



THE DEVELOPMENT OF GEOTHERMAL IN
INDONESIA AFTER ENACTMENT 2014
GEOTHERMAL LAW: DOES IT STILL NEED
LEGAL ADJUSTMENTS?



Author:
Ajar Buditama, S.H., MEL
(19860408 200912 1 001)

**LEGAL BUREAU
SECRETARIAT GENERAL
MINISTRY OF MARINE AFFAIRS AND FISHERIES**

2020

Table of Contents

I	Introduction	2
II	The Geothermal Energy in Indonesia	3
A	Overview of Geothermal Potential in Indonesia	3
B	Issues Related to the Development of Geothermal Energy in Indonesia 3	
C	Current Laws and Government Policies and Their Impacts Upon Geothermal Industries	6
1	The Geothermal Law	6
2	The Forestry Law	9
3	The Water Law	12
4	The Environmental Protection Law	13
III	Are there better approaches in comparable jurisdictions?	14
A	Overview of Geothermal Resources in the United States	15
1	Regulatory Classification and Preceding Issues of Geothermal Resources.....	15
2	Ownership Issues of Geothermal Resources in the U.S.....	18
3	Geothermal site permitting and Federal Land Leases	22
IV	Exposition and analysis of reform options	25
A	Leasing Process.....	26
B	Possibility to adopt the PEIS	27
C	Possibility to Adopt Water Regulatory Instruments	28
V	conclusion.....	29
	BIBLIOGRAPHY	30
A	Articles/Book/Report	30
B	Cases.....	33
C	Legislation.....	34

I INTRODUCTION

Indonesia has a big potential of geothermal energy,¹ but the development of geothermal energy in Indonesia is still facing difficulties.² The major reason of such difficulties is unsupportive law for utilizing geothermal resources that situated in forest areas.

Under the 2003 Geothermal Law, geothermal activities were categorized as mining activities.³ The category as mining activities has led to problems in developing geothermal energy, because the 1999 Forestry Law prohibits mining activities to be carried out within the protected forests.

In 2014, the Government of Indonesia ('the GOI') issued the 2014 Geothermal Law⁴ as an attempt to address conflicts against the forestry sector by declassifying geothermal activities as mining activities. However, there are some persisting problems in geothermal development after the enactment of the new law, such as lack of supportive regulation in forestry and water sector.

To address these issues, arguably Indonesia needs other countries' experience. The use of geothermal resources for generating electricity in the United States of America (the 'U.S.') is likely to provide a good example to develop geothermal resources in Indonesia. The U.S.' experience in developing its geothermal potential could help Indonesia to identify issues relating to

¹ In 2010, the Ministry of Energy and Mineral Resources of Indonesia ('the MMER') identified 276 locations with geothermal energy potential sufficient to generate 29 Giga Watt electricity ('GW-e'), or about forty per cent of the world's geothermal reserves. See e.g. Directorate General of New and Renewable Energy and Energy Conservation, Ministry of Energy and Mineral Resources of Indonesia (MMER), '*Statistik Energi Baru Terbarukan* [Statistic of New Renewable Energy] (23 June 2011), 3 <http://esdm.go.id/publikasi/harga-energi/cat_view/58-publikasi/240-statistik/355-statistik-energi-baru-terbarukan.html>; Alison Holm, et al, *Geothermal Energy: International Market Update* (May 2010) Geothermal Energy Association, 52 <http://www.geoenergy.org/pdf/reports/GEA_International_Market_Report_Final_May_2010.pdf>.

² The utilization of geothermal energy for power generation until 2014 is only 1189 Mega Watt electricity ('MW-e') or approximately four per cent of the total potential.² See e.g. Kasbani, 'Indonesian Geothermal Resources: Research Status, Potential and Type Geothermal Systems, Geology Agency, Ministry of Energy and Mineral Resources of (MEMR) Indonesia <http://psdg.bgl.esdm.go.id/index.php?option=com_content&view=article&id=841:sumber-daya-panas-bumi-indonesia-status-penyelidikan-potensi-dan-tipe-sistem-panas-bumi&catid=10:geothermal>[author's trans]; Ruggero Bertani, 'Geothermal Power Generation in the World 2005–2010 Update Report' (2012) 41 *Geothermics* 1, 2

³ *Undang-Undang Nomor 27 Tahun 2003 Tentang Panas Bumi* [Law No 27 of 2003 on Geothermal (2003 Geothermal Law)] (Indonesia) art 1.1 [author's trans].

⁴ *Undang-Undang Nomor 21 Tahun 2014 tentang Panas Bumi* [Law No 21 of 2014 on Geothermal (2014 Geothermal Law)] (Indonesia), General Explanation [author's trans].

utilization of geothermal resources for electricity generation and to improve laws and regulations regarding geothermal in Indonesia.

This essay will discuss about the development of geothermal in Indonesia and its preceding problems in particular its conflict with the forestry sector. After assessing Indonesia's situation and the current regulatory framework, the way in which the U.S. develops and regulates its geothermal resources will be further highlighted by comparing the classification of geothermal resources in the U.S., ownership issues of each regulatory classification, and the process of geothermal site permitting. I argue that there are some potential benefits relating to the application of some good aspects of the U.S. regulatory framework to develop geothermal resources in Indonesia.

II THE GEOTHERMAL ENERGY IN INDONESIA

A *Overview of Geothermal Potential in Indonesia*

Having a big potential of geothermal resources, Indonesia ranked third in the world after the U.S. and the Philippines, in terms of geothermal energy consumption.⁵ Indonesia has forty-two per cent or approximately 12,069 MW of geothermal energy potential in Indonesia located within a protected forest.⁶ Such situation is likely difficult for developing Indonesia's geothermal potential, because any licenses related to utilisation of geothermal energy, which is generally regarded as ecosystem service in the protected forest, would be subjected to strict conditions of forestry regulations.⁷

B *Issues Related to the Development of Geothermal Energy in Indonesia*

⁵ Holm, et al, above n 1, 53.

⁶ Ministry of Energy and Mineral Resources of the Republic of Indonesia, *Menteri ESDM Minta Proses Eksplorasi Dipercepat* [Minister of Energy and Mineral Resources Requires the Acceleration of Geothermal Exploration] (20 December 2011) <<http://www.esdm.go.id/berita/45-panasbumi/5285-mesdm-minta-proses-eksplorasi-dipercepat.html>> [author's trans].

⁷ *Undang-Undang Nomor 41 Tahun 1999 Tentang Kehutanan* [Law No 41 of 1999 on Forestry (1999 Forestry Law)] (Indonesia) art 26(1), 27 (2) [author's trans].

The ambit of issues of geothermal development in Indonesia could be divided into three broad categories: forestry regulatory framework issues, social and environmental issues, and licensing issues. Each of these issues will be described briefly below.

In 2003, the GOI promulgated the first legislation to manage geothermal resources ('the 2003 Geothermal Law'). The energy policy related to geothermal energy at that time set a gradual geothermal goal at 2000 MW-e by 2008 and 6000 MW-e by 2020.⁸ The target was not achieved successfully. In 2008 only the target only achieved around 340 MW-e⁹, because there were legal impediments to develop the most potential geothermal resources located in the protected forest.

Article 38 of the 1999 Forestry Law stipulates explicitly that opencast mining is prohibited in a protected forest. The prohibition of opencast mining has the key objective to avoid the vast destruction of the forest. In fact, according to the U.S. Department of Energy, with respect to the use of geothermal energy for electricity, a geothermal power plant does not likely need a relatively big acreage, because it does not need storage and transportation.¹⁰ Thus, the GOI's concerns about vast forest damage due to geothermal activity in the protected forest are unlikely to occur.

Other problems that may arise in the development of geothermal resources in Indonesia are site conflicts and land title issues when a geothermal project is situated within the customary forest. Under the Forestry Law, the customary forest is fall into the category of state forest.¹¹ State forest means 'forests that located on land that is not burdened with land rights'¹² and customary forest means 'state forests located in the traditional jurisdiction areas'.¹³ Accordingly, when a geothermal project is located in the customary forest, it would require a formidable effort for geothermal developer to get a site permit, because there is a set of criteria to determine customary forest: the

⁸ Neny Miryani Saptadji, 'Update on Geothermal Development in Indonesia' (Paper presented at 28th Geothermal Workshop 2006, New Zealand, November 2006) 2.

⁹ Ibid.

¹⁰ United States Department of Energy, *Geothermal FAQs* v<<http://energy.gov/eere/geothermal/geothermal-faqs>>.

¹¹ 1999 *Forestry Law* art 5(2) [author's trans].

¹² 1999 *Forestry Law* art 1.4 [author's trans].

¹³ 1999 *Forestry Law* art 1.6 [author's trans].

Government declares the existence of the forest, the relevant customary community still exists in the forests, and the Government acknowledges the existence of the community.¹⁴ The criterion of the relevant customary community may be the most arduous effort to be fulfilled, because of two reasons; first, the determination of existence and abolishment of the customary community requires a legislation making process to be promulgated into a local regulation, either in the form of district or municipal regulation.¹⁵ Second, such determination obliges several tests to determine the existence of the customary community and their capacity to exercise their customary rights.¹⁶

In the light of such long-winding process to establish a site permit, many geothermal projects that have acreage within customary forest are likely to delay their investment. Some instances of these situations occurred in Indonesia such as, a six years delay of 220 MW-e geothermal project in Rajabasa Mountain in Lampung Province around due to fifty per cent of the geothermal exploration plan was situated within protected forest and customary forest.¹⁷

Besides site permitting issues, refusal by local government also accounts for delays in geothermal projects in Indonesia. An example of such rejection occurred in the Bedugul Geothermal Project in Bali Province.¹⁸ The Governor of Bali issued a bold statement to reject the 175 Mw-e Geothermal Project in Bedugul, on the grounds that the area for developing a geothermal power plant was situated in an area that perceived as sacred by Balinese Hindus and that the project could harm the protected forest, which served as

¹⁴ 1999 *Forestry Law* art 5 (3) [author's trans].

¹⁵ 1999 *Forestry Law* art 67(2) [author's trans].

¹⁶ These tests can be highlighted as follows: whether such community is still bound by a set of customary law and order and still implement the customary law, whether a certain communal land still exist as a place for life for customary community and to support their daily life, and whether a set of customary law and order on management, control and the use of the communal land is still in force and is still obeyed by such customary community. See *Peraturan Menteri Negara Agraria No 5 Tahun 1999 tentang Pedoman Penyelesaian Masalah Ulayat Masyarakat Hukum Adat* [Regulation of State Minister of Agrarian Affairs No 5 of 1999 on the Guidance to Resolve Customary Issues of Customary Community (Agrarian Regulation 5 (1999))] (Indonesia) art 2 (2) [author's trans].

¹⁷ Agus Mulyadi (ed) '*Pembangunan Dua PLTP Tersendat* [the Development of two Geothermal Power Plant Suspended]' *Kompas* (online), 16 August 2011 < <http://sains.kompas.com/read/2011/08/16/23230012/Pembangunan.Dua.PLTP.Tersendat>> [author's trans].

¹⁸ Editorial, 'Islands in Focus: Bali still rejects geothermal plant' *The Jakarta Post* (online), 18 June 2013 < <http://www.thejakartapost.com/news/2013/06/18/islands-focus-bali-still-rejects-geothermal-plant.html>>.

Bali's water supply basin.¹⁹ These situations clearly illustrate how social and environmental issues could be a major problem for developing geothermal in Indonesia.

After granted a site permit by the relevant authority, a geothermal company still facing other multifaceted permits prior obtaining a geothermal exploration license. A geothermal company shall fulfill at least three types of licenses, namely environmental license, MEMR License, and forestry license and borrow-to-use (BUP) permit. Each permit and regulatory framework of the development of geothermal resources in Indonesia will be discussed in the next section.

C *Current Laws and Government Policies and Their Impacts Upon Geothermal Industries*

There are several laws in Indonesia that arguably relevant to geothermal activities, namely the geothermal law, the forestry law, the water law, and the environmental protection law. The geothermal law administers scope, acreage, and licensing of geothermal activity. Geothermal activities have to consider the forestry law, when such activities are located within forest. Geothermal companies also have to consider provisions under the water law to manage its water use in geothermal cooling system and water re-injection. The environmental protection law is important to take into consideration, because uses of geothermal resources are subjected to an environmental license, which is regulated under the environmental protection law.

1 *The Geothermal Law*

The 2014 Geothermal Law has key objectives to debottleneck any pending issues of geothermal object by declassifying geothermal resources from mining commodities to be something unique, neither mineral nor water resources, so-called *sui generis*.²⁰ The Law also has two key objectives relating

¹⁹ Ibid.

²⁰ *Undang-Undang Nomor 21 Tahun 2014 tentang Panas Bumi* [Law No 21 of 2014 on Geothermal (2014 Geothermal Law)] (Indonesia), General Explanation [author's trans]. See below Part III.1.

to the National Energy Policy ('the NEP')²¹ and climate change: first, to control the operation of geothermal activity to support energy independence and to increase the utilization of renewable energy in the form of geothermal energy to meet national's energy needs; second, to improve the use of clean energy resources to reduce greenhouse gas (GHG) emissions.²²

The next sub-section is limited only to discuss the first of these objectives, because the second objective is too broad and involves overarching policies and legislations. To achieve the first objective and to control the operation of geothermal activities, the 2014 Geothermal Law regulates the operation of geothermal activities into three main areas: scope, acreage, and licensing of geothermal activities.

(a) *The Scope of Geothermal Activities*

The 2014 Geothermal Law divides geothermal utilization in two ways, direct utilization and indirect utilization. The first refers to any activities that utilizing geothermal energy other than generating electricity, such as agribusiness, tourism, and industrial purpose,²³ while the second refers to the key priority of utilization geothermal energy, which is for electricity generation purpose.²⁴

Local government has authority to operate and to manage direct use of geothermal resources, while the central government retains such authority to indirect use of geothermal resources.²⁵ Assigning the authority to manage the indirect use of geothermal resources has the objective to avoid too much bureaucracy and inefficiencies by local government in managing indirect use of geothermal under 2003 Geothermal Law.²⁶

²¹ With respect to the NEP, reducing the backlog in the development of geothermal plant through declassifying geothermal resources is likely to significantly support Indonesia's optimization of energy mix scenario 2025, which aims to increase geothermal use from 1.4 per cent in business as usual ('BAU') scenario in 2011 to 3.8 per cent in optimization scenario in 2025. See Ministry of Energy and Mineral Resources of the Republic of Indonesia, *Cetak Biru Pengelolaan Energi Nasional 2005-2025* [Blue Print National Energy Management 2005-2025 (Blue Print Energy 2005-2025) (2005). 47-8 <http://psdg.bgl.esdm.go.id/kepmen_pp_uu/blueprint_PEN.pdf>[author's trans].

²² 2014 Geothermal Law art 3.a.b.c [author's trans].

²³ 2014 Geothermal Law art 9 [author's trans].

²⁴ 2014 Geothermal Law arts 1.11, 10 [author's trans].

²⁵ 2014 Geothermal Law arts 5, 6 [author's trans].

²⁶ Alex Wong et al, *Geothermal Power Project in Indonesia* (12 March 2015) Hogan Lovells <<http://www.hoganlovells.com/files/Publication/47607802-3793-4838-a275->

(b) *Acreage of a Geothermal Power Plant*

Before geothermal developers start to harvest geothermal resources, they have to obtain and to secure their geothermal working field, named Working Areas. According to the Geothermal Energy Association, that efforts are arguably very essential, since geothermal facility is characterized by very high cost relating to geothermal heating and cooling system, and such costs represents two third of total costs.²⁷ The 2014 Geothermal Law is aware of the high upfront cost by enacting stricter provision about working areas than the 2003 Geothermal Law.

Under the new law, the Minister of Energy and Mineral Resources determines a working area that may consist of state lands, native title rights, marine conservation areas, and/or forest areas.²⁸ The Minister determines the working areas based on a preliminary survey or exploration, then offers the areas through a competitive bidding.²⁹ Ultimately, the selected winner will be granted a geothermal license, a specific license for indirect use of geothermal resources, that will allow the licensee to conduct exploration and exploitation for thirty-seven years, and it may be extended for twenty years.³⁰

The provision about geothermal license term in the 2014 Geothermal Law is clearer than previous the geothermal law, as in the 2003 Geothermal Law only stated that a geothermal license lasts for thirty-five years and can be extended without any clear possible period of extension.³¹ The 2014 Geothermal Law also gives more flexibility to geothermal developers by applying no cap size of a geothermal concession; the MMER defines the acreage of working areas based on the geothermal system.³² In the previous geothermal law, the size of a concession was capped at 200,000 hectares.³³

b39980260301/Presentation/PublicationAttachment/2b9acd66-b41d-4f30-a1e5-cbb375993290/Geothermal_power_projects_in%20Indonesia.pdf>.

²⁷ Geothermal Energy Association, *Geothermal Basics - Power Plant Costs* <http://geo-energy.org/geo_basics_plant_cost.aspx>. See also Mathias Aarre Maehlum, *Geothermal Energy Pros and Cons* (1 June 2013) Energy Informative <<http://energyinformative.org/geothermal-energy-pros-and-cons/>>.

²⁸ 2014 *Geothermal Law* art 16 [author's trans].

²⁹ 2014 *Geothermal Law* arts 17,18 [author's trans].

³⁰ 2014 *Geothermal Law* art 29 [author's trans].

³¹ 2003 *Geothermal Law* art 22 [author's trans].

³² 2014 *Geothermal Law* art 19 [author's trans].

³³ 2003 *Geothermal Law* art 13 [author's trans].

(c) Licensing Regime

The licensing system under the 2014 Geothermal Law depends on the location of working areas, which may be in public lands, native lands, and/or forestry areas. A geothermal license is precluded by surface's ownership, thus, if a licensee has obtained a geothermal license, the licensee shall resolve land title issues or different licensing systems within its working areas.³⁴ Accordingly, the geothermal license holder bears to settle land use problems, when a geothermal plant is situated within public lands. This is one of the reasons of very high upfront cost to build a geothermal power plant and may create a difficult land acquisition, because prior acquiring a geothermal license in certain working areas, any adjacent land surrounding the working areas typically will be subject to price volatility.

If the location of a working area is situated in the forest, a geothermal license holder shall obtain a forest license either in the form of borrow to-use-license or the forest use license. The Ministry of Environment and Forestry ('the MEF') administers both of the licenses, which are regulated under subordinate legislation of the 1999 Forestry Law. The details of licensing system where a geothermal working area is situated in tribe lands will be described in the following sections.

2 The Forestry Law

The 1999 Forestry Law and its current subordinate legislations classify a forest according to land use in three distinct categories: a production forest, a protected forest, and a conservation forest. Within a production forest and a protected forest mining activities are subject to conditional approval, except for opencast mining that is strictly prohibited in the protected forest.³⁵ However, such prohibition is subjected to the exemption, in the way mining conducted in underground basis and a strict condition is imposed to the

³⁴ 2014 *Geothermal Law* arts 41, 42(1) [author's trans].

³⁵ 1999 *Forestry Law* art 38 (4) [author's trans].

geothermal developer, which prohibits changing the basic function of the protected forest area.³⁶

The MEF requires geothermal license holders to obtain a borrow-to-use license, when working areas for both direct and indirect geothermal use are situated in the production forest and the protected forest.³⁷ In protected forest areas the Minister obliges stringent regulations than in production forests. The geothermal licensee shall obtain in-principle approval from the Minister before a borrow-to-use license is granted and is required to provide compensation to the Minister either in the form of land compensation or non-state tax revenue payment couples with reforestation.³⁸

Recently, there is a moratorium on issuance borrow-to-use license for any forest's area that is designed for primary forests and peat lands to reduce the rate of deforestation in Indonesia, but geothermal activities are exempted from the moratorium.³⁹ The central GOI also supports the exemption by issuing a government regulation that gives opportunities to private sectors to conduct industrial activities in the production forest, but is limited only for food and energy security businesses. Previously any activities in a production forest were restricted only for timber extraction and any activities that related directly to the function of a production forest.⁴⁰ By debottlenecking any of these regulations that are likely diminish energy sector reflects a government's support to the energy mix target under the 2014 National Energy Policy and the Blue Print Energy 2005-2025.

However, the central government supports for a geothermal development when its working areas are situated within customary forests is probably weaker than if a geothermal plant is located in protected forest areas

³⁶ *Peraturan Pemerintah Nomor 24 Tahun 2010 tentang Penggunaan Kawasan Hutan* [Government Regulation No 24 of 2010 on Forest Areas Use (GR 24 (2010))] (Indonesia) art. 5(1)b. See generally *Peraturan Presiden Nomor 28 Tahun 2011 tentang Penggunaan Kawasan Hutan Lindung Untuk Pertambangan Bawah Tanah* [President Regulation No 28 of 2011 on Use of Forest Protected Areas for Underground Mining Forest Areas Use (PR 28 (2011))] (Indonesia) [author's trans].

³⁷ GR 24 (2010) art 6 [author's trans].

³⁸ GR 24 (2010) art 6(2). See also PR 28 (2011) arts 6 (5)b, 9.e [author's trans].

³⁹ Alex Wong et al, above n 26, 7.

⁴⁰ GR 24 (2010) art 4(2), as amended by *Peraturan Pemerintah Nomor 61 Tahun 2012 tentang Perubahan atas Peraturan Pemerintah Nomor 24 Tahun 2010 tentang Penggunaan Kawasan Hutan* [Government Regulation No 61 of 2012 on Amendment Government Regulation No 24 of 2010 of Forest Areas Use (GR 61 (2012))] (Indonesia) art I. 1.i, m [author's trans].

and production forest areas. In 2012, the Constitutional Court of Indonesia repealed the authority of government in the customary forest.⁴¹ The court concluded to remove the term “state” from the definition of the customary forest,⁴² annulled several related provisions about the conditional acknowledgement of customary forests,⁴³ and held that these provisions were contrary to the Constitution of Republic Indonesia.⁴⁴

In the absence of state power in customary forests, government programs or private developments, which have an intersected acreage with a customary forest, are likely delayed. To avoid such situation and to balance the interest between the government’s roles to protect their citizens, including natives who live within customary forests as well as to ensure geothermal energy developments, the government has issued a regulation on management of customary forests and customary forests mapping across Indonesia.⁴⁵

Meanwhile, the use of geothermal energy in conservation forest is not explicitly stated in the specific regulation regarding utilization of conservation forests (the GR 28 (2011)). The provisions under GR 28 (2011) only give general requirements of allowed activities in conservation forest areas, as long as these activities not harming the function of a natural preservation area and a natural conservation area. These activities could be: researches and developments, any activities relating to carbon sink purpose, and any activities

⁴¹ *Aliansi Masyarakat Adat Nusantara (AMAN) dan Negara [Nusantara Indigenous People Alliance (AMAN) v State]* Constitutional Court of Indonesia, 35/PUU-X/2012, (26 March 2012). Previously, under 1999 Forest Law, the definition of customary forest was state forests within the territory of indigenous communities; after the Constitutional Court removing the term ‘state’ in the definition of customary forest become forests within the territory of indigenous communities [author’s trans].

⁴² *AMAN [2012] 35/PUU-X/2012* 185 [author’s trans].

⁴³ *AMAN [2012] 35/PUU-X/2012* 185-6 [author’s trans].

⁴⁴ *AMAN [2012] 35/PUU-X/2012* 186-7 [author’s trans].

⁴⁵ To follow up the Constitutional Court decision, in 2014 the Minister of Internal Affairs, the Minister of Agrarian Affairs and Spatial Planning, the Minister of Environment and Forestry launched a joint regulation, aiming to resolve property rights and land tenure issues in forest areas and to set up a joint committee in national level and local level to conduct cadastral mapping for customary forests and forests title. The result of the committee would be integrated in the revision plan of spatial planning in the national and local level. See *Peraturan Bersama Menteri Dalam Negeri, Menteri Agraria dan Tata Ruang, Menteri Kehutanan dan Lingkungan Hidup Nomor 79 Tahun 2014 Nomor PB. 3 Menhut-11/2014, Nomor 17 PRT/M/2014, Nomor 8/SKB/X/2014 tentang Tata Cara Penyelesaian Penguasaan Tanah Yang Berada Dalam Kawasan Hutan* [Joint Regulation the Minister of Internal Affairs, the Minister of Agrarian Affairs and Spatial Planning, the Minister of Environment and Forestry No 79 of 2014, No PB. 3 Menhut-11/2014, No 17 PRT/M/2014, No 8/SKB/X/2014 of 2014 on Settlement Procedures of Property Rights and Land Tenure Issues in Forest Areas (2014 Joint Regulation)] (Indonesia) ch V [author’s trans].

relating to education purpose.⁴⁶ On the contrary, in 2014 Geothermal Law, the use of geothermal energy, either directly or indirectly, in conservation forest is clearly stipulated. In that conflicting situation the higher level of law would prevail. Aligning these regulations and preventing conflicts between regulation (GR 28 (2011)) and a law (2014 Geothermal Law) by modifying the list of allowed activities in conservation forests, arguably is necessary.

3 *The Water Law*

In 2014, the Indonesia Constitution Court annulled the 2004 Water Law⁴⁷ due to the issue of privatization on both types of water resources, surface and ground water.⁴⁸ The effect is that the 1974 Water Law was re-enacted.⁴⁹ In that case, the appellants are NGOs, Muhammadiyah and other non-profit organizations and individuals (collectively 'Muhammadiyah'), who concerned on defending water rights, whereas the appellees are the President of Republic Indonesia and the House of Representative of Republic Indonesia (collectively 'the GOI').⁵⁰ The appellants argued that the appellees had violated the Constitution of Republic Indonesia that stipulates 'earth and water and natural resources contained therein (in Indonesia) shall be controlled by the state and used for the greatest prosperity of the people.'⁵¹ The GOI was alleged by Muhammadiyah had violated that provision by issuing some regulations that could privatize on both types of water resources.⁵²

⁴⁶ See generally *Peraturan Pemerintah Nomor 28 Tahun 2012 tentang Pengelolaan Kawasan Suaka alam dan Kawasan Pelestarian Alam* [Government Regulation No 28 of 2011 on Management on Natural Preservation Area and Natural Conservation Area (GR 28 (2012)) (Indonesia) arts 32, 33, 34, 35 [author's trans].

⁴⁷ *Undang-Undang Nomor 7 Tahun 2004 tentang Sumber Daya Air* [Law No 7 of 2004 on Water Resources (2014 Water Law)] (Indonesia) [author's trans].

⁴⁸ *Muhammadiyah dan Presiden Republik Indonesia dan Dewan Perwakilan Rakyat* [Muhammadiyah v the President of Republic Indonesia and House of Representatives Constitutional Court of Indonesia (Muhammadiyah v State)] 85/PUU-XI/2013 (17 September 2014) [author's trans].

⁴⁹ *Muhammadiyah v State* 85/PUU-XI/2013, 146 [author's trans].

⁵⁰ *Muhammadiyah* 85/PUU-XI/2013, 1-2 [1.2]-[1.3] [author's trans].

⁵¹ Article 33 (3) Constitution of Republic Indonesia' [author's trans].

⁵² See especially *Peraturan Pemerintah Nomor 16 Tahun 2005 tentang Sistem Penyediaan Air Minum* [Government Regulation No 16 of 2005 on Potable Water Supply System (GR 16(2005)) (Indonesia) [author's trans]. This GR gives an authority to private companies to utilize potable water sources and sell them as bottled drinking water. The appellants alleged these practices as threats to water rights.

The decision of the Court that re-enacted the 1974 Water Law⁵³, is arguably correct in one hand, a necessity to address a legal vacuum in water resources in general, but on the other hand, the Law is insufficient to satisfy the need for a robust regulatory instrument related to use of water in geothermal development. Such regulatory instrument is necessary for managing the surface and the ground water use for cooling a geothermal power plant and water re-injection to reservoir⁵⁴ and water use in an advance geothermal plant.⁵⁵

The 1974 Law likely stresses on more outcomes based legislation than prescriptive based like the 2004 Water Law. The 1974 Water Law regulates water in a very general way; it gives the government the authority and right to control water use, planning for water resources, water utilization, water preservation, and establishes a licensing system to utilize water resources.⁵⁶ The Law gives considerable spaces to regulate any specific requirements regarding water resources, and to promulgate these regulations in the form Government Regulation. Arguably, this regulatory scheme is likely to delay geothermal development, as this scheme needs more time to prepare regulations.

4 *The Environmental Protection Law*

The 2014 Geothermal Law requires for indirect and direct geothermal resources to be subjected to the environmental license.⁵⁷ There are three stages involved to approve such license: preparing an Environmental Impact Analysis (EIA or 'AMDAL') or an Environmental Management Efforts and

⁵³ *Undang-Undang Nomor 11 Tahun 1974 tentang Pengairan* [Law No 11 of 1974 on Water (1974 Water Law)] (Indonesia) [author's trans].

⁵⁴ See generally C.E. Clark et al, *Water Use in the Development and Operation of Geothermal Power Plants* (January 2011) Office of Energy Efficiency and Renewable Energy U.S. 14 <http://www1.eere.energy.gov/geothermal/pdfs/geothermal_water_use_draft.pdf> and RPS Aquaterra and Hot Dry Rocks, *Geothermal Energy and Water Use* (2012) National Water Commission Canberra <http://nwc.gov.au/__data/assets/word_doc/0014/21470/72-Geothermal-energy-and-water-use.doc>.

⁵⁵ Robust regulatory scheme to avoid water reservoir depletion is arguably necessary, when a hydraulic fracturing is conducted in an advance geothermal plant system, such as Enhanced Geothermal System. See e.g. Nikola N Lakic, *Limitless Energy: About Most Recent Developments in Hot Dry Rocks Technology* (2014) <<http://www.geothermalworldwide.com/egs.html>>.

⁵⁶ *1974 Water Law* chs III, IV, VIII [author's trans].

⁵⁷ *2014 Geothermal Law* arts 11(6), 31(3), 32(2) [author's trans].

Environmental Monitoring Efforts ('UKL-UPL') documents, evaluation of the documents and obtaining approval of the documents, and application of an environmental license.⁵⁸ The AMDAL process applies for three categories of geothermal exploitation: geothermal activities are conducted in a work area and have acreage greater than two hundred hectares, open areas for the activity greater than fifty hectares, and the activity have the production capacity greater than 50 MW-e.⁵⁹ The UKL-UPL process applies to geothermal exploration activities that are not obliged to undergo the AMDAL process and are not situated within and/or directly adjacent a protected forest.⁶⁰

After a geothermal developer complies with these environmental requirements, the relevant level of AMDAL commission will evaluate its AMDAL or its UKL-UPL, either in the local government level for direct use or in the national level for indirect use of geothermal resources.⁶¹ Then, if all requirements and evaluation processes are successfully met, the relevant government authority will publish an environmental license.

The requirement to accomplish environmental law obligations indicates that the 2014 Geothermal Law applies more stringent environmental protection and more prescriptive in regulating environmental protection than the 2013 Geothermal Law. The 2013 Geothermal Law stated implicitly these environmental obligations and put them in its subordinate regulations.

III ARE THERE BETTER APPROACHES IN COMPARABLE JURISDICTIONS?

This essay considers the U.S.' experience in developing its geothermal resources as comparison. Several reasons for this position are: the U.S. has a long-term history in developing its geothermal and use them commercially to

⁵⁸ *Peraturan Pemerintah Nomor 27 Tahun 2012 tentang Izin Lingkungan* [Government Regulation No 27 of 2012 on Environmental License (GR 27 (2012))] (Indonesia) chs II, III, IV.

⁵⁹ *Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor 5 Tahun 2012 tentang Jenis Rencana Usaha Dan/Atau Kegiatan yang Wajib Analisis Mengenai Dampak Lingkungan (AMDAL)* [Minister of Environment and Forestry No 5 of 2012 on List of Business Plan and/or Activity that requires EIA (AMDAL) (AMDAL List)] (Indonesia) sch I div K [author's trans].

⁶⁰ *AMDAL List* art 3(4), sch II [author's trans].

⁶¹ See generally GR 27 (2012) chs III, V [author's trans].

generate electricity,⁶² some states in the U.S. have the same classification in treating geothermal resources as the 2014 Geothermal Law, and the U.S. is ranked first in the top five countries for installed capacity and electricity generation from geothermal resources, Indonesia is in the third position.⁶³ Therefore, according to these reasons, are arguably worthwhile to compare the U.S.' experiences in geothermal developments and its regulatory frameworks. Such comparison is likely useful to get understanding of Indonesia's issues on geothermal resources and to improve Indonesia's geothermal law and related regulations. This section will discuss about regulatory classifications of geothermal energy in the U.S., ownership issues, and site permitting system for a geothermal plant.

A Overview of Geothermal Resources in the United States

1 Regulatory Classification and Preceding Issues of Geothermal Resources

The potential of geothermal resources in the U.S. is approximately more than 100 GW-e, and there is 6 GW-e of potential from conventional geothermal resources could be developed beyond that has already been utilized.⁶⁴ Similar to Indonesia, the use of geothermal energy in the U.S. is classified to two types: direct use and indirect use. In the U.S. geothermal regulations fall into three categories: as mineral, as water, or as a *sui generis* resource.⁶⁵

(a) Regulations of Geothermal Resources as Mineral

Galli, Snarr, and Thatcher recognizes in their paper that, as a mineral, the development of geothermal resources have similarities as oil and gas regulatory framework and their onshore leasing process also raise similar

⁶² See generally Office of Energy Efficiency & Renewable Energy, *A History of Geothermal Energy Research and Development in the United States* (September 2010), U.S. Department of Energy (DOE) < <http://energy.gov/eere/geothermal/history-geothermal-energy-america>>.

⁶³ Bertani, above n 2, 9-10.

⁶⁴ Adam H. Goldstein, *2013 Market Trends Report, Geothermal Technologies Office* (2013) U.S. Department of Energy (DOE) 4 <<http://www1.eere.energy.gov/geothermal/pdfs/market-report2013.pdf>>.

⁶⁵ Sylvia Harrison, 'Geothermal Resources' in Michael Gerrard (ed), *The Law of Clean Energy : Efficiency and Renewables* (American Bar Association, Section of Environment, Energy, and Resources, 1st ed, 2011) 423, 426.

issues in particular land title questions, that will be discussed in the following sections.⁶⁶

In the federal level geothermal resources are defined as minerals and are regulated under the Geothermal Steam Act 1970. Such regulatory scheme has similarity to some states in terms of the definition and the purpose of geothermal resources' development, utilization, leasing, and the reservation of the federal right upon public land.⁶⁷ The Act defines geothermal resources in a broad sense and embraces all products of geothermal processes including indigenous steam, hot water, hot brines; steam and other gases, hot water, hot brines or other fluid as the results of the introduction into geothermal formations artificially; heat or associated energy located in geothermal formations; and any products originated from geothermal resources.⁶⁸ In the states level, there are several states that regulate geothermal resources as mineral, namely Hawaii, California, and New Mexico⁶⁹, but only Hawaii that explicitly categorizes geothermal resources as mineral.⁷⁰

Regulation of geothermal resources as mineral is not suitable for Indonesia's context, as it would create conflicts against the forestry sector.

(b) Regulations of Geothermal Resources as Water

An approach with respect to treatment geothermal resources as water can be found in Colorado. The Colorado's statute emphasizes on water right issues associated with production of electricity from geothermal energy.⁷¹ With regard to resource ownership, the Colorado statute allocates geothermal fluid, 'which is tributary groundwater'⁷² to be vested in the State and acknowledges that there is no correlative property right to the landowner.

In addition, with respect to the doctrine prior appropriation right, the statute assigns that the water right should be modified to accommodate the

⁶⁶ Craig D Galli, Steven W Snarr and Michael N Thatcher, 'Getting into Hot Water: Current Hot Topics in Geothermal Development' (2009) *Rocky Mountain Mineral Law Institute. Proceedings* 6. ch 6 app 1 <<http://www.rmmlf.org/AI55-Ch6-Appendix.pdf>>.

⁶⁷ 30 USC §§ 1002-1028.

⁶⁸ 30 USC § 1002 (c).

⁶⁹ Harrison, above n 65, 427.

⁷⁰ Haw Rev Stat § 182-1.

⁷¹ Colo Rev Stat § 37-90.5-107.

⁷² Colo Rev Stat § 37-90.5-104 (1).

development of geothermal resources.⁷³ The Statute restricts and obliges prior approval of the State Engineer, along with the Colorado Water Quality Control Commission and the Colorado Oil and Gas Conservation Commission⁷⁴ to the access of geothermal resources when the private citizen appears to claim a certain right of geothermal fluid through a traditional acquisition for water rights.⁷⁵ The State Engineer also determines whether the application to apportion the resources of the multiple owner, who may get access to the geothermal fluid, does not 'materially injury' other lawful right to the fluid.⁷⁶

In some states, the regulatory framework of water as geothermal resources is distinguished into low temperature and high temperature, such bifurcation correlates with the use of the resources: electrical generation and direct heat application.⁷⁷ States such as Idaho⁷⁸, New Mexico⁷⁹, and California⁸⁰ bifurcate their water resources to different temperature level. The benefit of such divergence could make the regulatory instrument of geothermal resources, which associate with electricity production, more simple. Furthermore, the advantage of the bifurcation of the resources is low temperature geothermal fluid can elude regulations in relating to the development of high temperature geothermal resources.⁸¹

Classification of geothermal resources as water probably suitable for supporting Indonesia's water law, because Indonesia needs a systematic regulatory instrument relating to the water use in geothermal activities. Colorado's geothermal regulation that obliges an approval prior using geothermal resources and states that bifurcate their geothermal energy to temperature basis might be useful for providing plausible treatments of water resources and supporting geothermal activities in Indonesia.

⁷³ Colo Rev Stat § §37-90.5-102 (c).

⁷⁴ Colo Rev Stat § 37-90.5-106.

⁷⁵ Mark D Detsky, 'Getting into Hot Water: The Law of Geothermal Resources in Colorado' (2010) 39 *Colorado Lawyer* 65, 67.

⁷⁶ Colo Rev Stat § 37-90.5-107(3).

⁷⁷ Laura MacGregor Bettis, 'In Hot Water: Can Idaho's Ground Water Laws Adequately Govern Low Temperature Geothermal Resources?' (2002) 39 *Idaho Law Review* 113, 124-5.

⁷⁸ Idaho Code Ann § 42-230 (a) (1).

⁷⁹ NM Stat § 71-5-3 (G).

⁸⁰ Cal Pub Res Code § 3703.1.

⁸¹ Bettis, above n 77, 126.

(c) *Regulations of Geothermal Resources as Sui Generis*

Regulation of geothermal resources as *sui generis* recognizes the resources is being neither mineral resource nor water resource; thus, this classification identifies the unique characteristic of geothermal resources.⁸² Idaho⁸³, Washington⁸⁴, and Montana⁸⁵, use this classification.

The *sui generis* classification may have effect to regulatory uncertainty. Relating to this issue, Bettis asserts in her paper that although arguably the *sui generis* classification describes geothermal resources accurately, it also impractical, since the issue in which legal regime applicable to allocate geothermal resources remains unanswered.⁸⁶ This issue appears in the treatment of the three states that categorize their geothermal resources as *sui generis*; although these three states classify their geothermal resources as *sui generis*, they treat the resources differently.⁸⁷ States that use *sui generis* classification, such as Idaho and Montana regulate the large part of their resources as water.⁸⁸

This impractical of *sui generis* treatment could be valuable input to illustrate the preceding issues after enactment of the 2014 Geothermal Law in Indonesia. The GOI should be aware of this issue to avoid overlap between the 2014 Geothermal Law and the 1974 Water Law.

2 *Ownership Issues of Geothermal Resources in the U.S.*

This section is going to discuss about ownership issues of geothermal resources in federal level, in states that treat their geothermal energy as *sui generis*, and in private lands. Discussion about such ownership issues in federal level arguably is important because of similarity between ownership issues of geothermal resources in the U.S. and in Indonesia, regarding Federal's authority (in the U.S.) and State's authority (in Indonesia) in administering geothermal resources in public lands.

⁸² Harrison, above n 65, 427.

⁸³ Idaho Code Ann §§ 42-4002 (c), 47-1602.

⁸⁴ Wash Rev Code § 78.60.040.

⁸⁵ Mont Code Ann § 77-4-104.

⁸⁶ Bettis, above n 77, 122.

⁸⁷ *Ibid* 121.

⁸⁸ *Ibid* 122.

Issues about geothermal resources in sui generis states are important as well as the ownership issues in federal level, because Indonesia applies the same classification as Idaho, Washington, and Montana in treating its geothermal resources. With regard to private ownership of geothermal resources, this section underlines the similarity between the U.S. and Indonesia in the way a geothermal project could acquire access to private lands.

(a) *Federal*

In federal level, ownership of geothermal resources is administered under the Geothermal Steam Act 1970. The objective of the Act is to facilitate leases of federal lands containing geothermal resources.⁸⁹ With respect to leasing in federal lands, the Act excludes any federal lands within the National Park System, the U.S. Fish and Wildlife Service lands, and any other land, which fall under category to be forbidden for leasing under the Mineral Leasing Act.⁹⁰

The leasing of federal land for geothermal development purpose was initiated in 1916, when the federal government attempted to sever its public lands that contain mineral resources from agricultural lands and was managed by homesteading.⁹¹ The federal government included the reservation of mineral resources in patents, but whether such reservation contained geothermal resources remained unclear.⁹²

In 1977, the Ninth Circuit held in the case *United States V Union Oil Co. of California* that reservation of minerals included geothermal resources.⁹³

⁸⁹ 30 USC § 1002. See also Ryan M Yonk, Randy T Simmons and Brian C Steed, *Green vs. Green: The Political, Legal, and Administrative Pitfalls Facing Green Energy Production*. (Routledge, 1st ed, 2013) 95-6.

⁹⁰ 30 USC Ch. 3A. See also Ida Kubiszewski, *Geothermal Steam Act of 1970, United States*, (4 September 2008) Encyclopedia of Earth <<http://www.eoearth.org/article/Geothermal>>. There are also several laws, which deal with natives that have direct impact upon the development of geothermal resources in US, such as Indian Mineral Leasing Act of 1938 and the Indian Mineral Development Act of 1982. See 25 USC §§ 393-416j and 25 USC §§ 2101-2108.

⁹¹ Harrison, Above n 65, 429.

⁹² Under the Stock-Raising Homestead Act 1916 (the SRHA) [43 USC § 291], the federal government decided to include reservation of mineral in general in patents, and stated that the patented land '... shall be subject to ... a reservation to the United States of all ... minerals in the lands so entered and patented, together with the right to prospect for, mine, and remove the same' [43 USC § 299].

⁹³ *U.S. v. Union Oil Co. of California*, 549 F.2d 1271 (9th Cir. 1977). See also *Rosette Inc. v. U.S.*, 277 F.3d 1222, 1230-35 (10th Cir, 2002).

Appellants in the case were the Union Oil and the others, who were lessees of the landowners in the Sonoma County, California.⁹⁴ The land was administered under the SRHA, which private individuals were granted a surface ownership of public lands, while mineral interests were retained under the federal government.⁹⁵ In this case the Ninth Circuit concluded to prevent the development of geothermal resources by the appellant and decided that the reservation of mineral to the Federal under the SRHA contained geothermal steam.⁹⁶

Today the responsibility for managing federal minerals and administering split estate lands with private ownership on the surface and the federal minerals beneath are carried out by the federal agency called the United States Bureau of Land Management (the BLM).⁹⁷ That responsibility for managing the use of public lands for geothermal activities has similarity to the GOI 's responsibility for administering public lands. Indonesia administers its public lands through a statutory body that has similar function to the BLM, so-called the Ministry of Agrarian Affairs and Spatial Planning.⁹⁸

(b) *States that using Sui Generis*

In the U.S. there are three states that have treated their geothermal resources as *sui generis*, namely Idaho, Washington, and Montana. This classification is similar to Indonesia's approach, which has excluded its geothermal resources from mineral resources and treated the resources as *sui generis*.

The ownership issues may arise when geothermal resources fall under categorization of *sui generis* resources. Under *sui generis* classification geothermal is treated as neither mineral nor water resources, but such

⁹⁴ *Union Oil*, 549 F.2d 1271, 1273 (1977).

⁹⁵ *Union Oil*, 549 F.2d 1271, 1273 (1977).

⁹⁶ *Union Oil*, 549 F.2d 1271, 1280-1 (1977). See also Ruth Mulgrave Silver, 'Federal Reservation of Geothermal Resources' (1978) 18 *Natural Resources Journal* 1, 2-3.

⁹⁷ Bureau of Land Management, *Split Estate* (20 October 2009) U.S. Department of The Interior <http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices/split_estate.html>.

⁹⁸ The Ministry of Agrarian Affairs and Spatial Planning has the authority to regulate management of public lands in Indonesia. See generally *Peraturan Presiden Nomor 7 Tahun 2015 tentang Kementerian Negara* [President Regulation No 7 of 2015 on State Ministerial Organization (PR 7(2015))] [author's trans].

treatment may conflict with the ownership principle in the *sui generis* state's water laws.

The ownership problem related to the water right and *sui generis* geothermal resources could be found in Idaho and Washington. Callison recognizes that issues in her paper that in Idaho, even though the state's geothermal law recognizes an interface between geothermal resources and water resources, it seems unsuccessful to explain the correlation between a property interest in water right and a property interest in geothermal resources.⁹⁹ Similar conflict of interest relating to private property holder in Washington between property administration under the Washington water law¹⁰⁰ and property administration under the Washington geothermal law¹⁰¹ are likely to arise.¹⁰²

Like the two states, in Montana geothermal resources are regarded as *sui generis*, 'but ... closely related to and possibly affecting and affected by water resources in many instances.'¹⁰³ Leasing of geothermal resources on state lands in Montana requires a water right application to the State Department of Natural Resources and Conservation.¹⁰⁴ Thus, relating to ownership of geothermal resources, the Montana statute seems ambiguous; since it concludes that geothermal resources are deemed as water resources.¹⁰⁵ As a consequence, disputes between owners of surface and subsurface is likely difficult to resolve. To avoid such difficulties, Blomquist suggested in his report, that the developers of geothermal resources should secure their necessary water rights, because Montana's water law might be

⁹⁹ Kathleen Callison, 'Water and Geothermal Energy Development in the Western U.S.: Real World Challenges, Regulatory Conflicts and Other Barriers, and Potential Solutions' (2010) 22 *Pacific McGeorge Global Business & Development Law Journal* 301, 9; See generally in Idaho Code Ann. § 42-4002(c)

¹⁰⁰ Wash Rev Code § 90.03.010.

¹⁰¹ Wash Rev Code § 78.60.040.

¹⁰² Callison, above n 99, 9.

¹⁰³ Mont Code Ann § 77-4-104.

¹⁰⁴ Kathleen Callison, 'Making Sense of Definitions and Ownership of Geothermal Resources and Recent Development in Washington State' (Paper presented at the Geothermal Resources Conference Annual Meeting, Washington, 26 September 2014) 25 <http://www.geothermal.org/Annual_Meeting/PDFs/1p%202.00%20%20GeothDefinitionsOwnership%20&%20WA%20State%20Legis,%20CALLISON.pdf>.

¹⁰⁵ Mont Code Ann §§ 77-4-102, 77-4-104.

applied to all development stages of geothermal, include production and fluid diversion of geothermal resources.¹⁰⁶

The illustration about a possibility of ownership issues by treating geothermal resources as *sui generis* could help Indonesia consider these issues. Meanwhile, with respect to a solution regarding these issues, Bloomquist suggestion to secure water rights for geothermal activities in these *sui generis* states is probably suitable for water regulatory instruments in Indonesia. The reason underpins that position is an opportunity to formulate subordinate legislations regarding water right that support geothermal activities under the 1974 Water Law, because any subordinate regulation under that law has not enacted yet.

(c) *Private*

In the states where geothermal resources are treated as *sui generis*, potential and developable of geothermal resources might be found upon private lands. To utilize these resources the geothermal developer are necessary to secure their access upon private lands. In Washington, Idaho, and Montana, access to private lands could be acquired through several ways such as selling, leasing, permitting, and any mutual agreement between the surface property owner and the geothermal estate.¹⁰⁷ The way in which Indonesia acquires access to geothermal resources is similar to these states.

3 *Geothermal site permitting and Federal Land Leases*

In the state level, site permitting of geothermal project and the state's land leasing depend upon legal treatment of geothermal resources, whether as a mineral, as water, or as *sui generis*. At the federal level, according to an estimation made by the BLM, approximately seventy per cent of federal lands have potential for geothermal development and beneath of these federal lands contain forty-six per cent of the U.S.' geothermal resources.¹⁰⁸ For the purpose

¹⁰⁶ R. Gordon Bloomquist, 'Geothermal: A Regulatory Guide to Leasing, Permitting, and Licensing in Idaho, Montana, Oregon, and Washington' (Technical Report No DOE/BP-00425-2, Washington State Energy Office, 1 October 1991) 118-9. <<http://www.osti.gov/scitech/servlets/purl/6544980>>

¹⁰⁷ Ibid 72, 85, 130, 204.

¹⁰⁸ United States Department of Interior, Bureau of Land Management, and United States Forest Service, *Final Programmatic Environmental Impact Statement for Geothermal Leasing*

of geothermal development, the BLM administers lease management upon federal land, which consists of the BLM land and the United States Forest Service ('the USFS').¹⁰⁹ Thus, to develop geothermal resources in the U.S.' federal lands, a leasing system and geothermal site permitting are critical.

In 2005, the Energy Policy Act 2005 altered the leasing process under the Geothermal Steam Act by removing competitive and non-competitive distinction and requiring all competitive leasing for geothermal acreage through auctions.¹¹⁰ In the new scheme developers may nominate their desirable lands for leasing or the BLM nominate available lease blocks on its own initiative and then evaluates such nominated lands.¹¹¹ To avoid the backlog issues in geothermal leasing, the Act establishes some improvement that requires to reduce the backlog by ninety per cent by August 2010, such as conduct auctions every two years for pending land nominations, increase the acreage lands for leasing, and extend leasing period either in initial leasing or in production leasing period.¹¹² To respond such requirements, the BLM and the USFS conducted a joint action to prepare a Programmatic Environmental Impact Statement ('the PEIS') to scrutinize any impacts on geothermal leasing in the U.S. and eventually issued approximately 118 million acres of federal land that available for geothermal leasing.¹¹³

Although the PEIS has significantly reduced issues related geothermal leasing upon federal lands, some problems relate to natural heritage and the tribes' consultation are likely create additional bottlenecks due to the surface nuisance of geothermal projects and the little flexibility of geothermal developer to avoid sensitive sites.¹¹⁴

in the Western United States (3 October 2008), 31 <http://www.blm.gov/style/medialib/blm/wo/MINERALS_REALTY_AND_RESOURCE_PROTECTION_/energy/geothermal_eis/final_programmatic.Par.95063.File.dat/Geothermal_PEIS_final.pdf>.

¹⁰⁹ Ibid 5.

¹¹⁰ 43 CFR § 3204.5.

¹¹¹ 43 CFR § 3203.

¹¹² *Geothermal Steam Act of 1970*, 30 USC § 1003 (as amended by *subtitle B John Rishel Geothermal Steam Act Amendments of 2005* §§ 222, 231, 235, 225; 43 CFR § 3207.5); See also Harrison, above n 71 433-34; Benn Tannen, 'Capturing the Heat of the Earth: How the Federal Government Can Most Effectively Encourage The Generation of Electricity From Geothermal Energy (2014), 37 *Environs Environmental Law and Policy Journal* 133, 134, 160-1.

¹¹³ Bureau of Land Management, above n 96, 46. See also Tannen, above n 103, 162.

¹¹⁴ Harrison, above n 65, 435.

*Pit River Tribe v U.S. Forest Service*¹¹⁵ is arguably suitable for illustrating a conflict between indigenous people and geothermal site permitting. The case is also arguably suitable for explaining a possibility of conflict that might be arisen when geothermal activities in Indonesia situated within customary forest or adjacent customary forest.

The appellants in this case were the Native Coalition for the Medicine Lake Highlands Defense and Mount Shasta Bioregional Ecology Center, collectively were called as Pit River, and the appellees were the Agencies that consist of the USFS, the BLM, and the Department of Interior and the Calpine Corporation.¹¹⁶ The Pit River sued the agencies with respect to the approval of the geothermal power plant conducted by the Calpine Corporation and the extension of geothermal lease in the Medicine Lake Highland, California.¹¹⁷ The Pit River alleged the agencies had violated the National Environmental Policy Act ('NEPA'), the National Historic Preservation Act ('NHPA'), the National Forest Management Act ('NFMA'), and the Administrative Procedure Act ('APA'), and the agencies' ancillary obligation to protect the Native American Tribes.¹¹⁸

The circuit judges concluded that the agencies had violated the NEPA by extending the lease term for geothermal development before finishing an Environmental Impact Statement ('EIS') for the Calpine's geothermal project¹¹⁹ and violated the NHPA by not conducting a consultation with local individuals and Native American organizations and not considering historic sites prior the extension of the lease.¹²⁰ The judges also concluded that the agencies failed to take a 'hard look' at any consequences of environmental of their decision to extend geothermal lease and did not consider 'the no-action alternative' for the geothermal sitting.¹²¹ Although the judges reversed the case, the case recognizes the standing of the Native Americans before the court and illustrates that any issues related environmental and historical issues surrounding

¹¹⁵ *Pit River Tribe v. U.S. Forest Service*, 469 F.3d 768, 773-4 (9th Cir, 2006).

¹¹⁶ *Pit River*, 469 F.3d 768 (9th Cir, 2006), 768.

¹¹⁷ *Pit River*, 469 F.3d 768 (9th Cir, 2006), 772-73.

¹¹⁸ *Pit River*, 469 F.3d 768 (9th Cir, 2006), 772.

¹¹⁹ *Pit River*, 469 F.3d 768 (9th Cir, 2006), 784.

¹²⁰ *Pit River*, 469 F.3d 768 (9th Cir, 2006), 787.

¹²¹ *Pit River*, 469 F.3d 768 (9th Cir, 2006), 787.

American tribes are necessary to be addressed to ensure geothermal plants operate smoothly.¹²²

The PEIS scheme is arguably appropriate for Indonesia's regulatory instruments to provide available working areas for geothermal activities and to avoid land title issues prior obtaining a geothermal license.¹²³ The *Pit River* case is possibly suitable for illustrating the important role of the AMDAL or UKL-UPL¹²⁴ in geothermal site permitting prior obtaining a geothermal license and extending such license in Indonesia. In addition, the case also illustrates the importance to conduct consultation with tribes when a geothermal activity is located in Indonesia's customary forest.

IV EXPOSITION AND ANALYSIS OF REFORM OPTIONS

It has explained above that Indonesia's *sui generis* classification of its geothermal resources has several aspects in common with the classification of geothermal resources in Idaho, Montana, and Washington. In addition, the classification of geothermal resources of water, such as in Colorado, is arguably suitable to support Indonesia's geothermal development by giving relevant grounds to formulate supportive subordinate regulations of the 1974 Water Law, which has not been enacted yet.

Instances of such similarities could be found in the general definition of geothermal resources, a machinery of geothermal resources leasing process, a possibility to conflict with forestry, a likelihood to conflict with water resources, and an obligation to geothermal activities to fulfill stringent environmental impact assessment.

This section focuses on discussion about regulatory instruments that are likely to be applicable for developing geothermal in Indonesia. These instruments are leasing process, a possibility to adopt the PEIS in forestry conflicts and land title issues regarding geothermal activity in Indonesia, and a possibility to adopt management for water resources from Colorado and the other states that bifurcating their geothermal resources. The other aspects such

¹²² Yonk, Simmons, Steed, above n 89, 109.

¹²³ See nn 27-8, 30, 34 and accompanying text.

¹²⁴ See nn 57-60 and accompanying text.

as ownership issues in federal lands and private lands would be not discussed, because the way in which Indonesia manage geothermal resources in public lands and private lands are similar to the U.S. and the existing regulatory frameworks to address these issues are still relevant.

A *Leasing Process*

The majority of geothermal resources in the U.S. are situated beneath federal lands, and leasing of the resources is administered under the federal statutory body, the BLM.¹²⁵ The BLM has the authority to lease federal lands and the lands that administer under the USFS and to manage competitive leasing for geothermal acreage under through auction.¹²⁶ The leasing process in competitive basis begins when the BLM collects nominations of parcel from qualified companies or individuals to be auctioned.¹²⁷ After the collection process, the Secretary of the Department of Interior ('the Secretary') posts the public notice for forty-five days before offering federal lands for competitive leasing through auction.¹²⁸ A bidder in the auction process must make an incremental bid per acre per year of the lease until \$5 per acre after the first decade of the lease.¹²⁹ The winner must pay 'twenty percent of bid, the total amount of the first year's rental, and the processing fee [to the BLM]'.¹³⁰ Meanwhile, the offered land at a competitive leasing, which received no bid, is subjected to non-competitive leasing.¹³¹

The U.S.' geothermal leasing scheme may be suitable as an input to create a prescriptive Government Regulation regarding working areas leasing and auction process. The 2014 Geothermal Law does not clearly prescribe the leasing for working areas; the law opts to administer the leasing by asking the MMER to create a subordinate legislation in the form Government Regulation.¹³²

¹²⁵ See above n 109 and accompanying text.

¹²⁶ See above nn 109-12 and accompanying text.

¹²⁷ 43 CFR § 3203.10(a).

¹²⁸ 43 CFR §§ 3203.15(b), 3203.14 (a)(2).

¹²⁹ 30 USC § 1004(a)(3).

¹³⁰ 43 CFR §3203.17(b).

¹³¹ 43 CFR §3204.5(a).

¹³² 2014 *Geothermal Law* art 18.

The U.S.' leasing scheme has been admitted to be similar to leasing of onshore oil and natural gas and coal, which are generally governed by the Mineral Leasing Act,¹³³ and Indonesia has well-established scheme for onshore and offshore oil and gas through production sharing contract ('PSC'). Thus, creating the Government Regulation is likely not difficult, because reference from the U.S.' geothermal leasing process and the PSC process are available and are likely plausible to be applied to Indonesia's leasing for geothermal resources.

B *Possibility to adopt the PEIS*

In the light of the forestry conflict that might hamper the development of geothermal resources, the *Pit River* could illustrate the importance of environmental assessment of the geothermal plant sitting.¹³⁴ To avoid the U.S. experience when deal with tribes' lands happens, the GOI has conducted a preventive action by mapping customary forests to identify possibilities of land tenure conflict, then integrate the result into a spatial planning document.¹³⁵ Such action may be coupled with the PEIS scheme, as had been done in the U.S. to assess any possible impacts on geothermal leasing.

The PEIS in Indonesia is likely possible to mirror the U.S.' PEIS. The GOI may forms a joint cooperation among the MEF, the Ministry of Agrarian Affairs and Spatial Planning ('the MAASP'), and the MMEF to conduct the PEIS. As a result, work areas that available for geothermal leasing through a competitive bidding, could be identified in advance to avoid geothermal activities hindered by any issues relating to ownership and land tenure. This action could also attract more investments in geothermal projects in Indonesia, since the investor of geothermal plant could carefully calculate a foreseeable upfront cost that might hamper a geothermal project and prepare preventive

¹³³ See n 90 and accompanying text. See generally Adam Vann, 'Energy Projects on Federal Lands: Leasing and Authorization' (Report for Congress No R40806, Congressional Research Service, 1 February 2012) 4-7, 14 <<https://www.fas.org/sgp/crs/misc/R40806.pdf#page=1&zoom=auto,-79,613>>.

¹³⁴ See nn 120-1 and accompanying text.

¹³⁵ See n 45 and accompanying text.

measures to deal with problems relating to land title issues due to multiple uses in the forest.¹³⁶

C Possibility to Adopt Water Regulatory Instruments

The 1974 Water Law arguably is insufficient to address the requirement of a prescribed regulation to manage water use in geothermal activities.¹³⁷ Currently, any subordinate legislation from the 1974 law to regulate water use has not enacted yet. Indonesia may adopt regulation relating to water use in geothermal activities from states that classify their geothermal resources as water and bifurcate their water resources into two categories: low temperature water and high temperature.¹³⁸ Such treatment arguably would be in accordance with the 2014 Geothermal Law, because in the 2014 Law, water is recognized as one of sources of 'hot energy that ... genetically inseparable in a geothermal system.¹³⁹ By bifurcating water resources in two different temperatures like Colorado, the regulation relating to water sources would not overlap with 2014 Geothermal Law, because the Law also recognizes the use of the low temperature water resource in direct use of geothermal.¹⁴⁰

Colorado obliges prior approval from the State Engineer to access geothermal resources.¹⁴¹ This requirement could be applied in Indonesia to secure the water right of a geothermal company and by doing so disruptions to geothermal plant activities are likely to be prevented, since the availability of water resources is essential in a geothermal plant, for example, in its cooling system.

However, exercising of that requirement requires a precautionary approach. If the circumstance of prior approval from a statutory body to obtain access to water resources required for supporting geothermal processes is exercised excessively and restricts public water rights, it would be deemed as privatization.¹⁴²

¹³⁶ See generally part C1(b),(c).

¹³⁷ See generally Part C3.

¹³⁸ See generally Part III.A.1.

¹³⁹ *2014 Geothermal Law* art 1.1 [author's trans].

¹⁴⁰ *2014 Geothermal Law* art 9(2)a (Explanation section) [author's trans].

¹⁴¹ See nn 74-6 and accompanying text.

¹⁴² See nn 48, 52 and accompanying text.

V CONCLUSION

Indonesia and the U.S. have some similarities in terms of regulatory instruments of geothermal resources, as this essay has demonstrated, the applicability of the U.S. instruments, such as leasing process, the PEIS, and the treatment of geothermal resources as water are arguably possible in Indonesia regulatory context. The 2014 Geothermal Law arguably is adequate to reduce the backlog relating to forestry issues by classifying geothermal resources as *sui generis*. However, in overarching regulatory instruments in Indonesia in respect to geothermal resources, which is related to site leasing, water resources and forestry aspects, legal adjustment of existing legislation is plausibly necessary.

To improve the leasing process of geothermal resources, Indonesia could adopt the U.S. leasing process by some modification conditions, such as adapting PSC scheme in geothermal leasing. Issues relating to the lack of support from forestry regulatory instruments could be addressed by conducting the PEIS in Indonesia to facilitate the availability working areas for geothermal leasing and prevent forestry issues disrupting the leasing. Indonesia could also adopt a bifurcation of water resources like Colorado, to enable an alignment between the 1974 Water Law and the 2014 Geothermal Law. A prior approval from statutory body in water use to support geothermal plants are also plausible in the Indonesia context, but this application needs a considerable precautionary approach to prevent privatization of water resources.

BIBLIOGRAPHY

A Articles/Book/Report

Alfian and Desy Nurhayati, '\$5 billion of deals signed at World Geothermal Congress', *The Jakarta Post* (online), 27 April 2010 <<http://www.thejakartapost.com/news/2010/04/27/5-billion-deals-signed-world-geothermal-congress.html>>

Aquaterra, RPS and Hot Dry Rocks, 'Geothermal Energy and Water Use' [2012] *Waterlines, National Water Commission, Canberra* <http://nwc.gov.au/__data/assets/word_doc/0014/21470/72-Geothermal-energy-and-water-use.doc>

Bertani, Ruggero 'Geothermal Power Generation in the World 2005–2010 Update Report' (2012) 41 *Geothermics*

Bettis, Laura MacGregor 'In Hot Water: Can Idaho's Ground Water Laws Adequately Govern Low Temperature Geothermal Resources?' (2002) 39 *Idaho Law Review* 113

Bloomquist, R. Gordon, 'Geothermal: A Regulatory Guide to Leasing, Permitting, and Licensing in Idaho, Montana, Oregon, and Washington' (Technical Report No DOE/BP-00425-2, Washington State Energy Office, 1 October 1991) <<http://www.osti.gov/scitech/servlets/purl/6544980>>

Bureau of Land Management, *Split Estate*, U.S. Department of The Interior (20 October 2009) <http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices/split_estate.html>

Callison, Kathleen 'Making Sense of Definitions and Ownership of Geothermal Resources and Recent Development in Washington State' (Paper presented at the Geothermal Resources Conference Annual Meeting, Washington, 26 September 2014) <[http://www.geothermal.org/Annual_Meeting/PDFs/1p%20.00%20%20Geoth DefinitionsOwnership%20&%20WA%20State%20Legis,%20CALLISON.pdf](http://www.geothermal.org/Annual_Meeting/PDFs/1p%20.00%20%20Geoth%20DefinitionsOwnership%20&%20WA%20State%20Legis,%20CALLISON.pdf)>

Callison, Kathleen, 'Water and Geothermal Energy Development in the Western U.S.: Real World Challenges, Regulatory Conflicts and Other Barriers, and Potential Solutions.' (2010) 22 *Pacific McGeorge Global Business & Development Law Journal* 301

Clark, C.E. et al, *Water Use in the Development and Operation of Geothermal Power Plants* (January 2011) Office of Energy Efficiency and Renewable Energy U.S. <http://www1.eere.energy.gov/geothermal/pdfs/geothermal_water_use_draft.pdf>

Conser, Alexander 'Double Dipping: Utilizing Oil Wells for Geothermal Energy' (2013) 37 *William & Mary Environmental Law & Policy Review* 813

Detsky, Mark D 'Getting into Hot Water: The Law of Geothermal Resources in Colorado' (2010) 39 *Colorado Lawyer* 65

Directorate General of New and Renewable Energy and Energy Conservation, Ministry of Energy and Mineral Resources of Indonesia (MEMR), *Statistik Energi Baru Terbarukan* [Statistic of New Renewable Energy] (23 June 2011) <http://esdm.go.id/publikasi/harga-energi/cat_view/58-publikasi/240-statistik/355-statistik-energi-baru-terbarukan.html>[author's trans]

Editorial, 'Islands in Focus: Bali still rejects geothermal plant' *The Jakarta Post* (online), 18 June 2013 <<http://www.thejakartapost.com/news/2013/06/18/islands-focus-bali-still-rejects-geothermal-plant.html>>

Galli, Craig D, Steven W Snarr and Michael N Thatcher, 'Getting into Hot Water: Current Hot Topics in Geothermal Development' [2009] *Rocky Mountain Mineral Law Institute. Proceedings* 6. ch 6 app 1 <<http://www.rmmlf.org/AI55-Ch6-Appendix.pdf>>

Geothermal Energy Association, *Geothermal Basics - Power Plant Costs* <http://geo-energy.org/geo_basics_plant_cost.aspx>

Goldstein, Adam H. *2013 Market Trends Report, Geothermal Technologies Office*, U.S. Department of Energy (DOE) <<http://www1.eere.energy.gov/geothermal/pdfs/market-report2013.pdf>>

Harrison, Sylvia 'Geothermal Resources' in Michael Gerrard (ed), *The Law of Clean Energy : Efficiency and Renewables* (American Bar Association, Section of Environment, Energy, and Resources, 1st ed, 2011)

Holm, Alison et al, *Geothermal Energy: International Market Update* (May 2010) Geothermal Energy Association <http://www.geo-energy.org/pdf/reports/GEA_International_Market_Report_Final_May_2010.pdf>

Kasbani, *Indonesian Geothermal Resources: Research Status, Potential and Type Geothermal Systems*, Geology Agency, Ministry of Energy and Mineral Resources of (MEMR) Indonesia <http://psdg.bgl.esdm.go.id/index.php?option=com_content&view=article&id=841:sumber-daya-panas-bumi-indonesia-status-penyelidikan-potensi-dan-tipe-sistem-panas-bumi&catid=10:geothermal>[author's trans]

Kubiszewski, Ida, *Geothermal Steam Act of 1970, United States*, (4 September 2008) *Encyclopedia of Earth* <<http://www.eoearth.org/article/Geothermal>>.

Lakic, Nikola N, 'Limitless Energy: About Most Recent Developments in Hot Dry Rocks Technology' (2014) *Geothermal World Wide* <<http://www.geothermalworldwide.com/egs.html>>

Lindquist, Laura *Geothermal firm eyes new technique to force open underground crevices* (14 March 2011) *Magicvalley.com* <http://magicvalley.com/news/local/state-and-regional/article_5a0291c0-5ecf-5ba0-a1f2-44a0f6250946.html>

Maehlum, Mathias Aarre, *Geothermal Energy Pros and Cons* (1 June 2013) *Energy Informative* <<http://energyinformative.org/geothermal-energy-pros-and-cons/>>

Ministry of Energy and Mineral Resources of the Republic of Indonesia, '*Cetak Biru Pengelolaan Energi Nasional 2005-2025* [Blue Print National Energy Management 2005-2025 (Blue Print Energy 2005-2025)]' (2005) <http://psdg.bgl.esdm.go.id/kepmen_pp_uu/blueprint_PEN.pdf>[author's trans]

Ministry of Energy and Mineral Resources of the Republic of Indonesia, '*Menteri ESDM Minta Proses Eksplorasi Dipercepat* [Minister of Energy and Mineral Resources Requires the Acceleration of Geothermal Exploration]' (20 December 2011) < <http://www.esdm.go.id/berita/45-panasbumi/5285-mesdm-minta-proses-eksplorasi-dipercepat.html>> [author's trans]

Mulyadi, Agus (ed) '*Pembangunan Dua PLTP Tersendat* [the Development of two Geothermal Power Plant Suspended]' *Kompas* (online), 16 August 2011 < <http://sains.kompas.com/read/2011/08/16/23230012/Pembangunan.Dua.PLT.P.Tersendat>>[author's trans]

Office of Energy Efficiency & Renewable Energy, *A History of Geothermal Energy Research and Development in the United States* (September 2010) U.S. Department of Energy <<http://energy.gov/eere/geothermal/history-geothermal-energy-america>>

Reed D Benson, 'Alive But Irrelevant: The Prior Appropriation Doctrine In Today's Western Water Law' (2012) 83(3) *University Of Colorado Law Review* 675

Saptadji, Neny Miryani 'Update on Geothermal Development in Indonesia' (Paper presented at 28th Geothermal Workshop 2006, New Zealand, November 2006)

Silver, Ruth Mulgrave, 'Federal Reservation of Geothermal Resources' (1978) 18 *Natural Resources Journal* 1

Tannen, Benn, 'Capturing the Heat of the Earth: How the Federal Government Can Most Effectively Encourage The Generation of Electricity From Geothermal Energy' (2014), 37 *Environs Environmental Law and Policy Journal*

133 United States Department of Energy, *Geothermal FAQs*
<<http://energy.gov/eere/geothermal/geothermal-faqs>>

United States Department of Interior, Bureau of Land Management, and United States Forest Service, *Final Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States* (3 October 2008), 31
<http://www.blm.gov/style/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/energy/geothermal_eis/final_programmatic.Par.95063.File.dat/Geothermal_PEIS_final.pdf>

Vann, Adam, 'Energy Projects on Federal Lands: Leasing and Authorization' (Report for Congress No R40806, Congressional Research Service, 1 February 2012) 4-7, 14
<<https://www.fas.org/sgp/crs/misc/R40806.pdf#page=1&zoom=auto,-79,613>>

Williamson, Jeremiah I, 'The Future of U.S. Geothermal Development: Alternative Energy or Green Pipe Dream' (2011) 1 *Texas Journal of Oil, Gas, and Energy Law* 1

Wong, Alex et al, 'Geothermal Power Project in Indonesia' (12 March 2015) *Hogan Lovells* <http://www.hoganlovells.com/files/Publication/47607802-3793-4838-a275-b39980260301/Presentation/PublicationAttachment/2b9acd66-b41d-4f30-a1e5-cbb375993290/Geothermal_power_projects_in%20Indonesia.pdf>

Yonk, Ryan M Randy T Simmons and Brian C Steed, *Green vs. Green: The Political, Legal, and Administrative Pitfalls Facing Green Energy Production*. (Routledge, 1st ed, 2013)

B Cases

1 *Indonesia Cases*

Aliansi Masyarakat Adat Nusantara (AMAN) dan Negara [Nusantara Indigenous People Alliance (AMAN) v State] Constitutional Court of Indonesia, 35/PUU-X/2012, (26 March 2012) [author's trans]

Muhammadiyah dan Presiden Republik Indonesia dan Dewan Perwakilan Rakyat [Muhammadiyah v the President of Republic Indonesia and House of Representatives Constitutional Court of Indonesia (Muhammadiyah v State)] 85/PUU-XI/2013 (17 September 2014) [author's trans]

2 *The United States of America Cases*

Geothermal Kinetics Inc. v. Union Oil Co, 75 Cal.App.3d 56 (Cal.App. 1977)

Rosette Inc. v. U.S., 277 F.3d 1222, 1230-35 (10th Cir, 2002)

U.S. v. Union Oil Co. of California, 549 F.2d 1271 (9th Cir. 1977)

C Legislation

1 Indonesia Legislations

Peraturan Bersama Menteri Dalam Negeri, Menteri Agraria dan Tata Ruang, Menteri Kehutanan dan Lingkungan Hidup Nomor 79 Tahun 2014 Nomor PB. 3 Menhut-11/2014, Nomor 17 PRT/M/2014, Nomor 8/SKB/X/2014 tentang Tata Cara Penyelesaian Penguasaan Tanah Yang Berada Dalam Kawasan Hutan [Joint Regulation the Minister of Internal Affairs, the Minister of Agrarian Affairs and Spatial Planning, the Minister of Environment and Forestry No 79 of 2014, No PB. 3 Menhut-11/2014, No 17 PRT/M/2014, No 8/SKB/X/2014 of 2014 on Settlement Procedures of Property Rights and Land Tenure Issues in Forest Areas (2014 Joint Regulation)] (Indonesia) [author's trans]

Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor 5 Tahun 2012 tentang Jenis Rencana Usaha Dan/Atau Kegiatan yang Wajib Analisis Mengenai Dampak Lingkungan (AMDAL) [Minister of Environment and Forestry No 5 of 2012 on List of Business Plan and/or Activity that requires EIA (AMDAL) (AMDAL List)] (Indonesia) [author's trans]

Peraturan Menteri Negara Agraria No 5 Tahun 1999 tentang Pedoman Penyelesaian Masalah Ulayat Masyarakat Hukum Adat [Regulation of State Minister of Agrarian Affairs No 5 of 1999 on the Guidance to Resolve Customary Issues of Customary Community (Agrarian Regulation 5 (1999))] (Indonesia) [author's trans]

Peraturan Pemerintah Nomor 24 Tahun 2010 tentang Penggunaan Kawasan Hutan [Government Regulation No 24 of 2010 on Forest Areas Use (GR 24 (2010))] (Indonesia) [author's trans]

Peraturan Pemerintah Nomor 28 Tahun 2012 tentang Pengelolaan Kawasan Suaka alam dan Kawasan Pelestarian Alam [Government Regulation No 28 of 2011 on Management on Natural Preservation Area and Natural Conservation Area (GR 28 (2012))] (Indonesia) [author's trans]

Peraturan Pemerintah Nomor 61 Tahun 2012 tentang Perubahan atas Peraturan Pemerintah Nomor 24 Tahun 2010 tentang Penggunaan Kawasan Hutan [Government Regulation No 61 of 2012 on Amendment Government Regulation No 24 of 2010 of Forest Areas Use (GR 61 (2012))] (Indonesia) [author's trans]

Peraturan Pemerintah Nomor 16 Tahun 2005 tentang Sistem Penyediaan Air Minum [Government Regulation No 16 of 2005 on Potable Water Supply System (GR 16(2005))] (Indonesia) [author's trans]

Peraturan Presiden Nomor 28 Tahun 2011 tentang Penggunaan Kawasan Hutan Lindung Untuk Pertambangan Bawah Tanah [President Regulation No 28 of 2011 on Use of Forest Protected Areas for Underground Mining Forest Areas Use (PR 28 (2011))] (Indonesia) [author's trans]

Peraturan Pemerintah Nomor 27 Tahun 2012 tentang Izin Lingkungan [Government Regulation No 27 of 2012 on Environmental License (GR 27 (2012))] (Indonesia) [author's trans]

Undang-Undang Dasar Republik Indonesia [Constitution of Republic Indonesia]

Undang-Undang Nomor 11 Tahun 1974 tentang Pengairan [Law No 11 of 1974 on Water (1974 Water Law)] (Indonesia) [author's trans]

Undang-Undang Nomor 41 Tahun 1999 Tentang Kehutanan [Law No 41 of 1999 on Forestry (1999 Forestry Law)] (Indonesia) [author's trans]

Undang-Undang Nomor 27 Tahun 2003 Tentang Panas Bumi [Law No 27 of 2003 on Geothermal (2003 Geothermal Law)] (Indonesia) [author's trans]

Undang-Undang Nomor 7 Tahun 2004 tentang Sumber Daya Air [Law No 7 of 2004 on Water Resources (2014 Water Law)] (Indonesia) [author's trans]

Undang-Undang Nomor 21 Tahun 2014 tentang Panas Bumi [Law No 21 of 2014 on Geothermal (2014 Geothermal Law)] (Indonesia) [author's trans]

2 *The United States of America Legislations*

25 USC §§ 393-416j

25 USC §§ 2101-2108

30 USC Ch. 3A

30 USC §§ 1002-1028

30 USC § 1002

30 USC § 1002 (c)

30 USC § 1004(a)(3)

43 CFR § 3203

43 CFR § 3203.10(a)

43 CFR § 3204.5(a)

43 CFR §§ 3203.15(b), 3203.14 (a)(2)

43 CFR § 3203.17(b)

43 CFR § 3204.5

43 USC § 291

43 USC § 299

Cal Pub Res Code § 3703.1

Colo Rev Stat § 37-90.5-107

Colo Rev Stat § 37-90.5-106

Colo Rev Stat § 37-90.5-104 (1)

Colo Rev Stat § §37-90.5-102 (c)

Colo Rev Stat § 37-90.5-107(3)

Geothermal Steam Act of 1970, 30 USC § 1003 (as amended by subtitle B John Rishel Geothermal Steam Act Amendments of 2005 §§ 222, 231, 235, 225; 43 CFR § 3207.5)

Haw Rev Stat § 182-1

Idaho Code Ann § 42-230 (a) (1)

Idaho Code Ann §§ 42-4002 (c), 47-1602

Mont Code Ann § 77-4-102

Mont Code Ann § 77-4-104

NM Stat § 71-5-3 (G)

Wash Rev Code § 78.60.040

Wash Rev Code § 90.03.010