – WB}\]

\[\text{Sectoral Action Program}\]

\[\text{Climate Change Action Program}\]

\[\text{In Mitigation and Adaptation (MA)}\]

\[\text{Required macroeconomic management, fiscal policy planning, alternative income generation; insurance market; long-term investment options.}\]

\[\text{- CDI.}\]

\[\text{Medium Priority.}\]

\[\text{Japan's Climate Change Central Action Plan}\]

\[\text{Coordination between government institutions}\]

\[\text{Geothermal.}\]

\[\text{Growth Rate 2.1%, doubling in 33 years}\]

\[\text{Growth} \text{ has reminded}\]

\[\text{2}\]

\[\text{Agency), Australia Treasury Plan.}\]

\[\text{REDD)}\]

\[\text{REDD+, transportation study}\]

\[\text{Biotechnology}\]

\[\text{Since 1650 population growth exponential; 1970 higher than 1950’s projection; population Growth Rate 2.1%, doubling in 33 years.}\]

\[\text{Source: Meadows, 1972.}\]

\[\text{Figure 4. The exponential growth of world population trends}\]
2.4. International and Indonesia Efforts and Policy

2.4.1. International efforts and policy

CO$_2$ is the main gas components in the Greenhouse Gas (GHG) that causes climate change by the result of global warming. Developed and developing countries make policy and program reductions in CO$_2$ emissions, that affect on industrial activity and investment.

UNFCCC in 1992 stated that Climate Change is caused by human activity. In 2004, about climate change, UN-COP states agreed on a number of general obligations regarding compliance formulation, publication, renewal of measures the national program in Climate Change Mitigation, the release of greenhouse gases, and on facilitation Adaptation of Climate Change). UNFCCC COP-13 in Bali in 2007 resulted in the Bali Action Plan and the Bali Road Map, which stated that we should try to mitigate GHG to prevent global warming.

Outside the UNFCCC (UN Framework Convention on Climate Change) there are Gleneagles and MEF (Major Economies Forum Energy and Climate Change) also attempted to keep the average temperature rise does not exceed 2°C world or retain as much as 450 ppm of CO$_2$ concentration in the atmosphere. CO$_2$ concentrations are expected to reach does not exceed 650 ppm by 2030.

IPCC 2007 stated that climate change is a change in weather conditions that can be identified in the average change, the diversity of nature in the long period.

Basically the more specific the UNFCCC COP-13 Bali 2007 (http://www.UNFCCC COP 13 2007) produced about:
- Bali Action Plan (BAP) seeking enhancement initiatives in the provision of financial resources and investment to support the Mitigation, Adaptation and Technology.
- BAP as a basis for negotiations at the UNFCCC COP-14, Poznan, Poland, 2008 and COP-15 Copenhagen.

In 2007 COP-13 started discussions towards sustainable low carbon development approach. Later in the year 2008 COP-14 was expressed as early intensive negotiations intensive international response and ambitious to Climate Change for approval at COP-15, that:
- Climate change is a development issue.
- Construction of an effort to invest in cleaner energy, to renewable energy, and forest and agricultural land wisely.
- Developing countries need aid flows (grants or soft loans) and additionally for development, in addition to the climate change.

Climate change affects macroeconomic management approaches, fiscal policy choices, alternative income generation, insurance markets and long-term options.

UNFCCC COP-14, Poznan, Poland in 2008 (http://www.UNFCCC COP-14 2008) prepared the international response to reach an agreement in Copenhagen 2009. Much realized that the global financial crisis complicates funding for MA. Climate change is
political-economical-social-and-cultural issue, not just environmental one. The parties urged the development of a global carbon market, the implementation of the extending government funding and developed countries to help improve the capacity and readiness of markets in developing countries to access global carbon market.

G-20 in Pittsburgh and Scotland 2009 realized the assessment and improvement of the role of fiscal and financial policies in order to overcome climate change becoming main target.

Furthermore, the UNFCCC COP-15 Copenhagen 2009 produced the Copenhagen Accord. On that occasion, Yudhoyono expressed his desire as the President of Republic of Indonesia about several things including: limiting global warming increase the range of 2°C, developed countries must take the lead, quick fundings commitment to the development of low-carbon. Indonesian targeted 26% reduction in emissions, funding from developed countries with well drained. Maintaining trees standing rather than cut them down. REDD plus being part of a global solution. In UNFCCC 2009 at Copenhagen (http://www.UNFCCC COP15 2009), UN has approved the Copenhagen Accord. which is expected to be operational, with the following main points [7]:

- Politically need to combat climate change, to stabilize the concentration of GHGs in the atmosphere so that there is an increase in global temperature below 2 degrees Celsius.
- Especially for developing countries that low emission development strategy is not solely and to the extent not impede sustainable development.
- Strengthening international cooperation in facilitating and supporting the adaptation action.
- Strengthening the emissions reductions initiated by the Kyoto Protocol, and financing by developed countries will ensure financial targets and precise, robust and transparent
- Will implement mitigation actions to finance and technology support Program, within the relevant capacity
- The role of reducing emissions from deforestation and forest degradation are unlikely require collateral with less positive incentives to implement REDD-plus funding to facilitate the mobilization of resources from developed countries.
- Strengthening cost-effectiveness of mitigation actions and to hold, especially for developing countries
- Improving adequate funding for developing countries in mitigation actions to reduce emissions from REDD-, plus, adaptation, technology development and transfer and capacity building. Advanced collective commitment country ensure new resources of $30 billion in 2010. 2012 with balanced allocation in mitigation and adaptation. And commitment of developed countries to jointly mobilize $100 billion a year by 2020 to meet the needs of developing countries.
- COP learn about the contribution of the potential sources of funds.
- Copenhagen Green Climate Fund to support project-2, programs, policies and other activities in developing countries in regard to mitigation including REDD-plus, adaptation, capacity building, development and technology transfer.
- Strengthening the development and transfer of technology for the inaugural determined a mechanism for acceleration technology.
- The implementation of this Accord was completed before 2015.

In COP-16 in Cancun has reflected the balancing level between politics in mitigation, commitment of the developed countries to support the developing countries in the forms of finance, technology, capacity building and their firm position in adaptation (http://www.UNFCCC COP-16 2010).

Some important results of COP-17 (2011, Durban), COP-18 (2012, Doha), COP-19 (2013, Warsaw) (http://www.UNFCCC COP-17 (2011) up to COP-19 (2013) are as follows [7]:

> provides guidance to the Board of the GCF, including on matters related to policies, program priorities and eligibility criteria;
> requests the Board to develop a transparent no-objection procedure to be conducted through national designated authorities, in order to ensure consistency with national climate strategies and plans and a country-driven approach and to provide for effective direct and indirect public and private sector financing by the Green Climate Fund;
> stresses the need to secure funding for the GCF to facilitate its expeditious operations and requests the Board to establish necessary policies and procedures, which will enable an early and adequate replenishment process;
> invites parties, through their regional groupings and constituencies, to submit their nominations for the members of the Board to the interim secretariat by 31 March 2012;
> confers juridical personality and legal capacity to the GCF Board;
> invites parties to submit to the Board expressions of interest for hosting the GCF Fund by 15 April 2012;
> further requests the Board to establish the independent secretariat of the GCF in the host country in an expedited manner as soon as possible;
> invites the Board to select the trustee of the GCF through an open, transparent and competitive bidding process in a timely manner to ensure there is no discontinuity in trustee services; and

+ COP-18 to COP-19 on some important results:
"Copenhagen Accord 2009 in Copenhagen, UN has approved the Copenhagen Accord. which is expected to be operational, with the following main points [7]:

- Politically need to combat climate change, to stabilize the concentration of GHGs in the atmosphere so that there is an increase in global temperature below 2 degrees Celsius.
- Especially for developing countries that low emission development strategy is not solely and to the extent not impede sustainable development.
- Strengthening international cooperation in facilitating and supporting the adaptation action.
- Strengthening the emissions reductions initiated by the Kyoto Protocol, and financing by developed countries will ensure financial targets and precise, robust and transparent
- Will implement mitigation actions to finance and technology support Program, within the relevant capacity
- The role of reducing emissions from deforestation and forest degradation are unlikely require collateral with less positive incentives to implement REDD-plus funding to facilitate the mobilization of resources from developed countries.
- Strengthening cost-effectiveness of mitigation actions and to hold, especially for developing countries
- Improving adequate funding for developing countries in mitigation actions to reduce emissions from REDD-, plus, adaptation, technology development and transfer and capacity building. Advanced collective commitment country ensure new resources of $30 billion in 2010. 2012 with balanced allocation in mitigation and adaptation. And commitment of developed countries to jointly mobilize $100 billion a year by 2020 to meet the needs of developing countries.
- COP learn about the contribution of the potential sources of funds.

Copenhagen Green Climate Fund to support project-2, programs, policies and other activities in developing countries in regard to mitigation including REDD-plus, adaptation, capacity building, development and technology transfer.

Strengthening the development and transfer of technology for the inaugural determined a mechanism for acceleration technology.

The implementation of this Accord was completed before 2015.

In COP-16 in Cancun has reflected the balancing level between politics in mitigation, commitment of the developed countries to support the developing countries in the forms of finance, technology, capacity building and their firm position in adaptation (http://www.UNFCCC COP-16 2010).

Some important results of COP-17 (2011, Durban), COP-18 (2012, Doha), COP-19 (2013, Warsaw) (http://www.UNFCCC COP-17 (2011) up to COP-19 (2013) are as follows [7]:

- COP designates the GCF as an operating entity of the financial mechanism of the Convention, with arrangements to be concluded between the COP and the Fund at COP-18 to ensure that it is accountable to and functions under the guidance of the COP to support projects, programs, policies and other activities in developing country parties. It also:
  > provides guidance to the Board of the GCF, including on matters related to policies, program priorities and eligibility criteria;
  > requests the Board to develop a transparent no-objection procedure to be conducted through national designated authorities, in order to ensure consistency with national climate strategies and plans and a country-driven approach and to provide for effective direct and indirect public and private sector financing by the Green Climate Fund;
  > stresses the need to secure funding for the GCF to facilitate its expeditious operations and requests the Board to establish necessary policies and procedures, which will enable an early and adequate replenishment process;
  > invites parties, through their regional groupings and constituencies, to submit their nominations for the members of the Board to the interim secretariat by 31 March 2012;
  > confers juridical personality and legal capacity to the GCF Board;
  > invites parties to submit to the Board expressions of interest for hosting the GCF Fund by 15 April 2012;
  > further requests the Board to establish the independent secretariat of the GCF in the host country in an expedited manner as soon as possible;
  > invites the Board to select the trustee of the GCF through an open, transparent and competitive bidding process in a timely manner to ensure there is no discontinuity in trustee services; and

+ COP-18 to COP-19 on some important results:
Among the many decisions taken, that governments:

- Strengthened their resolve and set out a timetable to adopt a universal climate agreement by 2015, which will come into effect in 2020.
- Streamlined the negotiations, completing the work under the Bali Action Plan to concentrate on the new work towards a 2015 agreement under a single negotiating stream in the Ad hoc Working Group on the Durban Platform for Enhanced Action (ADP).
- Emphasized the need to increase their ambition to cut greenhouse gases (GHGs) and to help vulnerable countries to adapt.
- Launched a new commitment period under the Kyoto Protocol, thereby ensuring that this treaty's important legal and accounting models remain in place and underlining the principle that developed countries lead mandated action to cut greenhouse gas emissions.
- Made further progress towards establishing the financial and technology support and new institutions to enable clean energy investments and sustainable growth in developing countries.

2.4.2. Indonesian Efforts and Policy

1. Some international milestones related to Climate Change.

- Some notes from international developments into account and the actions of Indonesia, among others, are that:
  - The Indonesian government has established the National Council on Climate Change as the focal point of handling Climate Change and coordination between institutions in Indonesia to link with the international institutions.
  - COP-15 has not fully deliver the expected results in the Bali Action Plan: (i) Mitigation of CO₂ is more ambitious, especially for developed countries; (ii) Implementation of Technology Transfer and Climate Fund is still constrained; (iii) The U.S. still has not come to the Kyoto Protocol.
- Still divided interests of developing countries in the elaboration of CBDR (Common But Deliberated Responsibility).
  - Copenhagen Accord is merely a discourse, not to be a binding agreement.
  - New Issue: need transparency about CO₂ emissions, implementation of MRV (Monitoring Reporting and Verification) and NAMAs (National Appropriate Mitigation Actions).
  - Indonesia President's speech at the G20 in Pittsburgh, said that Indonesia could reduce emissions by 26% and could be (41%) with the help of developed countries by 2050 and he was so called as the climate change hero!

- In addition, acquired some macro-level view of, among others, that:
  - Climate Change as economic challenges, development and investment.
  - Climate Change as a Development Issue.
  - Developing countries require health costs, education, infrastructure, poverty alleviation with additional funding development of Climate Change.
  - The Indonesia Ministry of Finance as a central institution in funding development in Indonesia (Badan Kebijakan Fiskal, Kementerian Keuangan RI, 2009), was instrumental in:
  - Managing the investment climate, fiscal policy, direct spending, and the risks in financial markets.
  - Inviting/influencing domestic and foreign investment in priority M(itigation) and A(daptation) Climate Change.
  - Power budget and affecting the financial markets and insurance as an important source of financing development and hence climate.
  - Instrument economic policies for mitigation and adaptation.
  - Department of Finance Working Group conducting a study of the methods and fiscal policy optimization options for Mitigation and Adaptation Climate Change in Indonesian economy.

Green Paper prepared by the Government of Indonesia and Australia as an input for the purpose of preparation of Indonesian Economic Policy with Climate Interchangeability shades contain important subject as follows (Ministry of Finance, Republic of Indonesia, Australia Indonesia Partnership, 2009) [12]:

- The role of Indonesia in the Global Climate Change Mitigation.
  - Indonesia plays an active and constructive role in international negotiations and has committed to make a strong contribution to the mitigation of global climate change.
  - Fulfilling this commitment requires consistency in achieving the goals of development and poverty reduction and economic policy requires prime.
- Green Paper: Towards a Climate Policy Economics nuanced.
  - Green paper detailing approaches policy for efficiency reduction – fare in emissions GHGs. Principle-2 for climate policy needs to be described in the policies implemented, and is a step forward toward climate policy framework as efficient long term one.
- Brief about Strategy.
  - Indonesian placing obstacles to the future with Carbon means beginning to restructure the economy towards structures with low emissions.
  - Strategy in the energy sector, the sector of land use
change and forestry, the international funding for Carbon, and institutional development.

> Carbon international funding.

Indonesia can obtain a greater contribution from the international carbon funds than it has gained now. Carbon withdraw funds is not an end goal, it seems to help Indonesia prepare for a low carbon future. Suitable strategy for Indonesia include: proposing a target for fossil fuel emissions; adequate assurance that the value obtained from the sale of licenses; and support the creation of a REDD mechanism with sub-national implementation.

> Assessment of energy and carbon prices.

Adequate price distortions in the energy and climate policies provide an opportunity to strengthen economic efficiency in addition to reducing emissions. Introductions Carbon price assessment is important in the medium to long term to achieve emissions reductions at minimum cost.

Accele rated removal of energy subsidies and the introduction of carbon prices is desirable and can be done in parallel. An appropriate strategy is introducing appropriate Carbon tax on fossil fuel combustion in the beginning. The application can be expanded by replacing the tax and emissions trading as a measurement system that can be developed further. Carbon prices could result in the acquisition of new larger, which can be used to help businesses and poor households, as well as to climate change as an additional measurement. A carbon tax could result in either a reduction or increase in the poverty rate of GDP.

A sectoral emission targets can result in the number of larger exports to Indonesia, and gives a strong international signal. There is fiscal role of the size and arrangement to assist assessment of emissions price. Policy incentives for geothermal power plants are examples of this. As an extra premium on the price of carbon for geothermal power plants, rates of geothermal that need to be able to describe the actual cost of the electrical current conducted by the Indonesian government. A conservative estimate of the actual cost of electricity from the Government of Indonesia is 13 cents ($) per kWh. Policy strategies proposed geothermal has 3 pillars, i.e.: strengthening the existing formation potential investors; ensuring geothermal tariff in line with the actual cost of electricity; and the existence of an efficient profit contribution arrangement.

Regional action on land-use change emissions, forests and peat. Management of land conversion, forest and peat land offers the opportunity to cut emissions. Efforts in the regulation, fiscal and budget will be critical in achieving emission reductions. Intergovernmental fiscal transfer system is a pathway to support regional climate change action. Performance based incentive mechanism is a means of adequate regional. Three potential pathways for implementation is to use a transfer mechanism that has been and will be. Review and reform of fiscal policy and regulation is needed, which will affect land-use change and forest.

In the case of institutional reform, effective policy coordination is key to the success of climate policy. The Indonesia Ministry of Finance is central to the development and implementation of policies. The proposed strategy may include:

- Establishing a climate policy unit in the Ministry of Finance.
- Establishing a Working Group on cross-agency Climate Policy, Ministry of Finance-Bappenas (the National Development Planning Agency)-and the Minister for Economic Affairs.
- Encouraging interministerial review of regulations, laws, and institutions affecting the structure of the formulation and implementation of climate change policy.
- Encouraging an integrated review of the climate policy.
- GHG emissions (CO$_2$)

CO$_2$-producing sectors that need to be addressed: (a) Peat sector, Forestry sector, Agriculture sector, Power sector, Transportation sector, Cement sector, Buildings sector, noting that: (a) Land use and forestry sector is still the biggest emitters - start recognized by Indonesia. (b) Various parties perform calculations with a different approach. (c) Emissions from energy use (fossil) is still relatively small - but at least 5x increased rapidly from 2005 to 2020 year.

Several findings (Badan Kebijakan Fiskal, Departemen Keuangan RI, 2008) [1] can be stated that:

> The annual GHG emissions in Indonesia amounted to 2,23 Gigatones (2.23 billion tons) in 2005. While construction continues in Indonesia, the total GHG emissions are expected to increase to 3.6 Gt by 2030. In 2005 and 2030 Indonesia's emissions ranged 5% of global GHG. Indonesian Contributions global emissions higher than the real contribution to the global GDP of about 0.6% in 2005.

> Benefit-cost analysis of the various efforts to reduce GHG emissions before 2030 suggests that Indonesia has potential to reduce GHG emissions by 2.3 Gt, which showed a reduction of approximately 65% when compared with the current trends. This would bring 2030 emissions 65% lower than emissions in 2005. Reduction of that size is an important contribution to global efforts, which amounted to about 7% of the global reductions needed by 2030 to achieve the recommended level Intergovernmental Panel on Climate Change (IPCC). The IPCC is a scientific intergovernmental body established in 1988 under the auspices of the United Nations and was assigned to evaluate the risk of climate change caused by human activity.

> It was stated that global GHG concentration would reach 650 ppm by 2030 follows the trend of the time now. It is far beyond their level of 450 ppm - a level at which the scientist believes that we can fully protect against catastrophic climate change with a global temperature increase does not exceed 2 degrees Celsius. According to
Project Catalyst, to limit greenhouse gas concentrations at a level that is safer, GHG emissions must be cut at least 35 GtCO₂-e in 2030 compared with current trends.

> Furthermore, the average cost of emission reduction potential Indonesia is relatively low compared with some of the options that the decline in developed countries. Opportunity cost and cost reduction in existing technologies indicate that Indonesia has estimated the average cost of approximately 3EUR-ton CO₂-e before 2030.

Options for Low Carbon Development Indonesia in this opportunity and Emission Reduction Policies Manufacturing Sector are as the followings [3]:

> The manufacturing sector is one of the largest sources of GHG emissions from fossil fuels in Indonesia. This sector is accounted for more than 40% of gas emissions from fossil fuels in 2005 (including the generation of electricity for the manufacturing sector), and increased by 6% a year.

> Assessing options without sacrificing low carbon development goals.

Practical and integrated approach to managing emissions of manufacturing sector in particular some key sectors, and moreover it is necessary of cost-effective emission reductions. Basic screening conducted multilevel approach (multi-tiered screening approach) (Badan Kebijakan Fiskal, Departemen Keuangan RI, 2008) [4] is generated as follows:

- 4 major economic sectors as the largest contributor to GHG emissions are namely nonmetallic mineral products; textiles; basic metals, food and beverage; including garments, pulp, porcelain, auto parts, fertilizers, and rubber crumb. The important subsector in value added are textiles, garments, transportation, food and beverages; annual growth rate: auto parts, non-metallic mineral materials; economic double effect: food and beverages and textiles.

- Increase the cost-effective energy efficiency with the same potential: cement, metal, textiles, garments, food and beverages.

- High Priority: cement, building materials porcelain, single artificial fertilizers, weaving, textile fibers, textile so, crumb rubber.

- Medium priority: steel mills, iron and steel basic industries, pulp, spinning, motor parts, spare parts, culture paper, tires and inner tubes, vegetable oil and crude palm oil, basic chemicals.

- Details: 20 biggest greenhouse gas-producing industry: 8 industry groups as a high priority with > 7 metric; 9 other groups as a medium priority with 4.5 metric.

- Appropriate action with 3 categories: management and implementation of energy efficiency; investment specific technology; efficiency standards.

- What needs to be followed include: large capital-intensive industry with a number of little and industry groups consisting of a large number of small and medium enterprises. Intervention: energy audits and efficiency standards.

- Option fiscal policy: additional incentive for example the rules on depreciation.

Energy policy and climate change in the context of Indonesia's energy security through conservation and diversification pursued through efforts to efficiency, fuel switching, renewable energy, and the use of clean energy technologies (Figure 6) (Departemen Energi dan Sumber Daya Mineral, 2009) [6].

**Energy Policy and Climate Change**

**Global Situation Climate Change**

**Indonesian Law No. 3/2007**

**CONSERVATION**

**DIVERSIFICATION**

**Energy Security**

**Available Accessible Affordable Acceptable**

**Resources Management**

**Energy Resources**

**CO₂ Emission Mitigation**

**Things to do**

- Efficiency
- Fuel switching
- Renewable
- Clean Energy Technology

**Policy**

**STRENGTHEN ENERGY SECURITY WHILE LOWERING CO₂ EMISSIONS**


*Figure 6. Energy policy and climate change in Indonesia*
Estimated CO₂ emissions rising trend of Indonesian industrial sectors, electric power, transportation and household of the year 2010 amounted to about 500 MtCO₂e (0.5 GtCO₂e) to about 875 MtCO₂e (0.875 GtCO₂e) in 2025 (Figure 7) (Departemen Energi dan Sumber Daya Mineral, 2009).

Figure 7. Estimates of CO₂ emissions by sector primary users


Figure 8. Energy resources distribution in Indonesia

3. Conclusion and Recommendation

a. Global efforts need to be implemented through joint action programs which have been swore, in order to achieve that goal of climate change mitigation happened causing the global warming due to GHGs emission form the potential sectors such as REDD, manufacturing industries, transportation, households and others. The developed countries should support the developing countries through may ways to have capacity building spirit in the forms of such as mitigation adaptation, finance (green climate fund/GMF), technology transfer, etc. to overcome their development as well as additional environmental burden. In other words, the developed countries must take the lead, quick funding, and commitment to the development of low carbon. In fact, sooner or later that all the nations and governments should take into real action that has been initiated and formulated by the international bodies to overcome the climate change to meet the demand of the humankind interest of green climate life.

b. The Government of Indonesia (GOI) has put all their efforts with the establishment of the National Council on Climate Change, in particular the Ministry of Finance together with relevant ministries and institutions in the Climate Change anticipate problems in relation to economic development, also has been working with international governments and institutions and universities in the country in the fields of institutional and fiscal matters, in addition to handling the Climate Change feels national wide also be integrated in the thinking of the solution.

c. In a way, the correlation between the natural carrying capacity and population pressure will be inverted. At first the natural carrying capacity is higher than the pressure of the population. In the next period, by the growing strength of population pressure, the natural carrying capacity decreases and the pressure is getting stronger and the population will soar higher. In the global effort is necessary that the carrying forward of this nature should be higher than the pressure of the population, for the purpose of environmental policies reached the man living in a good environment and healthy living (Figure 8).

![Figure 8. Graph of population pressure and the nature carrying capacity vs. time](image)
The population pressure is related with how to control the population growth rate. Program of family planning should be promoted in every country as global action. If it is necessary with zero population growth. The carrying capacity of the earth is very limited but the human need is ever growing over time. The facing critical global problems among others are scarcity of food, energy and water resources. For instance the available water in the earth, its quantity is consisted of 97% as salted water such as sea water, 2% as antarctic ice water or snow and only 1% of freshwater. One of the burden of the nature is gasses emission from the human activities. In the case of how to control in gasses content in the atmosphere is just following the US-EPA standard.

References


