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SWOT analysis on geothermal energy development in Indonesia and fiscal incentives needed

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Abstract

Until 2020, Indonesia's dependence on fossil energy in meeting energy needs is still high at 90,75%, while the use of new renewable energy has only reached 9,15%. Specifically, the installed capacity (which has only been utilized for electricity generation) geothermal is only 1,924.5 MW or around 6.51% of the total potential reaching 29,543.5 MW (40 percent of the world's geothermal potential).

Some of the problems that have arisen in relation to geothermal development are the high usage of fossil energy for electricity generation in Indonesia, and the strength and weakness of geothermal energy that has not been identified more adequately. there are still many problems, obstacles, and challenges in the development and utilization of geothermal energy in Indonesia, and the need for support from various parties (especially from the Government of Indonesia) to encourage the usage of geothermal energy in Indonesia due to the still high costs incurred for geothermal drilling and exploration.

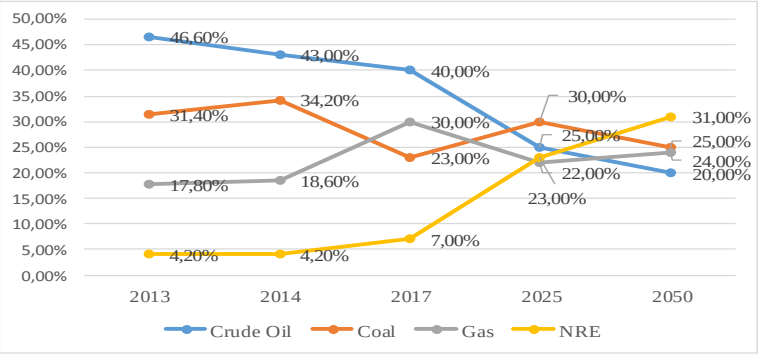
This study uses a SWOT analysis method to map the real conditions related to geothermal energy development with recommendations that the Government could provide fiscal incentives both from the State Revenue, State Expenditure, and State Financing in the State Budget.

Keywords: Geothermal development, SWOT analysis, fiscal incentives

1. Introduction

Indonesia's dependence on fossil energy in meeting energy needs is still high 90.75%, while the usage of new renewable energy (NRE) has only reached 9, 15% (based on CNBC data until 2020). The Government of Indonesia is targeting a new renewable energy mix (EBT) of 23% by 2025 in the National Energy General Plan as explained in graph 1 below. This situation is exacerbated by the Covid-19 pandemic which has an impact on the decline in world oil prices. As a result, fossil energy is cheaper than. Meanwhile, the amount of fossil energy reserves in Indonesia, especially petroleum, continues to fall because efforts to add new reserves have not been able to keep pace with the rate of decline in existing reserves as a result of ongoing exploitation. [1]

Graph 1: Indonesia's Energy Mix Target (2013-2050)



Source: [1]

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Indonesia's National Energy Council (DEN) explains the energy strategy in Indonesia that the country needs to use renewable energy to meet the 100% electricity ratio target by 2020 and eliminate the dependence on energy imports. Efforts to develop and use renewable energy, especially geothermal energy, must be supported by new policies that are planned and easy to implement [2].

Indonesia will find it difficult to pursue quality economic growth if it is not supported by adequate and environmentally friendly electricity supply. On the other hand, the condition of the electricity crisis that occurred in many regions (in Indonesia) even in locations that produce electricity, this is a big challenge for the Indonesian Government-Owned Electricity Company (PLN) which has the task to provide adequate national electricity. There are indications that the role of the private sector in supplying national electricity needs will increase in the future. Likewise, the opening role of the private sector in building transmission and distribution networks will be even greater in order to encourage the development of the electricity sector [3] so the Government needs to think of a form of fiscal support that can attract the interest of private companies to engage in electricity supply in Indonesia. .

Specifically related to geothermal energy, it can be explained that up to 2019 there have been 342 geothermal potentials spread in Indonesia with a total potential reaching 29,543.5 MW (40 percent of the world's geothermal potential) while the installed capacity (which has only been utilized for power plants) is only 1,924.5 MW or around 6.51% [4-5].

The high cost of drilling and geothermal exploration costs makes the construction of geothermal power plants quite difficult to do. Although it can be actually compete with the total costs incurred by electricity generation from fossil fuels and the cost of controlling pollution from power plants that use these fuels [6].

Khadijah (2017) explains that the management of geothermal energy is a high-risk management with a large investment. Meanwhile, financial support and fiscal incentives are still limited. Even so, there are currently fiscal incentive policies such as tax relief and spending. The provision of fiscal incentives is indispensable as a certainty and stimulus for investment in geothermal energy management that will increase economic growth and also national energy security where demand for national energy needs is expected to continue to increase every year by 4.5% -5.6% in 2014 to 2035. On the other hand, the main problems faced by geothermal energy businesses are mostly non-technical problems such as harmonization of regulations, permits, and land acquisition which are the authority of the government and regional governments, not business actors [7].

2. Problem Formulation

Reading the above description, the authors try to focus the problem on geothermal energy management and formulate problems on the topic as follows:

1) The high usage of fossil energy for electricity generation in Indonesia.
2) The very low capacity of installed renewable energy especially geothermal energy in Indonesia is 1,924.5 MW (6.51%) of its total potential (29,543.5 MW).
3) The strengths and weaknesses of geothermal energy have not been identified more adequately.
4) There are still many problems, obstacles and challenges in the development and utilization of geothermal energy in Indonesia.
5) The need for support from various parties (especially from the Government) to encourage the use of geothermal energy in Indonesia because there are still enough costs to be incurred for geothermal drilling and exploration.

2.1. Research purposes

From the list of problems mentioned above, the author chose 2 research objectives that are expected to answer the problems above, 2 goals are:

1) Analyzing maps of strengths, weaknesses, opportunities and obstacles (SWOT) in the development of geothermal energy in Indonesia.
2) Identifying the types of incentives and support that are appropriate for funding/financing provided by the Government of Indonesia and other parties that need to be done.

2.2. Research methods

To answer the problems and objectives of this study, the author chose the SWOT analysis method to see all the factors that are internal and external to geothermal energy in the form of strengths, weaknesses, opportunities, and threats. The results of this analysis are expected to be input in mapping issues in geothermal management and formulating the forms of fiscal incentives and support needed in developing geothermal energy.

The data used in this study are secondary qualitative data related to SWOT from various literatures and opinions of previous authors and from opinions of various sources on conditions in the field of energy exploration and exploitation.

As for the definition, and purpose of this SWOT method, the authors quote some of the opinions of the previous authors as follows**.**

Ommani (2011) says that Analysis of strengths, weaknesses, opportunities, and challenges (SWOT) shows work support for researchers or planners for planning and prioritizing business objectives, and for further refining strategies to achieve them. SWOT analysis is a technique used to analyze business strengths, weaknesses, opportunities, and threats [8].

Table 1. SWOT analysis matrix

	Strengths	**Weaknesses**
Opportunities	How do I use these strengths to take advantage of these opportunities?	How do I overcome the weaknesses that prevent me from taking advantage of these opportunities?
Threats	How do I use my strengths to reduce the impact of threats?	How do I address the weaknesses that will make these threats a reality?

Source: [8]

Gurel and Tat (2017) conclude that SWOT analysis is a tool used for strategic planning and strategic management in organizations. It can be used effectively to build organizational strategies and competitive strategies. According to the system, wholesale organizations are supported by their environment and consist of various sub-systems. In this sense, an organization exists in two environments, one inside itself and the other outside. This is a way to analyze this environment for strategic management practices. The process of accepting the organization and its environment is called the SWOT Analysis [9].

Bonnici (2017) explains that “A SWOT analysis evaluates the internal strengths and weaknesses, and the external opportunities and threats in an organization’s environment. The internal analysis is used to identify resources, capabilities, core competencies, and competitive advantages inherent to the organization. The external analysis identifies market opportunities and threats by looking at competitors’ resources, the industry environment, and the general environment” [10]

3. Literature Review

3.1. Electricity energy and new and renewable energy sources in Indonesia

The need for electricity in the world, including in Indonesia, is currently experiencing an ever-increasing demand for growth in accordance with the increasing needs of people's daily lives, including the demand for development demands in the fields of information, technology, infrastructure, and other fields.

The government has an obligation to provide electricity to its citizens in sufficient quantities and with good quality and reliability. However, along with the increase in population and economic growth causes demand for electricity is increasingly increasing. Development in Indonesia (also in the world) fulfills the meaning of sustainability if the development meets economic criteria, is socially beneficial, and preserves the environment. Sustainable social indicators are usually related to accessibility aspects (electrification ratio, ratio of number of villages with electricity). Whereas it sustainable economic indicators are usually associated with (1) availability of resources, (2) security for energy supply / energy security, and (3) energy efficiency. Meanwhile, sustainable environmental indicators related to climate change and emissions, and land use that is a source of energy is found [11].

Besides that (Hastuti, 2017) explained that the demand for electricity in the world (globally) from year to year shows symptoms of an increase because it is in line with increasing population, increasing economic activity, increasing technological and industrial development, and other factors. The increasing need for electrical energy has an impact on increasing CO_2 emissions and greenhouse gases because there are still many uses of energy sources derived from fossil fuels such as petroleum, coal and diesel [12].

Hastuti (2017) still explains that the State of Indonesia has committed to reduce emission levels by around 26 percent by 2020 with a business as usual (BAU) scenario and 41 percent by 2020 if it is supported by international funding. Therefore Indonesia is committed to developing new renewable energy, especially Geothermal energy as promised by the previous President of the Republic of Indonesia, Susilo Bambang Yudhoyono (SBY) in his speech at the World Geothermal Congress in Bali in 2010 [12].

Below is a description of a new renewable energy source that has been utilized as a primary source of electrical energy in Indonesia.

Table 2. Description of utilization of new and renewable energy in Indonesia

No	New Renewable Energy	Resources / Potential Installed	Installed Capacity	Ratio: Installed Capacity / Potential
1	Hydro	75.000 MW	8.111 MW	10,81%
2	Geothermal	29.543,5 MW *)	1.924,5 MW *)	6,51%
3	Biomass	32.000 MW	1.740,40 MW	5,40%
4	Solar	4,80 kWh/m2/day	71,02 MW	-
5	Wind and Hybrid	3-6 m/s	3,07 MW	-
6	Ocean	61 GW	0,01 MW**)	-
7	Uranium	3.000 MW***)	30,00 MW****)	-

Source: [12]
*) Source: [4-5]
**) Prototype BPPT (Technology Assessment and Application Board)
***) Only in Kalan, West Kalimantan
****) As a Non Energy Research Center Only in West Kalimantan

3.2. Geothermal energy and its development in Indonesia

Hariyanto, at all (2016) explained that geothermal energy has the advantage of being environmentally friendly and always in a condition that can be renewed. Geothermal energy cannot be transported except in the form of electrical energy, so it is very good for meeting local energy needs. Simply stated, geothermal energy is heat energy that is transferred from the inside of the earth. The energy can be taken in the form of steam or hot water. Geothermal energy sources are defined as a reservoir where geothermal energy can be extracted economically and utilized for power generation, industrial, agricultural or domestic needs accordingly [13].

Mary at all (2017) said that the development of geothermal energy has a strategic value in saving the usage of fossil energy, which means potential in saving foreign exchange for financing imports of energy, especially fuel oil, as well as to reduce the environmental impact due to the exploitation of fossil energy. Therefore, the Government of Indonesia needs to encourage and support (by providing appropriate and appropriate fiscal incentives). utilization of geothermal energy with a variety of efforts, both in refining governance policies on the upstream side and the utilization of geothermal energy on the downstream side, geothermal energy can provide energy at a constant level and does not depend on weather or season considerations [3].

Juliani and Rahmatsyah (2016), said that Indonesia has potential natural resources because it is geographically a meeting place for the Australian, Eurasian and Pacific plates. Indonesia is crossed by a volcanic belt that stretches from the island of Sumatra to Papua with 117 active volcanic centers that form a 7,000 km volcanic path. Subduction between the Eurasian Plate and Australia along the 4000 km plays a role in the formation of 200 volcanoes and 100 geothermal fields in Indonesia [14].

Indonesia's geothermal potential reaches 29,544 MW with an installed capacity at present only around 1,698.5 MW (6.51%). With such great potential, Indonesia is ranked the third largest in the world (after the United States and the Philippines) in the use of geothermal energy for electricity,

The development of geothermal energy in Indonesia began with the Kamojang field exploration in

1972 and continued with the era of Concession through the Joint Operation Contract (JOC) scheme. Guided by Presidential Decree of the Republic of Indonesia (Keppres RI) Number: 22 of 1981 and Number. 45 of 1991 the Government of Indonesia granted the Geothermal concession authority to the Pertamina Company. And in this case, the Pertamina Company can appoint another contractor to hold a JOC in which Pertamina is the management and contractor as the operational operator [4].

Since the issuance of Presidential Decree RI (Keppres) Number: 76 of 2000 to 2014, more than 50 Geothermal Working Areas (WKP) in Indonesia have been tendered and some have been issued Business Development Permits (IUP). With the new regulation currently, Law Number 21 of 2014 concerning Geothermal Energy, the Government of Indonesia assigns assignments to the Public Service Agency (BLU) and the State-Owned Enterprises (BUMN) that manage geothermal energy to develop this type of energy [4].

The following are 13 geothermal power plants (PLTP) which have been fully operational in Indonesia that have provided electricity in Indonesia of 1.69 GW [15].

Table 3. List of Geothermal Power Plants (PLTP) in Indonesia

No.	Power Plants *(PLTP)*	Developer/Operator	Total Energy Capacity *(has been installed)*	WKP Location *(Geothermal Working Area)*
1	PLTP Sibayak	PT Pertamina Geothermal Energy	12 MW	Sibayak-Sinabung, North Sumatera
2	PLTP Sarulla	Sarulla Operation Ltd	330 MW	Sibual-buali, North Sumatera
3	PLTP Ulubelu	PT Pertamina Geothermal Energy	220 MW	Waypanas, Lampung
4	PLTP Salak	PT Star Energy Geothermal Salak	377 MW	Cibeureum Parabakti, West Java
5	PLTP Wayang Windu	PT Star Energy Geothermal Wayang Windu	227 MW	Pangalengan, West Java
6	PLTP Patuha	PT Geo DIpa Energy	55 MW	Pangalengan, West Java
7	PLTP Kamojang	PT Pertamina Geothermal Energy	235 MW	Kamojang-Darajaat, West Java
8	PLTP Darajat	PT Star Energy Geothermal Darajat	270 MW	Kamojang-Darajaat, West Java
9	PLTP Dieng	PT Geo DIpa Energy	60 MW	Dieng Plateau, Central Java
10	PLTP Karaha	PT Pertamina Geothermal Energy	30 MW	Karaha Bodas, West Java
11	PLTP Matalako	PT PLN Indonesia	2.5 MW	Matalako, East Nusa Tenggara
12	PLTP Ulumbu	PT PLN Indonesia	10 MW	Ulumbu, East Nusa Tenggara
13	PLTP lahendong	PT Pertamina Geothermal Energy	120 MW	Lahendong Tompaso, North Sulawesi

Source: [15].

3.3. Fiscal incentives

In practicing, according to Aziz (2018) that “In general there are 3 types/sources of state budget incentives against other parties (society/business world/BUMN/etc.) that are:

1. State Budget incentives in the field of state revenue such as tax holiday, tax allowance, and others.
2. State Budget incentives that are sourced from the state expenditure side, for example for the construction of road infrastructure, bridges, subsidizing fertilizer prices, and others.
3. State Budget incentives from the financing side such as the granting of State Capital Participation (PMN) to the state owned enterprises, international institutions, business entities, or other legal entities”[16].

Aziz (2018) argues that "fiscal incentives through the state revenue side are usually in the form of tax incentives. Tax incentives are government policies that are usually in the form of nominal exemptions or reductions in tax types, or a reduction in the level of tax types, and or in the form of any tax that must be levied on certain parties with a certain amount and period in accordance with applicable. So, if seen from the short-term calculation paradigm, it is as if the government will suffer losses due to reduced tax revenue"[16].

Therefore the choice in formulating policy must consider the positive and negative aspects. One positive aspect of tax incentives is as an incentive for investors (in this case vocational education providers) to invest capital so that the amount of investment that enters will increase economic growth which is very much needed in improving people's welfare. Some forms of fiscal incentives that are potentially made by the government in an effort to improve the quality of vocational education and also solve problems that may arise are:

1. Deduction tax

The Government of Indonesia has provided several tax incentives to reduce the cost burden paid by investors / third parties operating in the field of research and development. The incentives are in the fields of Income Tax, Value Added Tax, and others.

2. Investment allowances and tax credits

Tax allowance means reducing the compaTax benefits mean reducing the company's taxable income. Whereas the tax credit directly reduces the amount of tax that must be paid. This incentive method is also quite applicable for investors involved in vocational education and training.

3. Tax holiday

Tax incentives in the form of tax holidays are tax incentives provided through income tax exemptions. The tax holiday is given for a limited period and is only allowed for newly established companies. The effective duration of a tax holiday depends on the start of the tax holiday.

Whereas the provision of fiscal incentives in the part of state expenditure can be done by identifying in advance the purpose or definition of a state expenditure, because - according to Aziz (2011) - the allocation of state expenditure (in the APBN) can be grouped in:

a. State expenditure for investment that can add to the country's wealth and support the strength of the national economy in the present and future, such as spending on capital expenditure for the construction of road, bridge, electricity, and other infrastructure.
b. State expenditures that directly support the welfare and prosperity of the community, for example: the provision of Community Health Insurance (Jamkesmas), School Operational Assistance (BOS), the rice program for the poor (Raskin), fuel subsidies, and others.
c. State expenditure that aims to save on state expenditure in the future, for example spending to support the policy of diversification of new and renewable energy in the present will have an impact on fossil energy savings or state finances in the future, of course if managed professionally.
d. State expenditure can be used to provide broader employment opportunities and increase people's purchasing power, such as state expenditure to support fiscal stimulus programs in order to face the effects of the global economic crisis [17].

While fiscal incentives from the financing side such as granting State Capital Participation (PMN) to state-owned enterprises, international institutions, business entities, or other legal entities. CGFR 2018 (2019) the most appropriate fiscal incentives that have been implemented by the Government of Indonesia, especially for state-owned companies such as PT PLN, PT Pertamina or others. Companies must have the opportunity to get capital assistance from the state if they meet the requirements set by the Indonesian government and the Indonesian House of Representatives such as (1) capital participation is prioritized to encourage infrastructure development and (2) support energy sovereignty and food sovereignty, and (3) support the sustainability of the people's business credit program and Micro, Small and Medium Enterprises [18].

4. **Discussion and Result**

4.1. SWOT analysis of geothermal energy development

Based on the description and explanation above and see the character of the SWOT analysis that can distribute all conditions on the issue discussed (in this case the utilization of geothermal energy) into 4 big maps namely strengths, weaknesses, opportunities, and treaths, the author try to identify one by one these conditions and map them in 4 parts of the SWOT so that it is expected to be easy to analyze and find a way out of each part of the SWOT even in each condition.

The identification and mapping of SWOT on the utilization of geothermal energy, the author explains

in Matrix 1 below.

Matrix 1: Matrix of SWOT Analysis of Geothermal Energy Utilization

Strengths	Weaknesses
1. Very large potential energy source, which is 29 Gwe (40% of world reserves) 2. Geothermal energy is very effective and easy to convert into electrical energy. 3. The cleanest energy source from carbon so that the use of geothermal energy in the long term will be very beneficial, especially in reducing greenhouse gases (C02), 4. Its nature is renewable energy (renewable) so that its reserves are maintained stable. 5. It cannot be transferred (export) and in its management does not require a large area. 6. It has potential to generate revenue for the state such as geothermal non-tax sourced from government part of the deposit, fixed exploration fees, fixed production fees, and production fees or royalties.	1. The utilization of geothermal energy has only reached 1,924.5 MW or around 6.51% 2. Utilization is domestic, meaning that it can only be developed where geothermal potential is located, cannot be transported or transferred to other locations (although it is quite close to the exploration area). 3. Many of the geothermal potential in the islands of Eastern Indonesia cannot be developed because the demand is still small so that it will be faced with economic prices. 4. The location of the geothermal potential is in the conservation forest and there is resistance to community resistance in the area around the source.
Opportunities	**Treaths**
1. Economic growth makes electricity supply continues to increase, so the demand for geothermal-based electricity in Indonesia is very high. 2. Research and data on geothermal resources and reserves are considered inaccurate to confirm the current real geothermal reserves in Indonesia. 3. Coordination with local governments needs to be done to address social issues. 4. The World Bank pays attention to the geothermal energy sector in Indonesia. By providing a biofuel fund as a search for geothermal steam, which is a source of energy for Geothermal Power Plants (PLTP), the grant is provided through "PT Sarana Multi Infrastruktur (Persero)" Ministry of Finance as a cost for conducting geological, geophysical drilling surveys and chemical geo (3G). 5. Fiscal incentives on the development of new renewable energy in Indonesia (including geothermal) are very open although they need to be added / improved. 6. The scale of geothermal power plants is very flexible, from small scale villages to large scale, which is 5 MW-110 MW per unit.	1. The initial costs of exploiting this energy (it is very high and requires a relatively long time to find, confirm, and develop geothermal resources so that it can have a negative impact on overall project financing (the estimated cost of geothermal exploration in Indonesia reaches 8 -9 percent of the total project cost). 2. The development and utilization of geothermal for electricity is always only associated with the electricity demand (demand) at the site. 3. The selling price of electricity that is not in accordance with the economics of the developer and the buyer of electricity which is single buyer (ie PT PLN), however, the selling price tends to be constant, not affected by price fluctuations as energy derived from fossil energy. 4. Licensing processes related to geothermal businesses that are not yet one-stop (many related institutions such as Ministry of Agriculture in charge of the areas of Life, Forestry, and Maritime Affairs) so that the licensing process takes a long time. 5. The working area management mechanism still has many problems, so that sometimes it does not go according to the target, even many work areas are not operating, thus wasting potential.

Source: Author's illustrations

After analyzing the SWOT from the development and utilization of geothermal energy, the writer tries to find a way out by considering the approach of the previous writers, especially Ommani (2011) in matrix 1 above.

The author accommodates all conditions of each SWOT element, especially on (large) strategic conditions by providing recommendations for solutions as described in Matrix 2 below.

Matrix 2: Recommended Solutions for Geothermal Energy Development SWOT Conditions

	Strengths	Weaknesses
Opportunities	*How do I use these strengths to take advantage of these opportunities?*	*How do I overcome the weaknesses that prevent conditions from taking advantage of these opportunities?*
	The magnitude of the potential energy sources and the number of potential points are expected to be optimized by related parties to build geothermal power plants in many population locations which are geothermal sources so that other energy sources (including fossil energy) can be directed to the regions / other locations that do not have geothermal potential).	Utilization of geothermal that is domestic/at the development site can be overcome by the construction of supporting infrastructure such as with good quality of pipes to distribute to locations that are not sources of heat energy. The construction of this expensive infrastructure can be assisted by financial assistance from banks (in Indonesia) or fiscal incentives in terms of state expenditure and financial assistance / equity participation for

		companies that are able and able to manage this energy source.
Threats	*How do I use the strengths to reduce the impact of threats?*	*How do I address the weaknesses that will make these threats a reality?*
	The usage of geothermal energy has the potential to bring sources of income to the country both in terms of non tax revenue (PNBP), royalty value, and other sources. This potential revenue is a stimulus for the Government to help private companies that will conduct geothermal exploration and exploitation, especially the Government promises to pays/ covers the initial costs incurred by the development companies with compensation for greater or potential share of the production. State revenue that will be obtained smoothly.	The location of the geothermal potential is in the conservation forest and there is community resistance around the geothermal source, making it difficult for the geothermal business licensing process. The way out is for the government to issue a regulation that every contractor who gets a business permit at a location must provide compensation to the local residents and or must employ local residents at the contracting company.

Source: Author's illustrations

4.2. Fiscal incentives for geothermal energy development

The second part of the discussion in this research is to explain fiscal incentives that may be carried out by the Indonesian Government to assist the development and utilization of geothermal energy.

In accordance with the authors mentioned in the literature review that the form of fiscal incentives can be take from 3 parts / sides, namely from the State Revenue, from State Expenditure, and from State Financing.

4.2.1 From the state revenue side

The Government of Indonesia has several fiscal policies related to tax revenue to support the development of the energy supply side, and also has the potential to develop this type of energy. The Indonesian government actually has provided various facilities / fiscal incentives in this section such as:

(a) Import duty reduction facility for certain energy products through the Minister of Finance of the Republic of Indonesia (PMK) Regulation Number 177 / PMK.011 / 2007 concerning Exemption of Import Duty on Imported Goods for Upstream Oil and Gas and Geothermal Business Activities [19].

(b) PMK Number 154 / PMK.011 / 2012 concerning the Second Amendment to the Regulation of the Minister of Finance Number 154 / PMK.011 / 2008 concerning Exemption of Import Duty on the Import of Capital Goods in the Context of the Development and Development of the Electric Power Industry for Public Interest [18].

Also regarding the Provision of Income Tax Facilities for Investment in Certain Business Fields and / or in Certain Regions as stipulated in PMK Number 144 / PMK.011 / 2012 (FPA, 2015) which can actually be developed for the fields and regions concerned by developing geothermal energy by private or other companies.

Other forms are as contained in Government Regulation No. 1/2007 jo. PP No. 62/2008 jo. PP No.52 / 2011 and PMK No. 144 / PMK.011 / 2012 jo. PMK No. 89 / PMK.010 / 2015 concerning the provision of income tax facilities for investment in certain business fields and / or in certain regions, with facilities:

1) Reduction of Net Income Tax (PPh) by 30% of the total investment for 6 years (investment tax credit).

2) Accelerated depreciation and amortization

3) Reduction of PPh rates on dividends paid to foreign taxpayers (Imposition of PPh dividends to 10% from the previous 20%)

4) Compensation for losses from 5 to 10 years [7].

4.2.2 From the state expenditure side

Some forms of fiscal incentive policies that actually have been rolled out by the Ministry of Finance that have been published in the research report are as follows:

(a) PMK Number 139 / PMK.011 / 2011 governing the Procedure for Providing Guaranteed Business Feasibility of PT PLN for the Development of Power Plants Using Renewable Energy, Coal, and Gas.

(b) PMK Number 260 / PMK.011 / 2010 concerning Guidelines for Implementing Infrastructure Guarantees in Government Cooperation Projects with Business Entities. This PMK opens opportunities for increased private participation in the development of the energy sector.

(c) Fiscal policy of state expenditure for transfers to regions is the budget for rural energy in the form of a Special Allocation Fund. Minister of Energy and Mineral Resources Regulation No. 10 of 2015 provides technical guidelines for the use of the Special Allocation Fund (DAK) for the development of rural energy in the 2015 fiscal year in which the DAK of rural energy prioritizes the development of new renewable energy [19].

Another form of incentive in the field of state spending is for example by providing interest subsidies for micro and small entrepreneurs who apply for credit schemes to the banking world specifically aimed at developing geothermal energy. This scheme has actually been applied to other sectors such as trade, agriculture, and others [19].

4.2.3 From the state financing side

Fiscal policies related to financing are policies relating to domestic state investment. Domestic financing in the energy sector is carried out through, among other things, domestic banking financing and domestic non-banking financing such as government investment funds.

According to PMK Number 218 / PMK.05/2009, the Ministry of Energy and Mineral Resources (ESDM) and / or the Ministry of Finance can establish financing facilities individually or by collaboration through a revolving funding mechanism to support energy conservation efforts as mandated in Government Regulation Number 70 of 2009 concerning Energy Conservation. The government has the option to provide incentives in the form of low interest rate funds for energy conservation investments as stipulated in Government Regulation Number 70 of 2009 Article 20 Paragraph 1d [19].

Fiscal incentives on the financing side can also be in the form of granting State Capital Participation (PMN) to state-owned companies that will seek to develop this geothermal energy.

5. Conclusion

Until 2020, Indonesia's dependence on fossil energy in meeting energy needs is still high at 90,75%, while the use of new renewable energy has only reached 9,15%. Specifically the installed capacity (which has only been utilized for electricity generation) geothermal is only 1,924.5 MW or around 6.51% of the total potential reaching 29,543.5 MW (40 percent of the world's geothermal potential).

Some of the problems that have arisen in relation to geothermal development are the high use of fossil energy for electricity generation in Indonesia, and the strength and weakness of geothermal energy that has not been identified more adequately. There are still many problems, obstacles, and challenges in the development and utilization of geothermal energy in Indonesia, and the need for support from various parties (especially the Government) to encourage the use of geothermal energy in Indonesia due to the still high costs incurred for geothermal drilling and exploration.

Therefore, the solution needs to be considered, namely by analyzing the SWOT of this development problem and proposing fiscal incentive support, especially for companies that will develop geothermal energy.

6. Policy Recommendation

Regarding to the discussion above, the author proposes that the Government can provide fiscal incentives to private companies or SOEs that will and are developing this geothermal energy. This fiscal incentive can be provided through the portion of State Revenue, State Expenditure or State Financing or a combination of the three types of fiscal incentives.

This fiscal incentive must consider various factors such as (1) an objective assessment of the feasibility study on energy development conducted by development companies, (2) there is calculation of the benefits and costs of this mining business and can be assisted with SWOT Analysis, (3) the existence of benefits for the country and residents from producing regions, and (4) It does not interfere with the health of the state budget.

The government can also encourage the development of geothermal energy better through non-fiscal support such as facilitating business licensing for contractors, facilitating the process of land acquisition,

and others.

Conflict of Interest

The authors declares no conflict of interest.

Author Contributions

The author declares that no other authors contributed to this paper.

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