



## Comparing “Carbon Tax” and “Cap and Trade” as Mechanism to Reduce Emission in Indonesia

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### ABSTRACT

Due to the high utilization of carbon results to environmental problems in most provinces in Indonesia, it can be concluded that Indonesia in urgently requires mechanism to solve environmental issues. Many attempts have been conducted by Government of Indonesia to solve the issues such as ratification of Kyoto Protocol and Paris Agreement, further the proposal on Nusantara Carbon Scheme (*Skema Karbon Nusantara* abbreviated as “SKN”). Unfortunately, the proposal has not adopted yet up to 2021. Calculating based on current situation, Indonesia’s greenhouse gas emissions are predicted to increase to 1.573 and 1.751 MtCO<sub>2</sub>e in 2030, which contrary to the commitment under Nationally Determined Contribution (NDC). There are several options of mechanism to be adopted, the most popular mechanism that deems highly effective are cap and trade as well as carbon tax. Many mechanisms adopted in different countries, it is important to assess which mechanism is more effective to be applied in Indonesia. Therefore, this research is conducted to assess difference on the effectiveness on carbon tax and cap and trade, examine current Indonesia’s stance towards the issue, and assess legal principle to be considered when applying the mechanism in Indonesia.

**Keywords:** Carbon Tax, Cap and Trade, Indonesia

**JEL Classifications:** K32, K34

### 1. INTRODUCTION

Due to the high utilization of carbon results to environmental problems in most provinces in Indonesia, among others, air and water pollution in megapolitan cities such as Jakarta and Bandung; loss of the country’s valuable forests due to unsustainable agricultural practices in the provinces of Sumatra, Kalimantan, Sulawesi, as well as Papua and West Papua; haphazard urbanization phase that results in traffic and urban sprawl; loss of fisheries, water supplies, and the country’s vibrant biodiversity; and contribution to the detrimental impacts of global climate change, such as sea level increase, severe weather disasters, and lower productivity as a result of increasing temperatures (National Development Planning Agency, 2019). Based on the facts presented, it can be concluded that Indonesia in urgently requires mechanism to solve environmental issues.

Many attempts have been conducted by Government of Indonesia to solve the issues. One to mention is the adoption of Kyoto Protocol which has been ratified in Law No. 17 of 2004 Ratification of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (“**Law 17/2014**”). The Kyoto Protocol’s general principles sought to reduce greenhouse gas pollution by developing nations, as well as the right to extend credit for lowering emissions, quota exchanges, and foreign reimbursement (Sindico, 2011). In term of mechanism of reducing the number of emission, Kyoto Protocol provides flexible mechanism which consists of Emission Trading (ET), Clean Development Mechanism (CDM), and Joint Implementation (JI) (Anggraini, 2009).

Other than Kyoto Protocol, the most current international law instrument that encourages the reduction of amount of carbon is Paris Agreement which was discussed at the UNFCCC COP 21 in

## 2. LITERATURE REVIEW

### 2.1. Carbon Tax

According to Piquou (1932), if in an economic activity it is recognized that there is an externality, then government intervention is required to impose taxes on these externalities. This view is based on the theory of prosperity (welfare theory) which states that if the individual considers all the impacts of their economic activities, including external impacts, it is necessary to have optimal measurement of the resources owned by society. The OECD defines an externality as a situation when the effects of the production or consumption of goods and services cause costs or benefits that are not reflected in the prices of the goods and services provided (market failure). Furthermore, based on the impact, there are two kinds of externalities, namely positive externalities and negative externalities.

If the impact that arises is in the form of benefits, it is called a positive externality, for example, namely the construction of a new road that fosters the economy of the community around the road. Meanwhile, if the impact that arises is in the form of costs, it is called a negative externality, for example pollution and pollution that damage the ecosystem is an example of a negative externality. Further, carbon emissions are a form of negative corporate externalities (Rosewarne, 2010).

One of the market-based policies that can be used to overcome problems caused by carbon emissions is the carbon tax policy (Barde and Opschoor, 1994; Cornwell and Greedy, 1996). In general, this policy aims to encourage business entities or companies to reduce the amount of their carbon emissions. Thalmann (1997) states that carbon tax is another term for emission tax, where the emission tax itself is a form of environmental tax. Furthermore, environmental taxes are a manifestation of the classic incentives for the Pigouvian Tax. According to this principle, environmental damage must be replaced by the party that caused the damage.

According to United Nations Environment Programme (2014), carbon tax policies aim to ensure that companies that emit carbon pay compensation in the amount of damage they cause (the polluter pays principle), according to Brown (1992) research results. In addition, the carbon tax policy is also useful for increasing state revenue. In terms of costs, the application of carbon tax policies is far more economical when compared to implementing other policies that are not market-based. Furthermore, UNEP also stated that the carbon tax policy would encourage companies to increase transparency in reporting their business activities. The transparency of business activities is in the form of including the amount of carbon emission resulting from its business activities. The total carbon emissions of a company consist of emissions that are directly related to the company's business activities (for example: gasoline for operational cars), as well as from emissions that are not directly related to the company's business activities (for example: electricity use and the company's supply chain activities). An additional requirement for the imposition of a carbon tax policy is the existence of a legal umbrella that mandates the tax collection authority in a country to impose a tax on carbon

December 2015 and has been adopted by Indonesia through Law Number 16 of 2016 concerning Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change (“**Law 16/2016**”), which opened a new chapter in the fight against climate change which considers as the source of all environmental problem. In the agreement, States Parties agree to take measures to hold global temperatures below 20 degrees Celsius. To carry out the Paris Agreement's pledge to limit global warming, States Parties should work together to meet their carbon mitigation targets, as set out in Article 6 of the agreement.

However, up to now there is no mechanism suggested by any international convention adopted in Indonesia. While it is important to be noted that Indonesia essentially shall reduce greenhouse gas emissions as stated in the Nationally Determined Contribution (NDC), a continuation of the Paris Agreement which has target by 2030 is 29% with its own efforts and 41% with international assistance (Government of Indonesia, 2016). If Indonesia does not conduct any strategy to reduce emission, Indonesia's greenhouse gas emissions are predicted to increase to 1.573 and 1.751 MtCO<sub>2e</sub> in 2030 (excluding the forestry sector) which clearly does not in line with the commitment stipulated under Paris Agreement (Climate Transparency, 2018).

Moreover, the data supported by facts that the State Electricity Company is intending to double the use of coal by 2017-2025 which highly impacted to the generate more emissions. Further, the government announced in 2017, that the government does not have any plant to build more electric steam power plant in Java Island, in an effort to achieve the national renewable energy target of 23% in the national energy mix by 2025. The rate of deforestation decreased to 60% during 2016-2017, most likely because there is a peat moratorium that has been in effect since 2016. Based on such facts, it concludes that Government of Indonesia is urgently required to adopt any measure to promote emission reduction in order to achieve the commitment stipulated under Paris Agreement.

Other than flexible mechanism which consists of Emission Trading (ET), Clean Development Mechanism (CDM), and Joint Implementation (JI) (Anggraini, 2009) provided by Kyoto Protocol, alternative mechanism emerges such as carbon tax. Carbon tax (energy tax/CO<sub>2</sub> tax) generally defines as a tax imposed on fossil fuels for the purpose of reducing emissions of carbon dioxide and other greenhouse gases (Glabush, 2015). Carbon tax considers as effective instruments available to achieve reduction of emission (Gandhi and Cuervo, 1998). Several developed countries such as Sweden, Finland and Denmark have been able to reduce negative externalities due to carbon emissions by 7-15% by using carbon taxes (Trudeau and Murray, 2011).

As many mechanisms adopted in different countries, it is important to assess which mechanism is more effective to be applied in Indonesia. Therefore, this research is conducted to assess difference on the effectiveness on carbon tax and cap and trade, assess legal stance of Indonesia with regard the current preference of mechanisms, and assess legal principle to be considered when applying the mechanism in Indonesia.

emissions issued by companies. The decision to issue regulations regarding carbon taxes is a sensitive national issue because it will significantly affect the wheels of the economy.

## 2.2. Cap and Trade

The fundamental idea is that carbon reductions are viewed like a tradable asset that can be purchased and sold in a market much as every other good. The aim of carbon trading is to incentivize industry actors to invest in renewable technology and creativity, resulting in increased productivity (NERA Economic Consulting, 2005). As a consequence, the requisite expenditure in lowering pollution would produce a measurable profit.

According to Article 17 of the Kyoto Protocol, countries with Kyoto Protocol obligations will purchase pollution units from other Kyoto Protocol countries and use them to reach a portion of their goals. The safe movement of pollution mitigation units between countries is ensured by a foreign transaction log, a software-based accounting system.

An pollution market (a kind of commodity exchange for emissions) or an over-the-counter (OTC) contract, which is a type of private transfer made either directly by one business to another or by a broker, may be used to trade secretly. The sale price of the pollution product, as well as the trend of price variations over time, is calculated by the supply and demand market system. The market authority should not intervene in the operation of the carbon market, however the permitted emissions quota is the primary determinant of the trading price (i.e. the level of the cap that is set by the authority). The smaller the ceiling, the greater the expense of abatement per ton and, as a result, the price of person exchanged carbon. (Zimmermann, 2006). Obviously, the price of exchanged carbon would not reach the amount of non-compliance fine per ton (Parry IWH, 2003).

## 3. METHODOLOGY

The type of research conducted in this research is normative legal research, in which this paper conducted library research. Referring to the statement of legal scholar Peter Mahmud Marzuki's, defines normative legal research as a step to find a rule of law, legal principles, and legal doctrines in order to answer legal issues at hand (Marzuki, 2005). Hence this paper, will utilize legal principles and legal doctrines to compare the effectiveness of carbon tax and cap and trade in relation with Indonesia stance towards the mechanism, as well as assess legal principle to be considered when adopting such measure in Indonesia.

Furthermore, literature research aims to obtain secondary data by analyzing legal theories and laws and regulations relating to carbon tax and cap and trade to be implanted in Indonesia. In this research, the techniques in obtaining data are literature study and interviews. In obtaining data through literature study, this study conduction examination and study on legal materials consisting of primary, secondary and tertiary legal materials (Amiruddin and Asikin, 2018). The primary legal materials examined in this study are domestic regulations and international instrument. While the secondary legal materials studied in this paper consists of legal publications

regarding official documents. Legal materials, such as textbooks, contain the principles of legal science and the views of experts.

While in obtaining data through interviews method, which explains as method of obtaining data acquired by inquires a resource person to obtain answers that are relevant to the research problem. The selected resource person for this study are 1 (one) energy expert and 1 (one) tax expert.

The approach taken on this study are statue approach and conceptual approach. Statue approach is carried out by reviewing the rules and laws and regulations relating to existing legal issues. Hence, in using this approach the consistency and suitability between one statute and another as well as between constitutions is examined so that it can answer the problems that are being studied. While the conceptual approach is carried out by examining the views or doctrines that develop in legal science so that they will get an understanding in building an argument in solving the issues at hand.

## 4. RESULTS AND DISCUSSION

### 4.1. Discussing the Quantitative Effectiveness on the Implementation on Cap and Trade as Well as Carbon Tax

As this research discussing with regards to the effectiveness on cap and trade and carbon tax, it is important to gain perspective on how much dangerous substances may be reduced by both applications. With regard to the implementation on cap and trade, may researches demonstrate that cap and trade has long been shown to be both environmentally and economically beneficial. To date, the available literature suggests annual average attributable emission reductions in the European Union is between 40 and 80 MtCO<sub>2</sub>/yr. This represents around 2% to 4% of the overall capped pollution (Laing et al., 2013).

While the effectiveness of carbon tax according to Ghazouani's study, the findings of various methods of calculation allow for the observation of an optimistic and substantial impact of the carbon-tax on the stimulation of CO<sub>2</sub> emission reduction. The carbon tax has a favourable and substantial effects, with a decrease in the overall effect of the treatment varying from 2.61 percent to 3.04 percent over the whole time, according to the nearest neighbor approach used for matching (ATE). Specifically, the distinction between the care and control nations. The overall impact of the procedure on the vector handled (ATET) was positive and important for the whole time, varying from 2.29 percent to 2.55 percent. The results of the analysis indicate that encouraging carbon-tax policies will greatly motivate CO<sub>2</sub> emissions reduction in the European Union. The findings that mentions that carbon-tax policies have a favorable effect on CO<sub>2</sub> reduction, are compatible with the researches obtained by Lin and Li (2011) for Denmark, Sweden, and the Netherlands, as well as Borozan (2018) and He et al. (2019) recently published related findings for the European and G7 nations, respectively.

Hence it can be concluded that the quantity of effectiveness between Cap and Trade as well as Carbon is relatively similar, which is between 2%-4%.

## 4.2. Comparing Advantages and Disadvantages of Cap and Trade with Carbon Tax

There are many obvious advantages of implementing a carbon tax rather than an ETS. It's easy, doesn't include a complex monitoring, reporting, and verification (MRV) scheme, and can be implemented utilizing the current tax administration framework. All of these topics will be included in this Handbook. Carbon taxes, on the other side, have the disadvantage (at least in their purest form) of not allowing for the establishment of a certain amount of emissions that can be allowed. In addition, offsets are not allowed. Carbon taxes neglect the geographic nature of climate change in this manner, as well as the idea that carbon emissions may be minimized (though not completely) in an area other than where it is produced. This disadvantage may be mitigated to some degree by using offsets, which enable economic actors to substitute for an equivalent amount of pollution that is reduced or “absorbed” elsewhere instead of paying the levy.

In their purest form, Cap and Trade is more complex to implement, but they will mitigate pollution at a lower net cost to society. Cap and Trade creates an aggregate cap on gross emissions within a given region and issue permits to carbon sources. Emitters may either use or sell their permits to other emitters who have fallen behind; they are usually allowed to openly trade within their own sectors and even jurisdictions. Since there is no need to collect licenses or speculate due to uncertainty, the Cap and Trade will take advantage of the different marginal costs of reduction between emitters if the business operates. To put it another way, a single emitter might find it more cost-effective to merely buy additional licenses from another business to avoid exceeding their limit, while another company might find it more cost-effective to install pollution-reducing machinery or procure energy from renewable sources (Aldy and Stavins, 2012; Goulder and Shein, 2013).

Despite the fact that introducing Cap and Trade is far more difficult than implementing a tax, it will be more cost-effective in reducing carbon pollution. Despite this, the opportunity to share through companies and markets is a key design element for a Cap and Trade. A tax might emulate the cost-effectiveness of the ETS by setting carbon quotas or introducing credits as a supplementary method to reduce prices, essentially enabling emissions swaps across factories or jurisdictions. The specific design features of the levy would ultimately be determined by the administrative and political structure of the jurisdictions implementing the instrument. The essential for our purposes is that a tax provide extra benefits that render it more cost-effective, which is an ETS's main advantage.

In light of the facts presented above, it can be concluded that carbon tax is easier to be implemented than cap and trade.

## 5. INDONESIA'S CURRENT PREFERENCE ON MECHANISM TO SOLVE EMISSIONS ISSUE

Indeed, Indonesia has taken several legal measures such as ratifying Kyoto Protocol through Law 17/2004 and enacting

Forest Ministry Regulation No. 14 of 2004 on Procedures for Afforestation and Reforestation in the Framework of the Clean Development Mechanism (A/R CDM) (“**FMR 14/2004**”). Under FMR 14/2004, it specifies limitation on forest as an attempt to achieve Clean Development Mechanism, which consist of:

1. Minimum forest area - 0.25 Ha
2. Percentage of crown cover - 30%
3. Minimum tree height - 5 m.

The protection of forest also regulates under Article 26 and 27 of the Law Number 41 of 1999 Forestry Laws (“**Law 42/1999**”), which specifies utilization of protected forest may utilized by Individuals, Cooperatives, Private Owned Enterprises (*Badan Usaha Milik Swasta* herein abbreviated as “**BUMS**”) and State-owned Enterprises (*Badan Usaha Milik Negara* herein abbreviated as “**BUMN**”) or Village-owned Enterprises (*Badan Usaha Milik Desa* herein abbreviated as “**BUMDes**”), in the form of area utilization, environmental service utilization, and collection of non-timber forest products as long as the utilization has been approved in the form of business license. The utilization mentioned under Law 42/1999 shall be strictly regulated in order to prevent the abuse of regulation.

According to Paragraph 3 concerning Utilization of Environmental Services in Protected Forests Article 20 of Government Regulation No. 34 of 2002 on Forest Management Plan and Forest Management Plan, Forest Utilization and Use of Forest Area (“**GR 34/2002**”) mentions that utilization of environmental services (for protected forest) is a form of business that utilizes the potential of environmental services without damaging the environment and reducing its main function. Further, it mentions that the utilizations are merely limited to nature tourism business; business challenge sport; water utilization business; carbon trading business (carbon trade); or efforts to save forests and the environment. As carbon trade or cap and trade has been mentioned in GR 34/2000, hence the regulation on carbon trading is more progressive than carbon tax.

Further the Nusantara Carbon Scheme (*Skema Karbon Nusantara* abbreviated as “**SKN**”) is introduced as a policy tool to reduce Indonesia's carbon emissions. SKN was prepared by the National Council on Climate Change (*Dewan Nasional Perubahan Iklim* abbreviated as “**DNPI**”) and was originally planned to be effective in April 2014. DNPI itself was formed based on Presidential Regulation number 46 of 2008 concerning the National Council on Climate Change (“**PR 46/2008**”). The main objective of establishing the DNPI is to improve coordination of climate change control and strengthen Indonesia's position in international forums. SKN is a discourse on a carbon trading scheme based on CDM projects located in Indonesia and generates carbon credits. The carbon credit unit is measured in units of the Archipelago Carbon Unit (*Unit Karbon Nusantara* abbreviated as “**UKN**”) which is equivalent to 1 ton of CO<sub>2</sub> emissions. The registration or registry for UKN is managed through a single database by the Ministry of Environment so that there are no duplicate transactions. Technically, the carbon trading mechanism adopted by SKN adopts the cap and trade mechanism that has been implemented in developed countries. However up to 2021, there is no development



regarding such establishment and adoption. Hence, Indonesia still in need of measures to solve the abovementioned issues.

Therefore, the issues in forestry practices are the laws are constantly evolving, becoming less stable, and has no development on cap and trade even if that GR 34/2002 has enacted since 2002. As has been discussed above that carbon tax has more advantages than cap and trade, hence the rational measure that shall be taken is to apply more effective mechanism.

## 6. PRINCIPLE OF CARBON TAX

Having considered that carbon tax is has more advantages than cap and trade, it is important to weight the value below carbon tax when drafting carbon tax regulation in Indonesia. There are principles shall be taken into account that are (a) the precautionary principle; (b) the principle of common but differentiated responsibilities; (c) the polluter-pays principle; and (d) the preventive principle

### 6.1. The Precautionary Principle

This principle presents there is a chance of potential long-term environmental impact that cannot be adequately measured at the point of decision-making, preventative steps should be taken. It is not necessary for the danger to be immediate or definite, it has been introduced in principle 15 of the Rio Declaration (Falcão and Cottrell, 2018).

### 6.2. The Principle of Common but Differentiated Responsibilities

The principle assumes that all countries accept accountability for preventing environmental destruction, albeit at varying degrees of commitment based on their social and economic growth as has been announced in Principle 7 of the Rio Declaration (Falcão, 2019). The theory of shared but separate obligations can only be visible within the context of foreign and regional environmental agreements, where countries adhere to specific goals and approaches while taking into consideration their unique circumstances.

### 6.3. The Polluter-pays Principle

It promotes the internalisation of environmental costs by the usage of economic tools, based on the principle that emissions should be borne by the polluter rather than shifted to the population (Tobey et al., 2007). It is based on the principle that unaccounted-for waste is absorbed by community at both the citizen and public levels.

### 6.4. The Preventive Principle

It notes that, in compliance with the United Nations Charter and international law standards, states have the sovereign right to exploit their own resources in line with their own environmental and development policies, as well as the duty to ensure that actions under their authority or influence do not affect the environment of other States or areas outside their reach. It therefore delves into inter-State accountability and obligation of protection in order to ensure that commercial practices carried out on one's own territories do not have a detrimental effect on the climate of neighboring or third countries.

## 7. ISSUE ON CARBON TAX WITH REGARD TO INTERNATIONAL TAXATION LAW

An arrangement that harmonizes carbon taxes across countries faces at least two major challenges. The first stumbling block is the cost sharing across nations. And if incremental costs are equalized across nations, net costs of lowering pollution are likely to vary. As CO<sub>2</sub> emissions are shared in a cost-effective way, the cost as a percentage of GDP varies dramatically between countries (Kverndokk, 1993). Furthermore, the world's wealthiest countries will have the lowest net costs of cutting pollution (relative to GDP). An international climate deal with such distributional assets would be unacceptably unfair to a vast number of countries, and therefore would be unworkable in effect unless it is balanced by some kind of cross-national compensation.

The second major challenge involved with harmonizing carbon taxes is determining if a current globally harmonized CO<sub>2</sub> levy can be added to established fossil fuel taxes or should be replaced by them (Hoel, 1993). The solution to this issue is contingent on the motivations behind current taxation. It's difficult to offer a generic response since there are too many possibilities. However, the two most clear explanations for domestic fossil fuel taxes are: (a) to offset domestic environmental impacts (and other detrimental domestic externalities, such as traffic congestion), and (b) to collect money where lump-sum taxation is not an option. If fossil fuel taxes are imposed for these purposes, the best tax rates would vary by nation. Marginal domestic environmental costs and the marginal deadweight costs of non-CO<sub>2</sub> taxation can decrease as tax rates rise (due to the implementation of an internationally harmonized CO<sub>2</sub> tax). Intuitively, we would assume that when CO<sub>2</sub> tax rates rise, not only the amounts of these marginal costs, but also the cost disparities within nations, would decrease. If this is the case, the actual variations in tax rates between countries would be smaller when tax rates rise (i.e. the lower is the target level of total CO<sub>2</sub> emissions).

Hence the issue on international taxation shall be considered in drafting carbon tax regulation in Indonesia.

## 8. CONCLUSION

There are several mechanisms to combat emissions such as Emission Trading (ET), Clean Development Mechanism (CDM), and Joint Implementation (JI), and carbon tax. This paper only examines the difference of carbon tax and cap and trade. After conducted literature research, it can be concluded that the quantity of effectiveness between Cap and Trade as well as Carbon is relatively similar, which is between 2% and 4%. However, carbon tax is easier to be implemented than cap and trade. After considering the advantages and disadvantages of cap and trade as well as carbon tax, this paper draws conclusion that carbon tax is more appealing to be implemented.

Speaking in Indonesia context, initially carbon trading business (carbon trade) or cap and trade has been mentioned in GR 34/2000. Further SKN is introduced as a policy tool to reduce Indonesia's

carbon emissions. SKN was prepared by DNPI and was originally planned to be effective in April 2014. Hence the regulation on carbon trading is more progressive than carbon tax. However up to 2021, there is no development regarding such establishment and adoption. Hence, Indonesia still in need of measures to solve the abovementioned issues. As carbon tax has more advantages than cap and trade, therefore this study proposed to adopt carbon tax rather than cap and trade.

In drafting carbon tax regulation, there are principles shall be taken into account that are (a) the precautionary principle; (b) the principle of common but differentiated responsibilities; (c) the polluter-pays principle; and (d) the preventive principle. Indonesia also shall consider the obstacles of international taxation law before adopting carbon tax.

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