CHAPTER I

INTRODUCTION

1.1 Background

The 17 Sustainable Development Goals (SDGs), which are an urgent call for action adopted by all United Nations member in 2015. Developed and developing or emerging countries acknowledge that to end poverty and other deprivations are collective efforts from all. Strategies to improve health and education, reduce inequality, and prompt economic growth while tackling climate change are elaborated in 17 SGDs. Climate risk is real, we all know and unfortunately some of us had first-hand experienced on the impact of Climate risk such as physical impact from increasing natural disaster, flood, forest fire, increased damaged to crops/rice production due to prolonged drought, warmer global temperature. Report shows that the average world's surface temperature has risen about 2.12 degrees Celsius since the late 19th century, which driven mainly by the increased carbon dioxide (CO2) emission and other human activities. Based on the Climate Risk Country profile issued by USAID in 2017[1], Indonesia facing a future climate risk such as projected climate change in 2050 which includes increased temperature of 0.8 – 2 degrees Celsius, with greater warming over large western islands i.e Sumatra, Java, Borneo; sea level rise of 150-450 mm by 2056.

On Climate risk, this is related to the SDG number 13, "Take urgent action to combat climate change and its impact" and The Paris Agreement (legally binding

[1] Template (climatelinks.org)

international treaty on climate change) adopted by 196 parties in Paris in 2015 and later came into force in 2016. With the goal to limit global warming below 2 degrees Celsius (preferably to 1.5 degrees Celsius compared to pre-industrial level), this is a journey that require collective effort globally from countries. Under Paris Agreement, countries are required to submit their plans in tackling climate action known as Nationally Determined Contributions (NDCs). In the NDCs document, countries outline actions that they will undertake to reduce the Green House Gas (GHG) emission as part of the contribution to reach the goal of Paris Agreement as well as actions undertake to build resilience to adapt to climate change.

The first Indonesia NDCs submitted in 2016, outlines its transition plan to a low carbon and climate resilient future, which focusing on Mitigation Sectors (Energy, waste, industrial processes, and product use (IPPU), agriculture, and forestry) and Adaptation Sectors (Agriculture, water, energy security, forestry, maritime and fisheries, health, public service, infrastructure, and urban system). Indonesia is the 4th populous country in the world, with the largest economy in Southeast Asia and the 16th largest in the world, further projected to be the top 10 world economy by 2030. In term of GHG emission, as of 2018 Indonesia is the world's eight biggest GHG emitter and has an ambitious target to cut it by 41 % by 2030 (conditional, and 29% unconditional), further setting net zero emissions target by 2070. Based on the 2nd Biennial Update Report (BUR), Indonesia national GHG emissions was 1.457 Gg CO2e in 2016, which was dominated by emissions from land use change and forestry including peat fires (43.59%) and energy (36.91%). With this ambitious target setting and current situation as a

starting point, there are a lot of homework to be done in between.

Despite CO2 is not the only substance in GHG that adversely impact global climate change, but it is the dominant substance produced in GHG. CO2 produced from the burning of fossil fuels, industrial production, and land use change. These activities have adverse impact to climate because of the CO2 emission. In Indonesia context, it is known that economy growth, which one of the indicators referred to is GDP, has been growing significantly in the past as well as projected to grow in the coming years.

This research also outlines the alternative in tackling climate risk, taking from the angle of potential Carbon offsetting mechanism. Carbon offsetting mechanism is referred to one of the mechanisms under Kyoto Protocol which was adopted back in 1997 and later came into force in 2015. Kyoto Protocol is governed under United Nation Framework Convention of Climate Change (UNFCCC) and committing industrialized countries in transition to limit and reduce GHG emissions in accordance with their individual targets. The Protocol was based on the principle of common but differentiated responsibilities which acknowledged that each countries have different capabilities in combating climate change. Despite it only binds developed countries (known as Annex I parties), Kyoto Protocols provides a flexible market mechanism (Clean Development Mechanism, Joint Implementation and Emissions Trading) that can be use as a reference to limit or reduce GHG emissions, thereby creating what is now known as the carbon market. Indonesia categorized as non-Annex parties (without binding target) under Kyoto Protocol and has signed The Protocol in 1998 and further ratification in 2004.

This has come into the picture in the back of Indonesia geographic condition with extensive tropical rainforests hence can be a source of high carbon stock. With the aim to create a future low carbon economy, transition progress to the clean or renewable need to be supported with the technology and more carbon reduction project (e.g creation of removal unit on the basis of reforesation), this is not something that could be achieved overnight. The decarbonization journey need strong push and collective effort, it is not going to be easy, yet it is possible. In this research, the extended topic is on the decarbonizing the economy which referring to the transformation from current condition to the future state of low carbon economy. With the current pace of transition, it is not fast and good enough, we need a catalyst to reduce the carbon as an effort in balancing carbon emissions, one of the mechanisms is creating carbon offsetting.

Carbon offset is a reduction in emissions of carbon dioxide or other greenhouse gases made to compensate for emissions made elsewhere. The commitment to reduce GHG is aligned with Paris Agreement and referring to Kyoto Protocol on the flexible market-based mechanism[2], there are three market-based mechanisms:

1. Clean Development Mechanism (CDM)
2. Joint Implementation (JI)
3. Emissions Trading (ET)

CDM and JI are the two project-based mechanisms which feed the carbon market. The CDM involves investment in emission reduction or removal enhancement projects in developing countries that contribute to their sustainable development,

[2] https://unfccc.int/process/the-kyoto-protocol/mechanisms

JI enables developed countries to carry out emission reduction or removal enhancement projects in other developed countries. While ET allows creation of the Carbon credit by countries that produce in the form of emission reductions or removals as opposed to the emission. Carbon Credit is the tradeable instrument or commodity in the form of carbon emission reductions or removals. One real action is creation of Voluntary Carbon Market (VCM) where individuals, corporations can take part in the Carbon offset in the absence of Regulatory Carbon Market. And one of the Carbon Credit produced from projects or activities generated under CDM (i.e Certified Emission Reduction), Carbon Credit need to pass certain verification from certified independent parties beforehand e.g The Gold standard, Verified Carbon Standard – Verra, etc. Under these two frameworks, the sellers or producer of Carbon Credit could be corporations or concession holders that focus in operating or financing carbon reduction project, while the buyers can be anyone with different purpose ranging from personal investment, reputational aspect, Corporate Social Responsibilities agenda, corporation operate in high CO2 emission sectors e.g Coal, Oil and Gas, Cement.

It is imperative, motivating, and beneficial to investigate if there is any relationship between GDP, Energy Consumption and CO2 emission. Put these variables altoghether, this thesis is meant to test and answer the question of whether there is any relation between GDP, energy consumption and CO2 emission both in short-term and long-term. And subsequently the potential financing opportunities that are available as part of action in tackling the Climate Risk. Some of the foreseen opportunities are the project financing where Corporation, especially those in high-intensive carbon sectors such as Minings,

Oil and Gas, Power, Infrastructure, need capital and specialized financing in transformation journey to the low carbon economy e.g Project finance, Green Bond issuance, Carbon Credit offsetting. Hence while economic in vast growth mode, there is an urgent need of comprehensive pathway and real action to promote sustainable development in Indonesia.

1.2 Problem Statement

Problem statement in the study elaborated as follow:

- Is there causal relationship between GDP growth, Energy Consumption and CO2 Emissions?

1.3 Research Objective

The objective of this research is to test whether there is a causal relationship between GDP, Energy Consumption, and the CO2 emissions. The research is also aimed to build awareness on the real Climate risk that we are facing as a nation that is in emerging or growth mode. Energy plays a vital role in economic development and also a potential key for sustainable development going forward.

1.4 Significance of the Study

As mentioned above, the research is to test the causal relationship between GDP, Energy consumption and CO2 emission. By understanding this, it is also aimed to build the awareness on the current situation as the economy and energy consumption continue to grow while at the same time resulting to adverse impact

to the environment with the CO2 emission. Subsequently, this research also intended to think one step further on what opportunities in the back of urgency of Climate risk. Which come to the suggestion of financing opportunities, especially for Indonesia corporation that working on transformation to a low carbon economy. This is where Financial Institution is expected to take part in the financing role given the need of capital and investment in the transformation jpurney.

In addition, this research intended to raise awareness for the respective policy maker on the potential implementation of Carbon offset and creation of the Voluntary Carbon Market in Indonesia and why this should be considered as one of the alternatives in decarbonization with reference to other countries that already have an established Carbon Market (Emission Trading System). This is become more crucial as currently in Indonesia this is still considered as an early stage of development of renewable or green energy or technology and a start of journey towards low carbon economy.

1.5 Scope and Limitation of the Study

This research conducted to the certain extent and limitation, which are outline as follow:

- Country Specific

  This research is country specific, conducted for one country which is Indonesia.

- Period of Data (Data range)

Data range or Data set used as an underlying in this research is for period of 1971 to 2014. Data is secondary and is sourced from Word Bank data. The period limtitation is due to unavailability of recent data for one of the variables in the research (Energy Consumption), hence the period of research is limited from 1971 to 2014. It is noted that Energy consumption data for Indonesia is only available till the year of 2014 while the other variables more recent data is available up to 2018.

- Variables

  There are three variables considered in the research, which are GDP (independent variable), energy consumption (independent variable) and CO2 emission (dependent variable). it is noted that more than two independent variables can be taken into account for subsequqnt and more extensive research.

- Ceteris Paribus assumption

  In this research, there is assumption built in which is ceteris paribus. Meaning that all other things are assumed of being unchanged or constant.