Carbon trading system as a climate mitigation scheme: why Indonesia should adopt it?

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Abstract. Peatland fires and deforestation are prominent environmental issues in Indonesia due to industrial and plantation activities. The Indonesian government is pressured to take mitigation measures to overcome the issue since there are legal obligations to do so. One of the climate mitigation strategies is by establishing a carbon market in which the entities will be assigned certain ‘permits’ on how much greenhouse gases (GHG) emissions can be emitted, and when they have exceeded their ‘permits’, they are allowed to buy ‘extra permits’ from the other entities who still have the spare. This market has been adopted by the European Union (EU) and other countries in Asia. Therefore, this paper aims to introduce the carbon market concept by taking into account its implementation in the EU, as well as analyse how the market can become one of the climate mitigation policies in Indonesia. The research uses a doctrinal methodology that involves an in-depth legal analysis of the regulatory framework related to the issue. The authors found that the market will enhance the REDD+ Project and projected to bring revenues. However, there are challenges due to the absence of technology and the number of stakeholders involved.

1. Introduction

Indonesia as an archipelago with over 13,000 islands keeps experiencing annual issues on peatland fires and deforestation [1]. One of the biggest case of peatland fires happened in 1997, in which the fires resulted in approximately 13-40% of global carbon emissions that year [2]. The issues eventually adding pressure for the Indonesian government to take immediate action to overcome this issue.

Peatland fires are prominently caused by a prolonged dry season and the habitual clearing land, in which the desiccated surface of the carbon-rich peat soils are ignited far beyond the intended areas [3]. Clearing the land using fires initially started as a traditional method from the agricultural farmers in the past. However, large companies (such as companies producing palm oil and papers) wanted to expand their business and ended up using the same method to multiply their production. This practice will eventually have a negative impact on the environment since peatland has a crucial role in the process of carbon sequestration and it is the most effective-stocks carbon than the entire forest biomass of the world [4].

The toxic haze and greenhouse gases (GHG) emitted from the fires have damaged the economy, health, and international relations since the emission also affected the air quality in neighboring countries such as Singapore and Malaysia. Indonesia has become one of the biggest GHG emitters in the world since the problem keeps happening every year. There is a pressure from the international...
forum towards the Indonesian government since environmental issues such as peatland fires in the abovementioned paragraph could actually lead to a climate change that happens at a global scale level.

Adaptation and mitigation are two major ways to reduce the risks and negative impact of climate change. Adaptation is one of the measures on reducing climate change by integrating policy development and decision-making process that can foster synergies with development and disaster risk reduction in a long-time perspective.[5] On the other hand, mitigation combines measures in a more effective and timely manner, which involves reducing energy consumption, decarbonizing energy supply, reducing net emissions, and enhancing carbon sinks in land-based areas [5]. Implementing mitigation measures will likely reduce the CO2 concentrations to low levels (approximately 450 ppm CO2-eq), and will result in the limitation of temperature increase to 2°C above pre-industrial levels [5].

Kyoto Protocol is an international agreement that serves as a legal basis for cooperation between the state parties to participate in the GHG emissions reduction. It establishes the legal obligations of the Annex I countries for the period 2008 to 2012 to reduce their GHG emissions rates by the minimum of 5% below the 1990 levels [6]. Part of the signatories parties are the European Union and the United States. The emissions of the industrialised countries had dropped 20% from 1990 levels by the time it reached the year of 2012 (five times the Kyoto targets of the remaining nations) and the European Union had successfully reduce the emissions by 19% [7].

Kyoto Protocol also sets out a mechanism for the state parties to conduct International Emission Trading as stipulated under Article 17. Emission trading will encourage the private sectors to acquire emission units from developing countries using a market-based mechanism. The scheme enables entities to be allocated allowances for their emissions, by trading their surplus of allocated allowances to the other entities that cannot reach their target [8]. International trading log in the form of a software-based accounting system ensures a secure transfer of emission reduction units between the parties [6]. This eventually created a new commodity which is emission reductions, tracked and traded between the countries to ensure that the emitters are able to stay below their limit [6].

The European Union is a dominant market which has implemented their own Emission Trading Scheme (ETS). The system is authorised by the European Commission, using the Union Registry, an online database whose function is to record the annual reconciliation of allowances (cap) and verified emissions of each company [9]. On the Asia level, Japan, China, and South Korea have established their own carbon market in compliance with the Kyoto Protocol. In 2005, Japan introduced a Japanese Voluntary Emissions Trading Scheme (JVETS) as part of its Keidanren Voluntary Action Plan to reduce the GHG emitted by the Japanese companies [10]. It resulted in a cumulative emissions decrease of the total 389 companies that participated in the JVETS.[10] China and South Korea on the other hand, have collaborated with the European Union to achieve the target for their GHG emission reduction and paving the way for more widespread uptake at a global scale level [11].

Indonesia has ratified a number of international laws in its participation to tackle the negative effect of climate change. Moreover, Indonesia has established its national laws as an addition to the former. Therefore, this paper aims to introduce the concept of carbon market and how it could be beneficial for the Indonesian government to adopt such concept in regards to reduce the GHG emission rates as part of its legal obligations.

2. Methodology
The research uses a doctrinal methodology consisting of a simple research that aims to find a specific provisions of the law as the legal basis and an in-depth legal analysis [12]. There will be a brief description on the Indonesian regulatory framework on climate mitigation to create a general legal basis on this paper. Afterwards, there will be an analysis on the advantages and challenges of implementing a carbon trading system in Indonesia. However, the paper will also take into account the European Union ETS to give the reader a better grasp on the mechanism and how the carbon market works.
3. Results and Discussion

3.1. Indonesian Regulatory Framework on Climate Mitigation

The outline of Indonesian regulatory framework on climate mitigation will be further described as follows:

3.1.1 National Laws. Indonesia has established several national regulations concerning climate mitigation. Law Number 32 the Year 2009 on Environmental Protection has the objective to enhance the environmental planning policy and decision making, as well as ensuring the monitoring, evaluation, and control of the exploitation of the environment [13]. The regulation mostly consists of provisions on permits and licenses on the correct procedures to exploit the environment commercially, ensuring the balance between the needs of the businesses and the obligation to preserve nature. In addition, Presidential Decree Number 61 Year 2011 on the National Action Plan for Reducing Greenhouse Gases Emission serves as the guidelines for the Indonesian government for the implementation and evaluation of the national plan to reduce the emissions, whereas Presidential Decree Number 71 Year 2011 on Conducting National Greenhouse Gases Inventory is the commitment of Indonesia to achieve its climate mitigation target [14].

3.1.2 International Agreement. Indonesia has ratified a number of international agreements related to climate adaptation and mitigation as a supplement to the national laws. Those international agreements, inter alia, United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol, and Paris Agreement.

UNFCCC has the objective to reduce the GHG emission in less than 2°C rise above the pre-industrial level by requiring all the state parties to work closely to put effort in reduce the negative effect of climate change. Indonesia ratified UNFCCC in 1994 and was listed as a Non-Annex I country (developing country). Therefore, Indonesia has the opportunity to cooperate with Annex I – Annex II countries to receive the fund and transfer of technology in implementing measures to reduce the GHG emissions.

As a follow-up to the UNFCCC, the Kyoto Protocol was then established in 1997. It acknowledges the fact that the emission rates in the developing countries should be reduced for climate protection to succeed globally.[15] Indonesia is one of the parties to the protocol and has ratified the agreement into Law Number 17 Year 2004 the Ratification of Kyoto Protocol. Therefore, as the developing country listed in the agreement, Indonesia will be able to benefit from the Clean Development Program by receiving a transfer of technology from the developed countries. The Clean Development Program is a cooperation plan between developed and developing countries to achieve the emission reduction goals set in the Kyoto Protocol.

Lastly, Indonesia has also ratified the Paris Agreement through the establishment of Law Number 16 Year 2016 on Ratification of Paris Agreement. It serves as a legal basis for Indonesia to implement measures to achieve the global emission target while at the same time receiving the technology transfer and financial funds.

3.2. The Emission Trading Scheme in the European Union

As the first and the biggest carbon market in the world, the Emission Trading Scheme is a cornerstone to combat climate change and a keypoint to reduce GHG emissions within the European Union [9]. The carbon market will enable emissions trading between companies, in which certain allowances (the amount of GHG emissions that can be emitted) will be allocated for each company. In the event of the company has exceeded its allocated allowance, they are allowed to buy a spare allowance from the company that has a surplus in its allowance [8]. The participants of the market may vary from energy-intensive industrial sectors, steel mills, iron and steel industry, and commercial aviation industries from 31 countries in the European Economic Area (EEA) [8].

The mechanism works as a ‘cap and trade’ in which the allowances are limited with a cap and can be auctioned through the market. Article 10 Directive 2003/87/EC requires that most allowances are allocated free of charge and the rest of the allowances can be auctioned in the market [16]. Therefore,
in align with that provision, 95% of the allowances will be distributed free of charge during the first phase (2005-2007). In the phase II, up to 10% of the allowances can be auctioned by the Member States without further constraints being specified [17].

The formats of the auction can be divided in two ways: 1) Ascending bidding auctions (bidders have the option to increase their bids while the auction is taking place), and 2) Sealed bidding auctions (bidders are only allowed to submit their final bids).[17] The auction in the carbon market will use a lot size; the number of allowances per unit of the auctioned product (the minimum lot size is 1,000 allowances/1,000 metric tons of CO2) [8]. The minimum lot size sets to not restrict the participation, but also to ensure effectiveness since it will be costly to participate in trading less than 1,000 allowances/1,000 metric tons of CO2 [8].

The revenue obtained by the Member States from auctioning the allowances can be used for various purposes up to the Member States to decide, although it is encouraged that the revenue can be allocated in climate and energy sectors. Approximately 80% of the revenue obtained from the Emission Trading Scheme has been used or allocated for climate and energy-related purposes within the European Union [18]. It is said that the implementation of the Emission Trading Scheme has subsequently reduced the GHG emission within the European Union. Most of the emission reduction was observed in the second trading phase of the European Union ETS: the first phase resulted in the impact of -6% and -15% in the second phase [19].

3.3. The Advantages of Implementing Carbon Trading System for Indonesia

As we have a better understanding on the carbon trading system from the European Union, we can move on to the proposal on why this system could also be benefitting Indonesia. The concept of carbon market has been adopted by several countries in Asia (e.g. South Korea, China, Japan). In Korea, the carbon trading system has become a core policy in GHG reduction policy, and has generated a steadily increasing carbon price that can drive increasing levels of low carbon action [20]. Likewise, in China, its Emission Trading Scheme is set to become the world’s largest carbon market and will expand to include eight sectors and cover 4.5 billion tonnes of emissions [20].

In the abovementioned section on Indonesian regulatory framework on climate mitigation, it is said that Indonesia is a party to the UNFCCC, Kyoto Protocol and Paris Agreement. The Paris Agreement itself aims to “keep the temperature rise below 2°C above pre-industrial levels and take in measures to limit the temperature increase to 1.5°C above pre-industrial levels”. Therefore, there is an obligation for Indonesia to implement measures to reduce GHG emissions, aligned with the objectives of those conventions.

Indonesia has introduced the proposal on its carbon trading market through Skema Karbon Nusantara (Archipelagic Carbon Scheme). This scheme is a mechanism for certification and registration results of any reduction activities of GHG emissions [21]. However, this scheme is voluntary, meaning that there is no legal consequences or legal obligation for any unwilling participants. The mechanism works as follows:[21]

1) The output of this certification is carbon credits named as Unit Karbon Nusantara (Archipelagic Carbon Units). One unit of these credits equals a reduction of one tonnes of carbon dioxide (CO2). Therefore, every carbon credit issued will be registered on the database and can be used to replace the emission of GHG by the credit owner.

2) The ownership of carbon credits can be transferred among registered users which will enable the trading of carbon credits. However, this certification mechanism is unrelated to any policies or decision making of the Indonesian government on the effort to reduce the GHG emissions.

This mechanism adopted a cap and trade system which has been conducted by the European Union. The cap and trade system will require verification for any GHG emissions according to the allowances assigned for an entity. Therefore, any surplus for allowances can be traded by the entity through a carbon market, and the other entities that exceed their allowances can reduce their GHG emissions by buying those surplus [22]. The scheme itself will cover the sector of renewable energy, industry, waste treatment, reforestation and reforestation, REDD, and agriculture.

Implementing a carbon trading system as part of Indonesia’s mitigation measures will help to ensure the effectiveness of REDD+ Project (Reducing Emissions from Deforestation and Forest
Degradation) - mitigation plan as the outcome of Bali Action Plan. REDD+ Project is a form of cooperation plan between the developed countries and the developing countries to initiate a plan to preserve the carbon sinks remained in the developing countries. The developed countries should assist its counterpart (the developing countries) in developing strategies to reduce deforestation and addressing the poverty issues by also taking into account the socio-economic settings of the local and indigenous people, in which their livelihood mostly depends on the forest [22].

REDD+ Project has several objectives such as reducing the emissions due to deforestation and forest degradation, sustainable development of the forest, and conservation of the carbon stocks. The project includes the possibility of trading the carbon stocks, in which it would have been lost if the forest had been cut down or cleared. The concept is for the developed countries to provide some funds for the developing countries in return of the ability of the developing countries to take measures in forest conservation and the loss of carbon in the atmosphere [23]. Therefore, both countries will equally cooperate in its effort to reserve the carbon sinks and reduce the climate change.

The challenges in REDD+ Project is mainly due to the economic drivers behind the peatland fires and deforestation. The existence of a carbon trading scheme will enhance this project and substantially reduce the GHG emission, especially if the price of the carbon is high enough to become an incentive for the inventors to innovate and come up with a new business plan to preserve nature [24]. The absence of a carbon market in carbon trading will result in the differences in the carbon price as the result of negotiations between the two parties and the carbon price formed in carbon exchange [24].

At the international scale, the carbon market can benefit Indonesia in terms of revenue. There is a projection for revenue from carbon trading of Rp. 51 trillion to Rp 180 trillion during the carbon emission reduction program [24].

3.4 The Challenges from Implementing Carbon Trading System in Indonesia

Therefore, we identify several challenges in implementing domestic carbon trading systems in Indonesia which will be described below:

a. Indonesia currently does not possess the facilities to create its own carbon market including adequate systems needed for emission reduction calculations [25].

b. Carbon credits or tradable allowances should be recognised as financial products and it should be managed by financial markets. Indonesia does not have the necessary policy instruments and institutional set-up yet on regulating those matters [26].

c. The proposal on Skema Karbon Nusantara (Archipelagic Carbon Scheme) is a voluntary scheme, in which it does not have legal consequences for any entities who are unwilling to report and certify their GHG emissions. There should be an identification on which sectors and the amount of allowances allocated by the government to ensure that the GHG emission emitted by the entities within those sectors in check.

d. Carbon trading system will require participation and cooperation from a lot of stakeholders. Prominently, it will require Ministries and Institutions in charge of the GHG emissions reduction program to collaborate to ensure that the implementation of the carbon trading system could achieve the objectives of emission reduction per sector [26].

4. Conclusion

The European Union currently has the biggest carbon market in the world and it has significantly reduced the GHG emission throughout the years. The carbon market mechanism in the European Union uses a cap and trade system in which each Member States will set their threshold of GHG emission rates that can be emitted by companies under the determined fields. Therefore, in case those companies have exceeded the threshold, they will be allowed to buy the remaining allowances from companies who emitted less.

In Indonesia, there is a proposal for a carbon market through Skema Karbon Nusantara (Archipelagic Carbon Scheme). The implementation of the carbon market in Indonesia will help the compliance with the existing international conventions on climate mitigation, as well as be projected to bring revenue for the country. The prominent advantage of this market is to enhance the implementation of the REDD+ Project, in which it has become an incentive for the developing
countries to implement such measures to preserve their remaining tropical forests. However, there are some challenges on the implementation of carbon markets in Indonesia such as the absence of adequate systems needed for emission reduction calculations, Indonesia currently does not have the necessary policy instruments and institutional set-up yet on regulating carbon credits, the voluntary scheme in Skema Karbon Nusantara (Archipelagic Carbon Scheme) is not legally binding, and lastly the market will require participation and cooperation from a lot of stakeholders.

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