

Carbon Pricing Policy to Support Net Zero Emission: A Comparative Study of Indonesia, Finland and Sweden

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Abstract. The Nationally Determined Contribution (NDC) of Indonesia in the Paris Agreement targeted emission reductions of 29% on its own and 41% with international cooperation in 2030, followed by Net Zero Emissions (NZE) in 2060. To achieve NZE, Indonesia enacted a carbon tax policy on April 1, 2022. The 2022–2024 carbon tax is limited to Steam Power Plants and will be imposed on other sectors by 2030. This research examines the ratio legis of carbon cost policies in Indonesia and compares the core of carbon tax policies in Indonesia with Sweden and Finland. Indonesia is starting to implement a Carbon Pricing policy under the ‘Cap-and-Tax’ scheme. The Cap scheme will be a means to force changes in the business culture in Indonesia, so the companies will pay attention to and reduce the carbon emission produced to avoid paying penalties for carbon exceeding the limits. Meanwhile, the Carbon Tax will provide economic resources to Indonesia to develop environmentally friendly technologies, fund research on renewable energy, and provide incentives for environmentally friendly businesses during the transition process to a carbon culture in Indonesia. Referring to the results of the comparison of carbon pricing policies in Finland and Sweden, Indonesia can gradually increase the cost of carbon taxes starting from Rp30,000/US\$2 per ton CO₂ equivalent to US\$10 per ton CO₂ equivalent. Meanwhile, for the imposition of high carbon tax rates, such as in Finland (US\$73.02 per ton CO₂ equivalent) and Sweden (US\$137 per ton CO₂ equivalent), Indonesia must carry out tax reforms, so the applied carbon tax is able to reduce carbon emissions without causing adverse impacts for the Indonesian economy.

Keywords: Climate change, carbon pricing, Indonesia, pigouvian tax, Paris Agreement, greenhouse gas emissions, nationally determined contribution, net zero emission

1. Introduction

Global warming is one of the major challenges of our time and the greatest threat to natural life, prosperity, and security.¹ Carbon dioxide emissions are a major component of greenhouse gases (GHG), accounting for nearly two-thirds of all GHG emissions.² The tenth annual report of the “Carbon Emissions Gap Report 2019” issued by the United Nations Environment Program (UNEP) showed that global carbon emissions need to be reduced by 7.6% annually between 2020 and 2030 to achieve the Paris Agreement goal of limiting temperatures within 1.5°C above pre-industrial levels.³ There is an urgent need for effective policy formulation to mitigate the

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1 B. Mundial (2018), *Doing Business 2018: Reforming to Create Jobs*. World Bank Group, Washington. S. Lihat juga Calderón et al. (2016), “Achieving CO₂ Reductions in Colombia: Effects of Carbon Taxes and Abatement Targets”, *Energy Economics*, 56: 575-586.

2 K. Sanglimsuwan (2011), “Carbon Dioxide Emissions and Economic Growth: An Econometric Analysis”, *International Research Journal of Finance and Economics*, 67(1): 97-102.

3 L. Christiansen et al. (2018), *UN Environment Emissions Gap Report 2018*

growth of carbon emissions. Reducing the use of traditional fossil energy while increasing the use of renewable energy has become an important step for many countries to deal with climate change.⁴

Realizing this problem, Indonesia and 194 UN countries attended a Paris Agreement to the United Nations Framework Convention on Climate Change on December 12th, 2015, in Paris. This convention resulted in an agreement that became known as the Paris Agreement.⁵ This agreement requires each country to be able to commit through a Nationally Determined Contribution (NDC) plan in terms of tackling climate change, in particular, to curb the rate of increase in the world's average temperature.⁶ Indonesia signed this agreement on April 22nd, 2016, and ratified it into Law Number 16/2016 on Ratification of the Paris Agreement, promulgated on October 25th, 2016.⁷ The first NDC Indonesia in 2015 targeted emission reductions of 29% on its own and 41% with international cooperation in 2030, followed by Net Zero Emissions (NZE) no later than 2060.⁸

To reduce emissions, the Government of Indonesia implemented a policy of imposing a Carbon Tax on the use of carbon-based fuels.⁹ Through Law Number 7/2021 on Harmonization of Tax Regulations (UU HPP), Indonesia created a new tax base in the form of a Pigouvian tax on carbon (Carbon Tax). The official carbon tax was passed on October 29th, 2021, and is to be effective on April 1st, 2022. Article 13 explains that a carbon tax will be imposed on carbon emissions that have a negative impact on the environment. The 2022–2024 carbon tax is limited to Steam Power Plants and will be imposed on other sectors by 2030.

Indonesia has just implemented a tax base on carbon. This shows that implementing a carbon tax is a bold step taken by Indonesia and proves the government's seriousness in implementing the Paris Agreement. This research examines the ratio legis of carbon cost policies in Indonesia and compares the core of carbon tax policies in Indonesia with Sweden and Finland.

2. Research problems

This research is focused on examining the following problems:

- a. Ratio Legis of the implementation of carbon cost policy in Indonesia.
- b. Comparison of carbon tax policies in Indonesia, Finland, and Sweden.

3. Methods

The method used in this study is doctrinal legal research. Doctrinal legal research involves rigorous analysis and creative synthesis of multiple doctrinal strands.¹⁰ Doctrines are central to the juridical treatment of concepts because they collaborate with historical, comparative, analytical, and philosophical approaches.¹¹ We begin with a preliminary study by problem identification in the current state of carbon tax policy in Indonesian law and

- 4 G. Bridge et al. (2013), "Geographies of Energy Transition: Space, Place and the Low-Carbon Economy", *Energy Policy*, 53: 331-340.
- 5 G. Lihat juga Ortega-Ruiz et al. (2020), "Is India on the Right Pathway to Reduce CO2 Emissions? Decomposing an enlarged Kaya identity using the LMDI method for the period 1990–2016", *Science of The Total Environment*, 737: 139638
- 6 A. Savaresi, (2016), "The Paris Agreement: A New Beginning?", *Journal of Energy & Natural Resources Law*, 34(1): Climate Change Justice: Challenges and Opportunities, pp.16-26
- 7 Cara A. Horowitz (2016), "Paris Agreement", *International Legal Materials*, 55(4): pp. 740-755. DOI: <https://doi.org/10.1017/S0020782900004253>
- 8 H. Siraj (2019), "Indonesian Policy in Ratifying The 2015 Paris Agreement", *Global: Jurnal Politik Internasional*, 21(1): 70-100. DOI: 10.7454/global.v21i1.353
- 9 D. Santoso et al., (2022), "Revisiting the Role of International Climate Finance (ICF) Towards Achieving the Nationally Determined Contribution (NDC) Target: A Case Study of the Indonesian Energy Sector", *Environmental Science & Policy*, 131: 188-195
- 10 D. Hartono et al. (2023), "Carbon Tax, Energy Policy, And Sustainable Development In Indonesia", *Sustainable Development*, pp. 1-15. P. Lihat juga Hoeller and M. Wallin (1991), "Energy Prices, Taxes and Carbon Dioxide Emissions", *OECD Economics Department Working papers* 106.
- 11 S. Taekema (2021), "Methodologies of Rule of Law Research: Why Legal Philosophy Needs Empirical And Doctrinal Scholarship", *Law and Philosophy*, 40(1): 33-66.
- 12 P.I. Bhat (2020), "Doctrinal Legal Research as a Means of Synthesizing Facts, Thoughts, and Legal Principles", *Idea and Methods of Legal Research*, Oxford University Press, pp. 143–168

practices.¹² Following the study is an analysis of the regulatory framework and conduct a comparative approach to other countries. We then systematically studied the materials and performed a qualitative analysis based on legal reasoning and legal argumentation to create the result.

4. The Ratio Legis Behind Carbon Pricing Policy

Behind every lawmaking process, there was always a ‘ratio legis’ meaning the reason or principle behind a law. The reason for the law or the policy reason is the underlying purpose for a specific norm, rule, treaty provision, act of legislation, or tribunal decision.¹³ Ratio legis can be commonly encountered in statutory interpretation based on a view of purpose and rationality.¹⁴ Rationality plays an important role in evaluating legislative decisions, especially to uncover sinister interests.¹⁵ From a legal stand point, the concept of rational legislation is ideal in the process of legal interpretation. In this context, the concept of the rational lawmaker is best understood as a set of methodological directives that govern the process of legal analysis. These rules enable the translation of ambiguous and often inconsistent texts of legal statutes into a coherent system of unequivocal legal norms.¹⁶ Hence, studying the ratio legis of the Carbon Tax Policy must be understood to assess how urgent the Carbon Tax Policy is from the lawmaker’s perspective.

4.1. Philosophical Reasoning

The philosophical basis for implementing Carbon Pricing is the development of the polluter-pays principle. Conceptually, the Polluter-pays principle is more directed to the economic aspect than the legal aspect since it regulates the calculation of the value of environmental damage. In his book *Het beginsel ‘de vervuiler betaalt’ en de Nota Milieueffingen*, Simons stated that economist E. J. Mishan originally proposed this principle in *The Cost of Economic Growth* in the 1960 s.¹⁷ In addition, the emergence of international organizations also contributed to the development of the polluter-pays principle concept. Among them are The Organization for Economic Cooperation and Development (OECD) and European Communities (EC), which play an important role in providing environmental policy recommendations.¹⁸ Not long after its establishment, the OECD adopted the polluter-pays principle within the framework of national environmental policy recommendations and international principles. Funding instruments in efforts to prevent and control pollution are key to important environmental problems, so at its first session, June 15 and 16, 1971, the OECD Subcommittee of economic experts determined: a. *that the internalization of the external effect connected with the environment obeyed an economics efficiency principle which provides a basis for a pollution control policy*; b. *that such internalization should be based as possible on the overriding principle that “the polluter should be the payers”*; c. *that exception may have to be meet to the principle which ought to be defined analyzed*.

Research on the polluter-pays principle resulted in a recommendation by the OECD Council on May 26, 1972. The Guiding Principles concern the international economic aspects of environmental policies adopted by member countries by implementing the polluter-pays principle and recommendations regarding adjustments to the related norms, namely those with international economic influence and trade traffic. Article 4 of the Recommendation

- 12 E.M. Al Amaren et al. (2020), “An Introduction To The Legal Research Method: To Clear The Blurred Image On How Students Understand The Method Of The Legal Science Research”, *International Journal of Multidisciplinary Sciences and Advanced Technology*, 1(9): 50-55.
- 13 A.X. Fellmeth and M. Horwitz (2009), “Guide to Latin in International Law (1 ed.)”, UK: Oxford University Press.
- 14 K. von Schütz (2018), “Immanent Ratio Legis?” Legal Forms and Statutory Interpretation. In: V. Klappstein, M. Dybowski, (eds) *Ratio Legis*. Springer, Cham, pp. 161-186
- 15 R.S. Nascimento (2022), “Political Rationality and the Argumentative Approach in Lawmaking. How to Deal with Them?”. In: F. Ferraro, S. Zorzetto, (eds) *Exploring the Province of Legislation. Legisprudence Library*, Vol 9. Springer, Cham, pp. 85-101
- 16 M. Krotoszyński (2018), “Legislative History, Ratio Legis, and the Concept of the Rational Legislator”. In: V. Klappstein, M. Dybowski, (eds) *Ratio Legis*. Springer, Cham, pp. 57-73
- 17 S.S. Rangkuti (2005), “*Hukum Lingkungan dan Kebijaksanaan Lingkungan Nasional*” Surabaya: Airlangga Univ. Press, pp. 244.
- 18 Herman and J. Xiang (2019), “Induced Innovation In Clean Energy Technologies From Foreign Environmental Policy Stringency?” *Technological Forecasting and Social Change*, 147: 198-207.

Appendix reads: “The principle to be used for allocation cost of pollution prevention and control measures to encourage national use of scarce environmental resources and to avoid distortion in international trade and investment is the so-called “Polluter-Pays Principle.” The principle means that the polluter should bear the expenses of carrying out the abovementioned measures they decide by public authorities to ensure that the environment is acceptable. In other words, the cost of these measures should be reflected in the cost of goods and services that cause pollution in production and consumption. Such measures should not be accompanied by subsidies that would create significant distortion in international trade and investment.” On May 26, 1972, in the Guiding Principles concerning the International Economic Aspects of Environmental Policies, the OECD advised member countries to apply the polluter-pays principle. The OECD recommended “the polluter should bear the expenses of carrying out measures decided by public authorities to ensure that the environment is in “acceptable state,” or in other words, the cost of these measures should be reflected in the cost of goods and services which cause pollution in production and or in consumption.”

Thus, the perpetrators of pollution will be charged for all costs of prevention and repairing the damages. As one of the starting points for environmental policy, this principle implies that polluters must be responsible for preventing and mitigating them. They are obliged to pay the costs to eliminate it. Therefore, this principle is the basis for imposing pollution levies. The realization of this principle, therefore, uses economic instruments, such as pollution charges on water and air, as well as deposit fees. This principle is contained in the 16th principle of the Rio Declaration, which reads: “National authorities should endeavour to promote the internationalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.”

Criticism arises regarding the obligation to pay for polluters, which interprets that the polluters have the right to pollute, provided they pay compensation. This interpretation is the expression of the right to pollute, license to pollute, paying to pollute, and *de betaler vervuilt*. Therefore, objections against the use of these facilities have arisen: “. . . some environmentalists have opposed proposals for pollution charges on moral grounds, claiming that they involve a “license to pollute.” (Doesn’t regulation also involve a “license to pollute”?)

Realistically, the polluter-pays principle of compensation for damage caused by pollution. Nor does it mean that the polluter should merely pay the cost of measures to prevent pollution. The Polluter-pays Principle means that the polluter should be charged with the cost of whatever the public authorities determine pollution prevention and control measures, whether preventive measures, restoration, or a combination of both. In other words, the Polluters-pays Principle is not a principle intended to fully internalize the cost of pollution. The polluter-pays principle may be implemented by various means ranging from process and product standards, individual regulation, and prohibition to levying various pollution charges. To or more of these instruments can be used together. The choice of instruments is particularly important as the effectiveness of a policy depends on it. This choice can only be made by public authorities at the central or regional level in light of a number of factors.

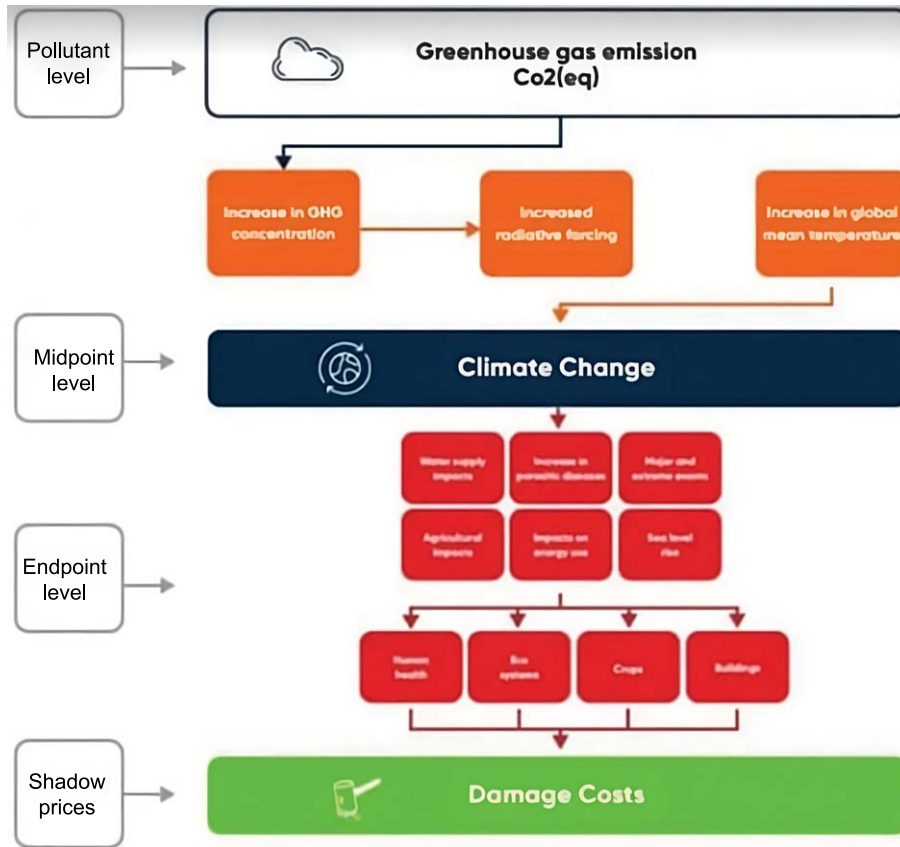
From the description, it can be said that the polluter-pays principle is implemented in various ways, including determining carbon costs through both Carbon Tax and Cap and Trade. The choice between various alternatives rests with the central and the regional government. The polluter-pays principle indicates that there is an environmental right to receive compensation. This means an embodiment of corrective justice for the environment. As for the environment, according to ecocentrism (deep ecology), when associated with the theory of corrective justice by Aristotle, it can be interpreted as the existence of a ‘right’ given to the environment to be able to maintain its sustainability and obtain improvement over pollution and damage caused by humans or human actions.

4.2. Social and Ecological Reasoning

The current climate emergency dictates that immediate action is required to mitigate climate change,¹⁹ which implies that carbon fluxes occurring twenty or more years from now are too late to have any mitigative

19 S. Perkins-Kirkpatrick and D. Green (2023), “Extreme Heat And Climate Change”, Book Chapter II in ‘Heat Exposure and Human Health in the Context of Climate Change’, pp. 5-36

effect.²⁰ Carbon pricing can be the central element of climate mitigation strategies, helping countries transition to ‘net zero’ greenhouse gas emissions over the next three decades.²¹ The benefits of carbon pricing are very significant.²² It is one of the strongest policy instruments available for tackling climate change. It has the potential to decarbonize the world’s economic activity by changing the behavior of consumers, businesses, and investors while unleashing technological innovation and generating revenues that can be put to productive use. In short, well-designed carbon prices offer triple benefits: they protect the environment, drive investments in clean technologies, and raise revenue.



Source: Ecochain

Fig. 1. Climate Change.

4.3. Judicial Reasoning

The implementation of the Carbon Pricing Policy is based on the political spirit of national and international environmental law.²³ Within the national policy framework, carbon pricing, both in the form of carbon taxes and carbon trading (cap and trade), is an attempt to maximize the function of law as a tool of social engineering²⁴

20 G.C. van Kooten et al. (2021), “Climate Urgency And The Timing Of Carbon Fluxes”, *Biomass and Bioenergy*, 151: 106-108
 21 P. Viola (2022), “The International Framework, Policies, and the Law: Towards National Legal Domains for Climate Issues”. In: *Climate Constitutionalism Momentum. Climate Change Management*. Springer, Cham, pp. 7-39: https://doi.org/10.1007/978-3-030-97336-0_2
 22 G. Peters, et al. (2017), “Key Indicators To Track Current Progress And Future Ambition Of The Paris Agreement”, *Nature Climate Change*, 7(1): 118-122: <https://doi.org/10.1038/nclimate3202>
 23 Y. Steinebach, X. Fernández-i-Marín and C. Aschenbrenner (2021), “Who Puts A Price On Carbon, Why And How? A Global Empirical Analysis Of Carbon Pricing Policies”, *Climate Policy*, 21(3): 277-289.
 24 L.J. McManama (1958), “Social Engineering: The Legal Philosophy of Roscoe Pound”, *John’s Law Review*, 33(1): 1-7.

aimed at changing business behavior by calculating and limiting the carbon produced. In its implementation, the Environmental Law shows the political direction of environmental law in the implementation of development, which must be eco-development or protect the environment in accordance with the principles of sustainable development, which guarantees survival and maintenance of the carrying capacity of the environment for the lives of future generations.²⁵

In international environmental law politics, the implementation of the Carbon Pricing Policy is based on Indonesia's commitment to achieving the Nationally Determined Contribution (NDC) target, namely Net Zero Emissions (NZE) no later than 2060 as the implementation of the Paris Agreement.²⁶ The Paris Agreement is one of the first of a new generation of multilateral environmental agreements in that it combines a number of "top-down" and "bottom-up" elements. The Paris Agreement goals address global emissions and thus have the potential to cover all sources of emissions that contribute to anthropogenic climate change.²⁷ It breaks new ground in international climate policy, by acknowledging the primacy of domestic politics in climate change and allowing countries to set their own level of ambition for climate change mitigation. As Robert Falkner suggested, governments often tend to express lofty aspirations but avoid tough decisions. The Paris Agreement instead creates a framework for making voluntary pledges that can be compared and reviewed, therefore, it can work.²⁸

5. Carbon Pricing Policy: A Comparison

Carbon pricing instruments can take many forms. A wide range of approaches and paths allows governments, businesses, and institutions to select the method best suited to the broader policy environment.²⁹ First, a carbon tax puts a direct price on GHG emissions and requires economic actors to pay for every ton of carbon pollution. It thus creates a financial incentive to lower emissions by switching to more efficient processes or cleaner fuels. This approach provides a lot of certainty about the price because the price per ton of pollution is fixed, but it offers less certainty about the extent of emissions reduction. Secondly, an emission trading system (ETS)/cap-and-trade system sets a limit (cap) on total direct GHG emissions from specific sectors. It sets up a market where the rights to emit (in the form of carbon permits or allowances) are traded. This approach allows polluters to meet emissions reduction targets flexibly and at the lowest cost. It provides certainty about emissions reductions but not the price for emitting, which fluctuates with the market.³⁰

Then how to structure an effective Carbon Pricing Mechanism? Although the design of carbon pricing schemes will vary depending on specific policy objectives and contexts, effective schemes share some common characteristics. The FASTER Principles for Successful Carbon Pricing as a guide jointly developed by the World Bank and the Organization for Economic Co-operation and Development (OECD),³¹ distills six key characteristics of successful carbon pricing based on the practical experience of different jurisdictions:

- a. Fairness. Effective initiatives embody the "polluter pays" principle and ensure that costs and benefits are fairly shared.
- b. Alignment of policies and objectives. Carbon pricing is not a stand-alone mechanism. It is most effective when it meshes with and promotes broader policy goals, both climate and non-climate related.

25 M.Y. Said and Y. Nurhayati (2020), "Paradigma Filsafat Etika Lingkungan Dalam Menentukan Arah Politik Hukum Lingkungan", *Al-Adl Jurnal Hukum*, 12(1): 39-60.

26 M. Kawanishi et al. (2020), "Issue Interpretations And Implementation Analysis For The National Greenhouse Gas Inventory: The Case Of Indonesia", *Journal of Environmental Studies and Sciences*, 10(1): 411-425.

27 J. Delbeke, A. Runge-Metzger, Y. Slingenberg and J. Werksman, "The Paris Agreement", Book Chapter from "*Towards a Climate-Neutral Europe*", (2019), 1st Edition, EU: Routledge, pp. 22

28 R. Falkner (2016), "The Paris Agreement and the New Logic of International Climate Politics", *International Affairs*, 92(5): 1107-1125, <https://doi.org/10.1111/1468-2346.12708>

29 J.D. Jenkins (2014), "Political Economy Constraints On Carbon Pricing Policies: What Are The Implications For Economic Efficiency, Environmental Efficacy, And Climate Policy Design?" *Energy Policy*, 69(1): pp. 467-477.

30 R.N. Stavins (2020), "The Future of US Carbon-Pricing Policy", *Environmental and Energy Policy and the Economy*, 1(1): pp. 8-64.

31 Timbeau and P. Wiejski (2017), "EU ETS-Broken Beyond Repair?" *An Analysis Based on FASTER Principles*, Research Paper No. 2017-24. Observatoire Francais des Conjonctures Economiques (OFCE).

- c. Stability and predictability. Effective initiatives exist within a stable policy framework and send a clear, consistent, and (over time) increasingly strong signal to investors.
- d. Transparency. Effective carbon pricing is designed and carried out transparently.
- e. Efficiency and cost-effectiveness. Effective carbon pricing lowers the cost and increases the economic efficiency of reducing emissions.
- f. Reliability and environmental integrity. Effective carbon pricing measurably reduces practices that harm the environment.

The carbon tax is an indirect tax, i.e., a tax imposed on transactions. Baranzini & Carattini stated that carbon tax is a price instrument in relation to climate policy. This is due to setting a certain price for the amount of carbon emissions. There are three basic options for imposing a carbon tax, namely, Tax applied directly to measured GHG emissions (a tax is imposed on carbon emissions issued. However, the taxation of output emissions is very complex), Fossil fuel input tax on coal, crude oil, and natural gas, based on their carbon content (a tax is imposed on the input of fossil fuels used, depending on the amount of carbon content in it where this alternative requires a chemical reaction manufacturing process), and Tax levied on energy outputs (a tax is imposed on the energy produced such as electricity).³² Several developed countries have imposed carbon taxes for a long time, such as Finland (1990), Sweden (1991), Norway (1992), and Denmark (1992).³³

5.1. Indonesian Carbon Pricing Policy

The Tax Basis of the Indonesian Carbon Tax is the amount of carbon emissions resulting from goods containing carbon and/or from certain activities that produce carbon emissions.³⁴ For this reason, the estimated amount of emissions generated from these goods or activities will be measured and determined by other authorized ministries. Article 13 paragraph 10 of Law Number 7/2021 on Harmonization of Tax Regulations (HPP Law) states that the Tax Basis of the carbon tax will be determined by the Regulation of the Minister of Finance after consultation with the House of Representatives, which until the time of writing this paper is still an unpublished draft. Then, the amount of carbon tax owed will be calculated by multiplying the Tax Basis with the carbon tax rate. Article 13, paragraph 8 of the HPP Law states that Indonesia's applicable carbon tax rate is "the same as the price of carbon in the carbon market." Therefore, applying a carbon tax in Indonesia will be carried out simultaneously with implementing a carbon market where the applicable carbon tax rate is the same as the carbon price in the carbon market. Thus, carbon tax rates will continue to change because they follow the movement of carbon prices in the carbon market. For this reason, Article 13, paragraph 10 of the HPP Law also states that the Regulation of the Minister of Finance will stipulate provisions regarding the determination of carbon tax rates.

Even so, Article 13, paragraph 9 of the HPP Law still provides the lowest limit on this carbon tax rate. In the event that the price of carbon on the carbon market is less than Rp30,000 per ton CO₂ equivalent or Rp30 per kilogram of CO₂ equivalent, the carbon tax rate will be set at Rp30 per kilogram of CO₂ equivalent. This paragraph's provisions provide certainty that Indonesia's carbon tax rate will not be lower than Rp30 per kilogram of CO₂ equivalent. In addition, Article 13, paragraph 10 of the HPP Law also provides space for the Minister of Finance to change this lower limit if necessary. This paragraph authorizes the Minister of Finance to change the lower limit by increasing or decreasing it by issuing a new Regulation of the Minister of Finance after consultation with the House of Representatives.

Many parties claim that Indonesia's carbon tax rate is quite low compared to other countries, such as South Africa. South Africa has implemented a carbon tax effectively since January 2017 at a rate of US\$8 (Rp112,000, with the exchange rate of US\$1 = Rp14,000) per ton CO₂ equivalent.³⁵ However, this is still reasonable because this is Indonesia's first carbon tax imposed, so caution is needed in setting tariffs. In addition, this regulated rate was made so as not to cause rejection due to the high tax burden.

32 Selvi, et al. (2020), "Urgensi Penerapan Pajak Karbon di Indonesia", *Jurnal Reformasi Administrasi*, 7(1): pp. 29-34

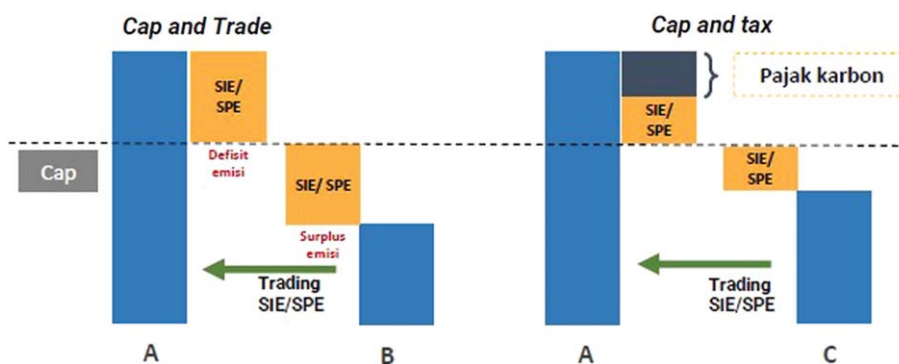
33 M.S. Anderson and P. Ekins (2010), *Carbon Energy Taxation: Lessons from Europe*. Oxford University Press.

34 A.I. Saputra, (2021), "Pajak Karbon Sebagai Sumber Penerimaan Negara Dan Sistem Pemungutannya", *Jurnal Anggaran dan Keuangan Negara Indonesia*, 3(1): 57-69

35 D. Nong (2020), "Development of the Electricity-Environmental Policy CGE Model (GTAP-E-PowerS): A Case Of The Carbon Tax In South Africa", *Energy Policy*, 140(1): <https://doi.org/10.1016/j.enpol.2020.111375>

Usually, policymakers considering introducing or scaling up carbon pricing face technical choices between Carbon Taxes and Emissions Trading Systems (ETSs)/Cap and Trade in their design.³⁶ This includes administration, price levels, relation to other mitigation instruments, use of revenues to address efficiency and distributional objectives, supporting measures to address competitiveness concerns, extension to broader emissions sources, and coordination at the global level. Political and economic considerations also affect the choice and design of instruments. This paper discusses such issues in the choice between and design of carbon taxes and ETSs, providing guidance, broader considerations, and quantitative analyses. Overall, carbon taxes have significant practical advantages over ETSs (especially for developing countries) due to ease of administration, price certainty to promote investment, the potential to raise significant revenues, and coverage of broader emissions sources; however, ETSs can have significant political economy advantages.

The carbon tax mechanism in Indonesia shows a quite unique implementation compared to other countries. In Indonesia, the taxation and carbon trading mechanism is carried out jointly, known as Cap-and-Tax. This scheme combines the Cap-and-Trade system and the Carbon Tax system. Therefore, through the Ministries with the authority and competence, the Government will determine and provide a maximum limit for the amount of carbon emissions allowed for each company. This maximum limit is the right of the company to produce emissions, which is then referred to as Cap. If the company succeeds in changing its behavior to be more environmentally friendly, so the total carbon emissions produced are still below the stamp given, then the difference is an asset for the company. This difference is then known in Indonesia as the Emission Permit Certificate (SIE). Conversely, in the event that a company is unable or unwilling to change its behavior to be more environmentally friendly so the total carbon emissions produced exceed the cap given, then the company will be subject to a penalty or payment according to the difference in the excess emissions it produces. This penalty or fee that must be paid by the company is called a carbon tax. The amount of carbon tax that must be paid will be calculated by multiplying the excess emission difference by the applicable carbon tax rate.



Source: Ministry of Finance of the Republic of Indonesia

Fig. 2. Cap and Tax in Indonesia Carbon Pricing.

5.2. Lesson From Finland and Sweden

Finland has implemented a carbon tax since 1990, making Finland the first country in the world to impose a carbon tax. Initially, Finland applied a tariff of €1.12 (US\$1.20) per ton of CO₂ equivalent. This tariff is low compared to the tariff imposed by Sweden in 1991, which was US\$ 26 per ton CO₂ equivalent. Furthermore, Finland reformed its policy by slowly increasing the carbon tax rate. Therefore, by 2021, the carbon tax rate in Finland was €62 (US\$73.02) per ton of CO₂ equivalent. With this policy, Finland managed to reduce carbon emissions. This success results from carbon and other environmental taxes implemented in Finland to address environmental issues such as energy, transport, and resources taxes. The combination of a carbon tax with other

36 J. Carl and D. Fedor (2016), "Tracking Global Carbon Revenues: A Survey Of Carbon Taxes Versus Cap-And-Trade In The Real World", *Energy Policy*, 96(1): 50–77: <https://doi.org/10.1016/j.enpol.2016.05.023>

taxes has successfully reduced carbon emissions in Finland, which have decreased in the last 30 years.³⁷ From 2000 until the end of 2018, Finland’s carbon emissions have decreased significantly by 19.49%.³⁸ In addition to implementing a disincentive carbon tax, Finland has made many other incentive policies for the community. One of the main policies to maintain this economic growth is to reduce the income tax rate. This is why Finland did not make a policy of earmarking carbon tax revenues to reduce emissions but included it as central government revenue. In this case, Finland’s tax revenues were greatly reduced due to the reduction in income tax rates, so it had to be covered with revenues from carbon taxes.

Sweden is the country with the highest carbon tax rate in the world. In 1991, Sweden started implementing a carbon tax of US\$26 (Rp364,000, with an exchange rate of Rp14,000) per ton CO₂ equivalent. These rates continue to increase over time. Based on data obtained from the Tax Foundation (2021a), it is known that Sweden imposes a carbon tax rate of US\$ 137 per ton CO₂ equivalent. Compared to all countries that have implemented



Fig. 3. World Carbon Pricing. Source: Ecochain.

37 M. Khastar et al. (2020), “How Does Carbon Tax Affect Social Welfare And Emission Reduction in Finland?” *Energy Reports*, 6(1): 736-744: <https://doi.org/10.1016/j.egy.2020.03.001>

38 J.-D. Elbaum (2021), “The Effect of A Carbon Tax On Per Capita Dioxide Emissions: Evidence From Finland (No. 21; 05).”

carbon taxes, Sweden has the highest rates. As a developed country, Sweden has a carbon tax rate almost 2 (two) times higher than Finland.³⁹

In 1991, Sweden implemented a tax reform called ‘*grön skatteväxling* (green tax-switch).’ This tax reform aimed to form a new tax regulation based on the environment to address environmental problems that have started to be considered since 1988. One of the results of this tax reform was the issuance of a new tax, i.e., the carbon tax implemented in Sweden, which able to reduce carbon emissions and not have a negative impact on the economy. Since the beginning of its implementation in 1991 until 2018, Sweden has succeeded in reducing carbon emissions by 27%. The Swedish government imposes a carbon tax on fossil fuels for transportation and heating. Fossil fuels include gasoline, coal, and diesel oil. However, Sweden has excluded many sectors from imposing a carbon tax to maintain economic conditions. The sectors excluded from the imposition of a carbon tax included the industrial, mining, agricultural, and forestry sectors. However, the Swedish Government required these sectors to pay for their emissions, namely the carbon trading scheme, also known as the European Union Emission Trading Scheme (EU ETS). The EU ETS is a carbon emission trading scheme established and intended for European countries. The carbon prices or rates in the EU ETS tend to be small when compared to carbon tax rates in Sweden. This made the Swedish Government make strategic sectors such as industry, agriculture, forestry, and mining to be subject to EU ETS instead of carbon taxes. This is because considering the EU ETS tariff is quite low, so it will not greatly affect the strategic sectors and consequently will not have a negative impact on the country’s economy.⁴⁰

	Finland	Sweden	Indonesia
Pricing Design	Carbon Tax	Carbon Tax-EU ETS	Cap-and-Tax
Carbon Cost	US\$73.02 per ton CO ₂ equivalent	US\$137 per ton CO ₂ equivalent	Rp30,000 per ton CO ₂ equivalent
Result	Carbon emissions decreased by 19.49%	Carbon emissions decreased by 27%	-

Source: Author

Fig. 4. Comparison.

6. Conclusion

By referring to the results of the study, the following conclusions can be drawn:

First, the Ratio Legis of Carbon Pricing Policy in Indonesia is based on the Philosophical, Socio-Ecological, and Juridical aspects. The philosophical aspect emphasizes the moral aspect that carbon emitters must be held responsible for paying the costs of preventing and overcoming environmental damage (polluter-pays principle). The Socio-Ecological aspect places the urgency of implementing a Carbon Pricing Policy that is right on target, considering climate change is heating up due to increased CO₂ carbon emissions, so it requires serious handling. Then, the Juridical aspect is based on the national environmental law policy framework and international commitments to comply with the Paris Agreement through Indonesia’s Nationally Determined Contribution (NDC) towards Net Zero Emissions (NZE) no later than 2060.

Second, Indonesia implements a Carbon Pricing policy under the ‘Cap-and-Tax’ scheme with stages in 2022–2024 that will be limited to Steam Power Plants and will only expand the imposition sector in 2030. The ‘Cap-and-Tax’ based policy combines the ‘Cap and Trade’ and ‘Carbon Tax’ policy concepts. Cap and Trade will be a tool to force changes in the business culture in Indonesia, so companies will pay attention to and reduce the emission of carbon emissions produced by each industry to avoid paying penalties for carbon that exceeds the set limit (cap). Conversely, environmentally friendly companies with total carbon emissions produced under the stamp will be given incentives with an Emissions Permit Certificate (SIE). Furthermore, the Carbon Tax will provide economic resources to Indonesia to develop environmentally friendly technologies,

39 E.B. Barus and S. Wijaya (2021), “Penerapan Pajak Karbon Di Swedia Dan Finlandia Serta Perbandingannya Dengan Indonesia”, *Jurnal Pajak Indonesia*, 5(2): 256-279.

40 J.J. Andersson (2019), “Carbon Taxes and CO₂ Emissions: Sweden as a Case Study”, *American Economic Journal: Economic Policy*, 11(4): 1–30: <https://doi.org/10.1257/pol.20170144>

fund research on renewable energy, and provide incentives for environmentally friendly businesses during the transition process to a carbon culture in Indonesia. The comparison results of carbon pricing policies in Finland and Sweden indicate Indonesia can gradually increase the cost of carbon taxes starting from Rp30,000 (US\$2) per ton CO₂ equivalent to US\$10 per ton CO₂ equivalent. Meanwhile, for the imposition of high carbon tax rates, such as in Finland (US\$73.02 per ton CO₂ equivalent) and Sweden (US\$137 per ton CO₂ equivalent), Indonesia must carry out tax reforms, so the applied carbon tax is able to reduce carbon emissions without causing adverse impacts for the Indonesian economy.