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Rethinking Indonesia's Geothermal Foreign Direct Investment Policy: Certainty and Economic Analysis of Law Perspective

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Article

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Abstract

This study aims to anylize Indonesian government policy regarding the 100% ownership over geothermal sector projects by foreign direct investors, based on the certainty and effectivity using economic analysis of law perspective. This study is formulated as legal research, using statutory approach, conceptual approach, and comparative approach, as research method. The results of this Based on these explanations, it can be concluded that in terms of certainty, renewable energy investment policies in Indonesia, which frequently change, ultimately reduce the value of that certainty. This is different from Germany which tends to be more stable because it has a renewable energy policy that does not change too often, for example this can be seen in German policy regarding providing incentives to foreign investors. Furthermore, regarding the effectiveness of the policy of 100% ownership by foreign investors for geothermal development projects, based on EaL and game theory, this policy can be said to be effective. However, improvements are needed so that the policy does not conflict with SoNR principles. This improvement, for example, is by using the BOOT scheme used by the Philippines in relation to the geothermal development sector, not only can it be 100% owned by foreign investors without a certain period of time.

Introduction

The shift in the development paradigm has led to the emergence of a globally recognized concept known as sustainable development (Simlesa, 2003). The idea of

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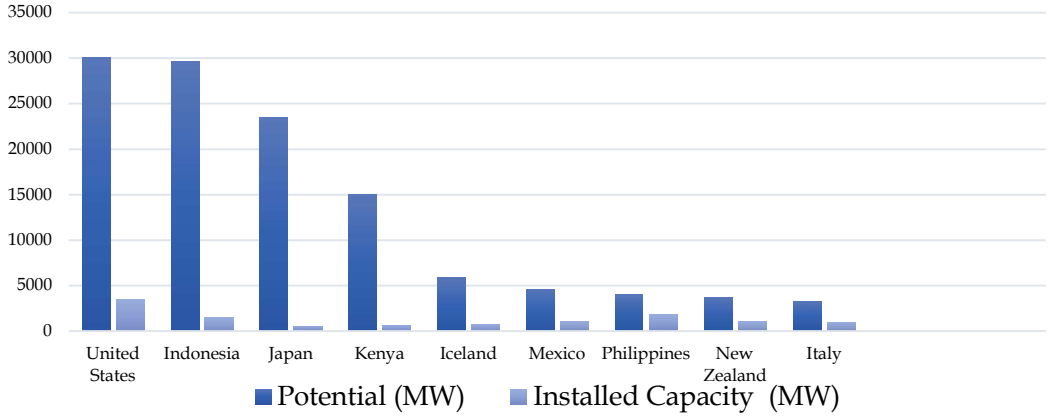
sustainable development was thoroughly explored in the 1987 Brundtland Report, a research project conducted by the World Commission on Environment and Development (WCED)--established by the United Nations. The main objective of the WCED was to study the harmonization of environmental conservation and development, which are often seen as conflicting priorities (Hardjasoemantri, 1996).

A new approach was then introduced as part of the sustainable development paradigm in an effort to strike a balance between development and environmental sustainability. Referring to Brundtland Report, starting to shift the use of energy that is secure, does not harm the environment, and is also sustainable plays a significant part in attaining this aim (Orsini et.al., 1987). As a follow-up to the report, the discussion on sustainable energy continued, the culminating was in the 1992 United Nations Convention on Climate Change, where the idea of sustainable energy began to become increasingly clear as an effort to reduce carbon, emissions, and the greenhouse effect— This is what makes the international community is starting to pay attention to new approaches to energy consumption with an emphasis on reducing emissions. This series of events has attracted international attention to the development of renewable energy (Gunnarsdottir et.al., 2021).

While energy transition is crucial for achieving sustainable development goals, the shift from fossil-based to renewable energy is a complex and challenging process. It involves building infrastructure for renewable energy technologies and reducing dependence on fossil fuels. Even countries like Germany have taken decades to effectively transition to renewable energy sources (J.F. Hake et.al., 2015). Additionally, the high cost of developing renewable energy infrastructure also poses a significant challenge in developing renewable energy (Fouquet, 2016).

The challenges in transitioning to renewable energy have spurred many countries, particularly developing nations with renewable energy potential, to implement aggressive investment policies. This includes Indonesia, which is actively promoting both foreign and domestic investments in renewable energy development. Indonesia itself is estimated to be the largest geothermal owner in the world, with an estimated 29 GWe from 300 points. During the 3 years between 2015 and 2018, it was noted that there were three new projects that succeeded in increasing the installed capacity from 465 MWe to 1,948.5 Mwe (Huttrer, 2021).

Figure 1. Potential and Installed Capacity of Geothermal Renewable Energy



Source: (Katadata, 2017)

With a very large amount of potential and capacity for renewable energy based on **Figure 1**, the investment policy plays an important role for a country like Indonesia, in efforts to develop technology and use renewable energy. It is due to the fact that in investment law, there exists a Rational Choice Theory (RCT), where the essence of RCT is maximum profit for the host country and home country (from the investor side). In this theory, it is emphasized that the state in determining its policies must be based on rationality and provide the maximum possible benefit to the host country, both from an economic and social perspective. With these rational considerations, it can avoid the occurrence of irrationality and inefficiency, which is detrimental in the future (Pawestri et.al., 2019).

In response, the government has taken new steps to attract international investors to Indonesia's renewable energy sector through Law of the Republic of Indonesia Number 11 of 2020 concerning Job Creation. This law was replaced in 2023 by Law of the Republic of Indonesia Number 6 of 2023 on the Determination of Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation into Law (hereafter referred to as the Job Creation Law). The job creation law then introduced a significant step taken by the Government of Indonesia for geothermal renewable energy, which is the opening of foreign investment faucets to carry out investment activities of 100%. Said policy is different from the previous policy which was regulated in Presidential Decree Number 44 of 2016 that concerns the Negative Investment List, where in Appendix III (open business fields with conditions) stated that Foreign Investors (hereinafter referred to as FDI) may carry out investment activities of 95% for the Survey Service Business Sector

Geothermal, 95% for Geothermal drilling service, 90% for geothermal operation maintenance services, and 67% for Geothermal Power Plant with a Capacity of 10 MW.

After the Job Creation Law was issued, there was a change in Law Number 25 of 2007 concerning Investment (hereinafter referred to as the Investment Law)—Article 12 paragraph (1) of the Investment Law has been changed to, "All business fields are open for investment activities, except for business fields that have been declared closed for investment or activities that can only be carried out by investment carried out by the Central Government". In this regard, the Presidential Decree derived from the Job Creation Law related to the business sector is enacted, namely, Presidential Regulation Number 10 of 2021 concerning the Investment Business Sector (hereinafter referred to as Presidential Decree 10/2021), and then changed to Presidential Regulation 49 of 2021 concerning Amendments to Presidential Regulation Number 10 of 2021 concerning The Investment Business Sector (hereinafter referred to as Presidential Decree 49/2021). In this new regulation, goethermal energy related business activities does not mention, thus, it can be concluded that survey activities and geothermal management open 100% opportunities for foreign investment.

The possibility for foreign investors to own 100% over geothermal sector business, based on the Presedintial decree 49/2021 then raise questions when it is associated with the principle of Sovereignty Over Natural Resources (hereinafter referred to as SoNR). SoNR is a principle that emphasizes the role of state in the management of natural resources in its country—in Indonesia this provision is emphasized in the constitution, specifically through the Article 33 paragraphs (2) and (3) of the 1945 Constitution of the Republic of Indonesia (hereinafter referred to as UUD NRI 1945), which stated that: (Paragraph 2) Production branches which are important to the state and which affect the livelihood of the people are controlled by the state. And (Paragraph 3) Earth and water and the natural resources contained therein are controlled by the state and used for the greatest prosperity of the people.

The granting of rights for foreign investors to carry out investment activities in the geothermal sector raises the question of whether this condition is the best solution that can bridge the interests of the host state and investors on the other hand. The host state is as the owner of resource, it is a party that needs to be prioritized, based on the provisions of UUD NRI 1945 above. Thus, in this study, researchers try to find the position of state over the owner of renewable energy resources (geothermal), but also by paying attention from the investor side. The author conducted a study by adding an

analysis using a cross-disciplinary approach, namely Economic Analysis of Law (hereinafter referred to as EAL). The selection of EAL is intended to find certain and efficient policy, where the relationship between a regulation and its own efficiency is that efficient regulation can provide broad benefits or benefits to its subjects (Sugianto et.al., 2021). Thus, it is hoped that the best solution can be found that can accommodate the interests of the host state and investors in mutually beneficial conditions.

There are previous studies that also discuss related to policy discussions in Indonesia by utilizing the Economic Analysis of Law approach, firstly is the research conducted by Isti Sulistyorini and Siti Zulaekhah with the title "Economic Analysis of Law on Changes in Contract of Work Policy to Special Mining Business Permits (IUPK): Case Study of PT. Freeport Indonesia". This research is different from the study in this paper, because it focuses on the analysis of policy changes that were originally carried out by Cooperation using a Contract of Work into a Business Permit (Sulistyorini & Zulaekhah, 2018). While this paper focuses on foreign investment policies in the geothermal business sector. Secondly, is the research conducted by Putu Gede Arya Sumerta Yasa, et.al., with the title "Automatic Exchange of Information (AEoI) for Indonesian Tax Purposes: Economic Analysis of Law Approach", the study focuses on access to financial information and the legal implications of automatic taxation or Automatic Exchange of Information in terms of the Indonesian economy (Yasa et al., 2022). So, this research has a different object of research, which is in this paper, it focuses more on investment policies in geothermal renewable energy.

Method

This study is formulated as a legal research. According to Peter Mahmud Marzuki, legal research is a process of finding answers to a legal problem through the rule of law, principles, and existing doctrines (Marzuki, 2010). The authors in this study use the statute approach, conceptual approach, and comparative approach. The statutory approach is carried out by the author by for reviewing the laws and regulations related to state control and geothermal. Conceptual approach is carried out by examining concepts related to the principle of efficiency, certainty, and economic analysis of law. Finally, with regard to the comparative approach, the author did by comparing the existing policies in Indonesia with other countries related to the policies of these countries regarding geothermal investment activities.

Discussion

1. Geothermal Energy Investment Policy: a Matter of Certainty

Geothermal as a renewable energy source has the advantage, that it produces small greenhouse gas emissions, and can guarantee energy security (Marry et.al., 2017). Indonesia is located on the "Ring of Fire" line that stretches by the Pacific from southeast Australia to the American Southwest, where seismic activity often occurs at that point (Pambudi, 2018). Geothermal energy in the Ring of Fire has good prospects for power generation and direct utilization (Masum & Ali Akbar, 2019). Indonesia's geothermal potential is very abundant, estimated at 28,910 GW with a total installed capacity of 1533.5 MW (Pambudi, 2018). It should be a concern that despite the geographical location with great wealth, in fact Indonesia has not been able to take full advantage of the existing potential.

Underutilization of geothermal energy is often due to various obstacles such as technological limitations, challenges in exploration and development, and regulatory constraints. The exploration phase demands significant investment and carries a high level of risk. These factors hinder the full potential of geothermal energy utilization in Indonesia (Salazar et.al., 2017).

Investors are driven by the desire for a return on their capital and investment, particularly in high-risk business activities. According to the dominant theory, Foreign Direct Investment (FDI) seeks certainty and efficiency. Thus, to attract investors, a country must develop policies that offer both criteria properly (Perry, 2000).

Based on the explanation above, the first thing that need to be considered in formulating the best policies to attract investors is certainty. Before discussing this further, we will first briefly discuss the development of geothermal investment policies. In 1918, at the initiative of J.B. van Dijk, Geothermal in Indonesia was first developed by utilizing geothermal energy in Kamojang Crater, West Java (Lembaga Ilmu Pengetahuan Indonesia (LIPI), 2014). The initial policies on geothermal utilization in Indonesia were outlined in several Presidential Decrees, until finally in 2003 the Government issued the National Energy Policy (KEN) and Law Number 27 of 2003 that concerns Geothermal (hereinafter referred to as Law 27/2003) which was later repealed in 2014 through Law Number 21 of 2014 concerning Geothermal (hereinafter referred to as Law 21/2014).

With regard to investment activities, in 2020, the Government of Indonesia has enacted Job Creation Law. Where in Job Creation Law changes several existing statutory provisions, two of which are related to investment in the investment sector, namely

Investment and Geothermal Law. The Negative Investment List as regulated in Presidential Decree 44/2016) is amended through Presidential Decree Number 10 of 2021 concerning the Investment Business Sector (Presidential Decree 10/2021) and Presidential Decree 49 of 2021 concerning Amendments to Presidential Decree Number 10 of 2021 concerning the Investment Business Sector (Presidential Decree 49/2021).

Table 1. Comparison of Presidential Decree 44/2016, Presidential Decree 49/2021 Jo. Presidential Decree 10/2021 on Geothermal

Indicator	**Presidential Decree 44/2016**	**Presidential Decree 49/2021 Jo. Presidential Decree 10/2021**
Attachment of Business Fields	Appendix I: List of Business Fields Closed to Investment Appendix II: List of Business Fields Open with Requirements: reserved or in partnership with Micro, Small and Medium Enterprises and Cooperatives Appendix III: Business Fields Open with certain Requirements (one of which is the energy and mineral resources sector)	Appendix I: List of Priority Business Fields Appendix II: List of Business Fields Allocated or Partnership with Cooperatives and Micro, Small and Medium Enterprises Appendix III: List of Business Fields with Certain Requirements
Foreign investment	Article 2 and Article 6	100% Open (Article 2)
Foreign Investment in Presidential Decree	1. Geothermal survey services: 95% 2. Geothermal drilling services: 95% 3. Geothermal operation and maintenance services: 90% 4. Geothermal power plant with capacity ≤ 10 MW: 67%	Not regulated in the Attachment of Investment Business Sector

The **Table 1.** above shows that the management of geothermal in Indonesia has changed after the enactment of the Job Creation Law. Where is in the geothermal business sector before the enactment of the Job Creation Act, it provided restrictions on foreign investment on the amount of capital ownership. Then, based on Article 2 of Presidential Decree 49/2021 Jo. Presidential Decree 10/2021 affirms that a business field is declared open if, except for a business field that is declared closed and a field that can only be operated by the Central Government, this is a form of implementing regulation of Article 12 paragraph (1) of the Investment Law with a similar substance. Based on this, previously limiting the amount of geothermal investment capital, is now changed to be fully open to foreign investors without any restrictions on the amount of capital, as well as the classification of business activities in the geothermal sector.

The change was imposed by the government, as an effort to attract investors, considering that investment in geothermal has a high risk. This risk is influenced by high investment costs, longer payback costs compared to power plants sourced from other renewable energies, as well as quality uncertainty before the drilling stage is completed (Seyedrahimi-niaraq & Nouri, 2022). Thus, based on the investors perspective, a policy that can maintain the rhythm of instruments, that can affect risk must be able to provide a guarantee, so they can project their investment plans.

Certainty is a crucial factor that appeals to investors, particularly in Indonesia, where the legal system is based on the civil law system (Ramadhan, 2018). In the civil law system, laws are always written down, providing a clear framework for regulating behavior and ensuring that laws are explicitly stated in statutory regulations (Aditya, 2019). This emphasis on written laws aims to provide guarantees that individuals' actions are governed by a legal framework.

Jaap Hage, a Dutch legal philosopher, explained that the basic concept of legal certainty can be seen from how a civil law country makes a rule of law. Legal certainty can be seen through two elements, namely legal predictability and legal stability (Hage & Akkermans, 2014). Legal predictability can be interpreted that a legal rule can at least be predicted for an arrangement. While legal stability means that the rule of law does not change too dynamically, but it must be able to provide a guarantee that the rule of law is at least a stable rule. So, based on the investor's point of view, there are two elements, they are legal predictability and legal stability, it can be taken into consideration when investing in a country.

When discussing legal certainty, which encompasses legal predictability and stability, in the context of geothermal investment activities in Indonesia, it is evident that policy changes in the business sector are quite dynamic. This observation is based on a review of multiple changes in investment field policies. Notably, Presidential Decree 49/2021 and Presidential Decree 10/2021, as implementing regulations following the amendment of the Investment Law by the Job Creation Law, were issued in a relatively short timeframe. These decrees were initially issued on February 2, 2021, and underwent revisions approximately three months later on May 25, 2021.

As we can judge from the explanation above, the geothermal policies in Indonesia have undergone several changes for the past few years. Albeit its advantages for the investor, Indonesia needs to formulate policies that would not undergo changes in a relatively short period of time. It can be learned through one of the countries that has

quite good renewable energy development policies, Germany. Even though changes were also made by the Germany government in relation with geothermal energy policies, Germany provides certainty by ensuring the stability of the investment climate in the renewable energy sector (Putri, 2020).

Germany has a long and dynamic history of energy use. In the 1950s, when Germany was still divided into East Germany and West Germany, policies based on the use of energy for development were first implemented by West Germany under the leadership of Chancellor Konrad Adenauer (from the Christian conservative party). In those early days, energy policy had a paradigm of economic growth, with two main focuses to reconstruct the energy infrastructure in West Germany, and to overcome the problem of West Germany's lack of existing energy potential. The focus of energy at this time is lignite and coal, with the main view being to utilize energy as cheaply and safely (economically and supply-wise) as possible (J. F. Hake et.al., 2015). After the ratification of the 1955 Paris Agreement, the West German government began to focus on using atomic energy as a second pillar in Germany's energy supply—with this, the ministry of Nuclear Affairs and the German Atomic Energy Commission were created. The following years became an important path for the use of nuclear energy as a generator in Germany, for example in 1957, at the same time as America, Germany began to intensively carry out research into the use of nuclear energy due to the increasing depletion of coal. Three years later, in 1960, the law regulating nuclear power plants in Germany was passed (J. F. Hake et.al., 2015).

The use of nuclear energy in Germany is experiencing very dynamic development. In the late 1960s, a wave of protests began to erupt in Germany regarding the use of nuclear energy. The German opposition party (APO), which is dominated by social and environmental scholars, began to hold protests oriented towards anti-authoritarian government and environmental issues threatened by the use of nuclear energy. These movements have been strengthened since the Harrisburg incident that occurred in Pennsylvania, America in 1979, but still did not produce significant results - at that time the German parliament was still dominated by parties that supported the use of nuclear energy.

In the 1980s, the protest movement grew stronger due to a lot of forest destruction caused by acid rain and significant climate change. This follows the initiative of the bundestag to discuss the future use of nuclear energy. Through this discussion, replacement energies for electricity generation began to be discussed, which resulted in

the conclusion that the use of nuclear energy was actually not necessary. Furthermore, this movement gained even more significant strength when in 1983, the German Green Party won 5.6% of the vote for the German parliament. However, this was not strong enough to defeat Germany's pro-nuclear parties which controlled 95% of the votes in Parliament. Until 1986, the Chernobyl disaster that occurred in Ukraine (at that time still part of the Soviet Union), changed the German public's view of the use of nuclear energy. A week after the Chernobyl disaster, as many as 86% of the German public thought that it was time for Germany to stop using nuclear energy (nuclear phase out), 17% of them even wanted the German government to stop using nuclear energy directly. The real consequence of this change in view is that, even though during the reign of chancellor Helmut Kohl (1982-1998) nuclear energy was still the second pillar of Germany's energy supply, however, nuclear's position as an innovative energy began to disappear and the view of nuclear energy continued as something that can not be continued (J. F. Hake et.al., 2015).

The nuclear phase-out was getting closer when in 1998, there was a coalition between the green party and the social democratic party in Germany (often called the red-green coalition) under the government of the new chancellor Gerhard Schroder (1998-2005). For the first time in German history, an ecology-focused party has become an important component of the federal government; over the twenty years since its formation, the party has consistently campaigned for the use of renewable energy and called for an immediate end to the use of atomic-based energy. The coalition also urges an end to the nuclear power plant regime in Germany. This struggle bore fruit when the EEG was passed in 2000. One of the instruments that influenced the formation of the EEG was the 1997 EU Electricity Market Directive, which began to pay serious attention to environmental sustainability and the use of renewable energy.

As a result, the term of a nuclear power plant is limited to only 32 years, the establishment of a nuclear power plant is not permitted from the year the regulation comes into force. Changes occurred again when in 2005-2009, the grand coalition was a combination of the CDU (Christian Democratic Union) and SPD (Social Democratic Party) parties with the leadership of Chancellor Angela Merkel. In her government, Merkel again changed the paradigm of using nuclear energy and renewable energy, where nuclear energy was seen as an important bridge for Germany to switch to renewable energy, with the main idea being non-ideological, technology-open, and market oriented energy policy. As a result, several regulations in Germany regarding

Nuclear Power Plants were changed. Originally only 32 years, it became 36 years. Merkel's policy is not without objections. The Green Party stated that Merkel's policy was "the phase-out of nuclear phase-out" (J. F. Hake et.al., 2015).

The elimination of the use of nuclear energy for generating and using renewable energy was further strengthened when the Fukhusima tragedy occurred in 2010. The long aftermath of this incident was that, on March 15 2011, Chancellor Angela Merkel issued a nuclear moratorium policy. At that time, German public confidence in the use of nuclear energy dropped drastically, reaching 20% - the seven oldest nuclear reactors in Germany were temporarily closed (but have not been reopened to date). The German grand coalition CDU/CSU/FDP began to change its political direction regarding the use of nuclear energy, namely by initiating a policy to form an "ethical commission for a safe energy supply" whose task was to produce a joint political agreement following the Fukushima incident. The biggest result of this change in political paradigm is to offer nuclear phase-out as quickly as possible, even if possible, it must be completed by 2021 (J. F. Hake et.al., 2015).

Germany's courage to consistently eliminates its main energy (nuclear), making the use of renewable energy more maximal. In its efforts to maximize these energy changes, Germany is offsetting them on the profits that investors can gain from the FiT tariff scheme. Learning from countries that have successfully used FiT, such as Germany, the main key to success is the stability and continuity of the country's overall policies (Couture et al., 2010). Indonesia and Germany have the same paradigm in changing energy use, especially to shift it to renewable energy. This then became the basis for this comparison between Germany and Indonesia, where Indonesia is currently trying to shift the use of coal to renewable energy.

Germany, although there have been improvements to its policies, has ensured the stability of the investment climate in the renewable energy sector. This can certainly attract investors' interest in investing. In contrast to Indonesia whuch tends to strictly change the policy in the renewable energy sector. One of the example of Germany policy stability in renewable energy sector can be seen from the FiT regulation. Even though The German Ministry of Energy will conduct periodic evaluations and reports regarding the progress of FiT implementation. The Ministry will ensure that the applicable legal regulations function properly, then if necessary they will propose improvements or changes (Mendonca et.al., 2010). Germany, carries out modifications every four years. Improvements carried out periodically are intended to guarantee stability for the actors,

as well as provide space for the legislature to make changes. Investors will feel safe during the four year period because the regulations regarding FiT will not be changed, thus giving them the confidence to make investments and be able to predict what actions or strategies will be carried out in the future.

2. An Economic Analysis of Law Perspective

The second consideration is efficiency. As previously discussed, legal studies can benefit from analysis beyond the scope of legal science alone, including perspectives from related fields such as economics. Richard A. Posner suggests that economics, as a science, explains rationality in human decision-making by assessing whether a particular situation can maximize benefits according to human desires. (Yasa et.al., 2022). Posner's view is based on the philosophy that humans are rational agents, therefore, rationality is measured through the fulfilment of human interests when faced with certain conditions. In this context, Posner's view is very likely to be used to answer the efficiency side in investment policy. There are two formulas that may arise, the first is the host state as a human being and the investor as a condition, and the second is vice versa. In this formulation, efficiency is a consideration, both for the host state as a human or an investor as a human being faced with the host state as a condition and investors as a condition. Simply put, the formulation can be written as follows:

Host State (as a human in Posner theory) v Investor (as circumstance in Posner theory). As a human, it is safe to assumed that what can be considered as efficient policy by the host state should serve its personal interest, whilst maintaining that the circumstance keeps happening, because, such interest could only be maximized with regards to the mentioned circumstances.

Furthermore, when we tried to put the Investors (as a human in Posner Theory) and the Host State (as a circumstance), it can be assumed that the formula will bear no differences whatsoever. In that case, one important thing, that is needed, it is an equilibrium to bridge the two interests in the formulation presented earlier. In that case, an efficient polices would occur when it serves both the interest of the state and the investors.

However, the formulation cannot be written in a simple and clear manner. To clarify, the use of the prisoner's dilemma is more appropriate to find an equilibrium between the interests of the host state and investors. Prisoner's Dilemma based its notion on hard decision faced by two criminals who commit crimes together, we can call them

A and B (Yasa et.al., 2022). Furthermore, the hard decision start when the police decided to conduct separate interrogation—due to it, both of them faced with 2 choices whether or not to confess. However, the choice that they made, would certainly led to different consequences—if both of them choose to confess, they will be sentenced for 5 years. If both of them choose not to confess, they will be sentenced for 1 year. On the other hand, if one of them choose to confess, the other will not be sentenced and vice versa, but those who do not confess will be sentenced for 20 years (Yasa et.al., 2022).

Based on the description above, we can say that the prisoner's dilema involve with three main variables, these are, the subject (A and B), the choices (confess or not confess), and the consequences. With regard to what Posner said earlier, it seems fair to assume that both of them (A and B) will choose the best for their interest, which is to confess (hoping that the other party did not choose to confess). On the other hand, rationally speaking, the best choice that they should made, it is not to confess. Simply put, the choice that only based on interest meanwhile jeopardizing rationality would led to worse outcome—imprisoned for 5 years. However, the best outcome (which is for them not to confess) can only be possible if both of them agree upon which choices they should make before separated interrogation happen. In this sense, it is almost impossible due to their position as a captured criminal.

On the other hand, when the prisoner's dilemma applied to analysed the most efficient foreign direct investment policies for both State and foreign investors, it would be possible since both of the party can negotiate. Furthermore, using the prisoner's dilemma model, the variables (in the case of host state and foreign investors) would be, Subject (S for state and V for investor), Interest (I), and Consequence (C). As explained earlier, the interest of state would be to develop renewable energy but maintain the SoNR, and for investor the interest would be benefits or return on investment as good as possible. As for the consequences, it can be explained using scenarios below:

1. If both 'S' and 'V', choose to maximize their 'I' by jeopardizing each other 'I', the investment could never happen (to put it simply, we can call this consequence as inapplicable).
2. If 'S' chooses to set the best investment policies for the 'V' 'I', because the 'V' put the 'S' reliability on foreign investment as advantageous factor, the 'S' 'I' in maintaining the SoNR doctrine would be decreased. (We can call this consequence as Decrease Host State Interest).

3. If 'S' chooses to maximize its 'I' by jeopardizing the 'V' 'I' using the SoNR Doctrine, while the 'V' complies with the 'S' unfair set of policy, the 'V' 'I' would be decreased. In the worst scenario possible would the 'S' harms the 'V' rights through inter alia expropriation and corruption. (We can call this consequence as Decrease Investor Interest).
4. If both 'S' and 'V' realize each other needs and negotiate truthfully, both of there 'I' would be maximized (We can call this consequence as Efficient).

Simply put, those scenarios can be explained using table below:

Table 2. The interest in geothermal investment and partnership

The Interest		**Investor**	
		Fully Control	**Equitable Partnership**
Host-State	Fully Control	Inapplicable	Decrease investor interest
	Equitable Partnership	Decrease host-state interest	Efficient applicability

Table 2. adapted from the prisoner's dilemma in game theory, with several changes to indicators, which essentially aims to find an efficient solution that can accommodate both interests, so the possible conditions can be explained as follows:

1. The first conditions in the table, it depicts the first scenario when the host-state and the investors have full control over management and investment of geothermal. This condition is impossible to apply because both of them are in a state of full management which will result in them fighting over each other interest. In that case, negotiation would hardly succeed and the investment would never happen.
2. The second condition in the table, it depicts the second scenario when the host-states reduces their share, while investors remain in full control. It will provide great benefits for investors, meanwhile jeopardizing the state SoNR.
3. The third condition in the table, it depicts the third scenario when what happen is the opposite of second condition, the host-state has full control, while the investor only gets a portion. This condition will provide benefits for the host-state, but vice versa for investors.
4. The last condition is when the host-state and investors agree on the amount of control over both. So, in the fourth condition, the equilibrium that mediates

between the interests of the host-state and the interests of investors can be accommodated.

The description of **Table 1.** above provides a view that efficiency can be found in the fourth condition, but it is actually still at the level of conclusions that were born out of a prisoner dilemma. In its application later, additional considerations need to be given, considering that the discussion related to geothermal is closely related to the public interest. In order for the fourth condition to work and the public interest to be protected, the thing that can be taken into consideration, it is an agreement to limit the time of exploitation or a proportional distribution between the host state and investors.

It is in line with Principle 2 of Rio Declaration on Environment and Development (hereinafter referred to as the Rio Declaration) Principle 2 Rio Declaration on Environment and Developtment:

> "States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction."

Where a sovereign country has the right to exploit in accordance with the country's own policies. So, in order to maintain the guaranteed welfare as mandated by Article 33 of the 1945 Constitution of the Republic of Indonesia, policies must be able to provide clear limitations for such cooperation, so it is as to continue to pay attention to the public interest (host state).

Based on the explanation above, it seems fair to assume that the Indonesian government choice to ruled out the geothermal sector from negative investment as an effective policy to attract investors, albeit, it is not proven yet due to the fact that such policy made almost a year before the authors write this study. However, in order to not decrease the host state interest**,** limitations for foreign investor, in order for the state to enforce SoNR doctrine, should be made. Such limitations can be done through limitating how long does the foreign investor could maintain its 100% ownership over geothermal sector exploitation. It can be learned from Philippines that limit the ownership only for 25 years and can be expanded for 15 years (Van Campen & Rai, 2015). Philippines, however, have different approach than Indonesia. Based on section 8 of Republic Act No. 7043 and Philippines constitution which implicitly regulate that geothermal sector, it is included as negative investment sector. However, according to Article 15 Republic Act No. 7043, implicitly, geothermal investment sector can be owned by foreign investor

for 100% but with transitory provisions that mandated the investor to give up its ownership over geothermal project after the period time over, which is 25 years, expandable for 15 years. Philippines, in other words use BOOT (*Build Own Operate Transfer*) sceme for the ownership of geothermal development projects.

The Philippines choice to use BOOT can be deemed as adherent with the SoNR principle, manifested in article XII section 2 of the Philippines constitution which stated that:

> "All lands of the public domain, waters, minerals, coal, petroleum, and other mineral oils, all forces of potential energy, fisheries, forests or timber, wildlife, flora and fauna, and other natural resources are owned by the State. With the exception of agricultural lands, all other natural resources shall not be alienated. The exploration, development, and utilization of natural resources shall be under the full control and supervision of the State. The State may directly undertake such activities, or it may enter into co-production, joint venture, or production-sharing agreements with Filipino citizens, or corporations or associations at least sixty per centum of whose capital is owned by such citizens. Such agreements may be for a period not exceeding twenty-five years, renewable for not more than twenty-five years, and under such terms and conditions as may be provided by law. In cases of water rights for irrigation, water supply, fisheries, or industrial uses other than the development of water power, beneficial use may be the measure and limit of the grant."

In other words, the BOOT scheme used by the Philippines can be considered as an act of supervising by the state, in order to maintain SoNR, while also attracting foreign investors. This kind of supervising model can be adopted by the Indonesian government through limitating how long does the foreign investor could maintain its 100% ownership over geothermal sector exploitation. It can be learned from Philippines that limit the ownership only for 25 years and can be expanded for 15 years.

Last, a policy that has commitment and political willingness on geothermal development, it is very much needed to achieve the emission reduction target. Thus, the government must be really careful in formulating geothermal investment policies as an effort to achieve these targets (Chelminski, 2022).

Conclusion

Based on these explanations, it can be concluded that in terms of certainty, renewable energy investment policies in Indonesia, which frequently change, ultimately reduce the value of that certainty. This is different from Germany which tends to be more stable because it has a renewable energy policy that does not change too often, for example this can be seen in German policy regarding providing incentives to foreign

investors. Furthermore, regarding the effectiveness of the policy of 100% ownership by foreign investors for geothermal development projects, based on EaL and game theory, this policy can be said to be effective. However, improvements are needed so that the policy does not conflict with SoNR principles. This improvement, for example, is by using the BOOT scheme used by the Philippines in relation to the geothermal development sector, not only can it be 100% owned by foreign investors without a certain period of time.

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