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FIGHTING FIRE WITH FIRE: HOW DEVELOPING GEOTHERMAL ENERGY PLANTS ON U.S. PROTECTED LAND WILL MINIMIZE THE EFFECTS OF GLOBAL WARMING

Joseph B. Rinaldi

I. INTRODUCTION: HOW THE EARTH'S HEAT WILL DIMINISH GLOBAL WARMING

Countless scientific reports, as well as other literature, illustrate the terrible reality of global warming. These studies are so prevalent that almost every person in this country knows about them in great detail. It is well known that the ice caps are melting, sea levels are rising, and the Earth is getting significantly warmer.¹ Scientists have been trying to figure out how to slow down or reverse this seemingly impossible catastrophe, but the answer may be right in front of us. More accurately, the answer may not be directly in front of us, but actually below us: geothermal energy.

Geothermal energy has been used since the beginning of human civilization.² For example, in ancient times hot springs and volcanic mud pits were used as sources of heat, for many aspects of ritual, and in everyday life.³ Volcanoes held religious and agricultural value as well.⁴ Early humans believed that volcanoes held the key to the Earth's heat, releasing high temperatures sporadically throughout time.⁵ In much of the last century, humanity has developed a way to harness the constant heat of the Earth in

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¹ See William R. L. Anderegg et al., *Expert Credibility in Climate Change*, 107 (27) PROC. NAT'L ACAD. SCI. 12107, 12107-09 (2010); Peter T. Doran & Maggie Kendall Zimmerman, *Examining the Scientific Consensus on Climate Change*, EOS, TRANSACTIONS, AM. GEOPHYSICAL UNION, Jan. 2009, at 22, 22; Naomi Oreskes, *Beyond the Ivory Tower: The Scientific Consensus on Climate Change*, 306 SCI. 1686, 1686 (2004).

² See Raffaele Cataldi, Review of Historiographic Aspects of Geothermal Energy in the Mediterranean and Mesoamerican Areas Prior to the Modern Age, GEO-HEAT CTR. Q. BULL., 313 (1993).

³ *Id.* at 16.

⁴ *Id.* at 13.

⁵ *Id.* at 14.

order to capture this sustainable energy.⁶ Over time, society has discovered that heat is continually produced below the Earth's crust.⁷ Within 10,000 meters of the surface, the Earth produces enough heat to provide 50,000 times more energy than all of the oil and natural gas resources in the world.⁸

If this clean energy exists under our feet, then why are we not utilizing it to the best of our ability? In reality, the heat necessary to produce geothermal energy lies at different depths in different areas of the world. This inconsistency leaves many people unwilling to pay the extra money to determine at what exact depth the heat exists in their area. Places like the Philippines, Indonesia, and the Western United States have some of the world's largest volcanic hotspots, which are also the closest to the Earth's surface.⁹ In other places, like the Southeastern United States, the hotspots are located deeper in the earth.¹⁰

Another setback to the development of geothermal energy in the United States is the large amount of red tape surrounding these extraordinary hotspots. The western United States constitutes a majority of the northeast quarter of the Pacific Rim Region.¹¹ The hotspots located within this region helped to create some of the geographical and environmental wonders currently preserved in the National Park System.¹² Native American lands also contain large amounts of geothermal energy potential.¹³ These federally protected lands are safeguarded by statutes that specifically ban the development of geothermal energy.¹⁴ After this country's long and terrible history of destroying the environment and conquering Native American land, these statutes provided a necessary response to the actions of a wayward United States. However, these statutes did not prevent society from destroying the environment and

⁶ See *How Geothermal Energy Works*, UNION FOR CONCERNED SCIENTISTS (Dec. 22, 2014), http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/how-geothermal-energy-works.html#bf-toc-0.

⁷ See *id.*

⁸ *Id.*

⁹ *Id.*

¹⁰ *Id.*

¹¹ See *Where is the Pacific Rim Region?*, PACIFIC RIM INST., LLC, <http://www.pacificrimllc.net/where.html> (last visited Oct. 31, 2015).

¹² See *Hot Spots*, OREGON STATE UNIV., <http://volcano.oregonstate.edu/hotspotparks> (last visited Oct. 31, 2015).

¹³ Peter Meisen, *Renewable Energy on Tribal Lands*, GLOBAL ENERGY NETWORK INST. 3, <http://www.geni.org/globalenergy/research/renewable-energy-on-tribal-lands/Renewable-Energy-on-Tribal-Lands.pdf> (last visited Oct. 31, 2015).

¹⁴ U.S. Dep't. of the Interior, *Geothermal Energy Development Regulatory Overview*, NAT'L. PARK SERV. (Jan. 2003), http://www2.nature.nps.gov/geology/adjacent_minerals/EnergySummit/Geothermal/geothermal%20regs.pdf.

perpetuating global warming. For this reason, clean energy initiatives, like geothermal energy, need to be seen as a public good and a natural commodity necessary for all American citizens.

In the fall of 2014, the international community saw Indonesia adopt a solution, which, if reproduced stateside, should help the United States think outside the box regarding geothermal energy. That August, Indonesia passed the new Geothermal Law that eliminated legal barriers blocking the development of Indonesia's geothermal resources, which are among the largest in the world.¹⁵ Energy and Mineral Resources Minister, Jero Wacik, said that the new law heralded a breakthrough in the development of geothermal resources in the country.¹⁶ Activities relating to geothermal development were no longer considered "mining" activities equivalent to the exploration and production of oil, gas, minerals and coal.¹⁷ As a result of this new law, Indonesia will now begin developing geothermal plants in their federally protected forests.¹⁸ The country saw the importance of not relying heavily on fossil fuels. Although protected forests are meant to care for the beauty of the natural world, the country took a stance and said that clean energy, which will lead to a clean environment, is more important because it will preserve the natural world on a global scale.¹⁹

This note argues that the United States should follow Indonesia's model by amending its statutes to allow geothermal development on protected lands. Allowing this development will significantly lower carbon emissions, eliminate reliance on fossil fuels, and promote a clean environment for the public good.

The United States needs to follow Indonesia's lead and promote geothermal development on all land, whether it is federally protected or not. This note will build upon this thesis and provide a conclusion that will promote an Indonesia-like solution to U.S. laws. Part I of this note will introduce geothermal energy by discussing: (A) the history of human use; (B) how geothermal production works; (C) what a geothermal hotspot is; and (D) the global impact of geothermal energy in this field. Part II will illustrate the statutes and regulations affecting geothermal development by discussing: (A) the geothermal regulatory overview; (B) statutes governing this resource; (C) the Code of Federal Regulations that regulates

¹⁵ Raras Cahyafitri, *Legal Barrier to Geothermal Development Removed*, JAKARTA POST (Aug. 27, 2014, 9:20 AM), <http://www.thejakartapost.com/news/2014/08/27/legal-barrier-geothermal-development-removed.html>.

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ *See id.*

geothermal energy; and (D) the Bureau of Indian Affairs' influence on this renewable resource. Part III will analyze multiple cases that call on the need to separate clean energy production from that of fossil fuels in the eyes of the law. Finally, Part IV will resolve the issues addressed in this note and supply an overarching conclusion that geothermal energy is the answer the world has been waiting for.

II. GEOTHERMAL ENERGY: HISTORY, GLOBAL INFLUENCE AND THE NEED TO GO FURTHER

To fully understand the process and future prospects of geothermal energy, the United States must look at the history of this energy source and the influence it has had on other nations around the world. Before scientists were able to use special instruments to discover heat thousands of feet below the ground, early humans had to rely on site-specific experiences.²⁰ Only people living in and communities located in areas with geothermal hotspots visible at the surface, like volcanoes and hot springs, were able to gain an insight into this potentially vast renewable energy source.²¹ Early humans knew about the heat available below the surface, but with the unpredictability of terrestrial heat seen by volcanic eruptions and similar phenomena, most civilizations did not know how to harness this heat.²² Only recent scientific advancements during the modern era have made it possible for humans to form a more symbiotic relationship with geothermal energy on a large scale.²³ With this new relationship comes a new renaissance that stems from the need to learn and fight for clean and renewable energy. Around the world, there are more and more initiatives furthering geothermal development and renewable energy.²⁴ The United States must follow the rest of the world and continue moving further with its geothermal development.

A. History of the Relationship Between Geothermal Energy and Human Civilization

Throughout the world, geothermal phenomena were considered by people in ancient times to be manifestations of gods, signs of evil spirits, or

²⁰ Cataldi, *supra* note 2, at 13.

²¹ *Id.*

²² *See id.*

²³ *See id.*

²⁴ *See How Geothermal Energy Works, supra* note 6.

even a *ludus naturae* (“prank of nature”).²⁵ Most depictions of geothermal energy in the past were supernaturally based, but these depictions later branched out to embody three types of relationships between geothermal energy and humans.²⁶ The three types of relationships that developed were: (1) a relationship of a pragmatic nature, concerning the use of natural heat or the exploitation of hydrothermal products for practical purposes; (2) a relationship of confidence (sometimes involving worship) with those manifestations that occurred in harmless forms; and (3) a relationship of caution and watchfulness (and sometimes fear) with the dangerous manifestations.²⁷ These rapports created the foundation for a working relationship between people and the Earth in regard to geothermal development.

After establishing a relationship with geothermal energy, humans began to develop direct uses for the Earth’s heat.²⁸ Throughout the geothermal-rich areas of the world, “a propulsive effect on those localities where the possibility of practicing thermal balneotherapy (bathing), and/or of using the by-products of terrestrial heat (hydrothermal minerals, travertine, obsidian, etc.) and/or developing farming in fertile volcanic soils gradually helped man to improve the quality of his life.”²⁹ Volcanic soil is one of the most fertile soils in the world, and early humans certainly realized this and benefited from it.³⁰ Utilizing thermal heat and fluids from the Earth in agriculture gave way to more hydrothermal products, and led to the increased importance of heat in cooking and other aspects of daily living.³¹ Ancient people in places like Italy and Mexico used volcanoes in many instances of their daily lives to survive, and as the modern era began to approach, humanity began contemplating new ways to harness heat.³² As a result of innovations in harnessing heat, society finally began to understand what exactly geothermal energy was.³³

B. *How does Geothermal Energy Work?*

Below the Earth’s crust, heat is continually produced in a layer of hot, molten rock called magma.³⁴ This heat has been a constant since the

²⁵ Cataldi, *supra* note 2, at 13.

²⁶ *See id.*

²⁷ *Id.*

²⁸ *Id.* at 14.

²⁹ *Id.* at 16.

³⁰ *See id.*

³¹ *Id.* at 14.

³² *See id.* at 15.

³³ *See id.* at 13.

³⁴ *How Geothermal Energy Works, supra* note 6.

formation of the planet, so this heat is unquestionably not fading.³⁵ Scientists have also stated that the first 10,000 meters of the Earth's crust contains 50,000 times more heat energy than all the oil and natural gas resources in the world.³⁶ This unbelievable amount of energy seated right below us can change the world, and the world is finally starting to capture it more and more each day.³⁷

Today, the most common way to capture this energy is “to tap into naturally occurring ‘hydrothermal convection’ systems, where cooler water seeps into Earth’s crust, is heated up, and then rises to the surface.”³⁸ The heated water sent to the surface will release steam, which drives the electric generators in the geothermal power plant.³⁹ Once the steam and heated water has been used, the plant condenses the steam back into water to be used over and over again.⁴⁰ This process reuses the same water and constant heat to continuously generate electricity.⁴¹ The U.S. Department of Energy has provided images of three types of geothermal power plants to help illustrate how to efficiently capture geothermal energy.⁴² The electricity generated provides many towns and countries with the power they need to conduct their everyday lives. Right now, places located in “geothermal hotspots” will likely benefit the most from geothermal development.

C. *Geothermal Hotspots*

Geothermal Hotspots are areas of the world that have the highest underground temperatures and are generally found in regions with young or active volcanoes.⁴³ Hotspots occur on the boundaries of tectonic plates or in places where the crust is relatively thin.⁴⁴ Countries like Indonesia and Iceland have very active volcanoes and very rich geothermal energy potential.⁴⁵ These countries lie on the boundaries of tectonic plates, causing hotspots to occur throughout the entirety of both these countries.⁴⁶

³⁵ *See id.*

³⁶ *Id.*

³⁷ *See id.*

³⁸ *Id.*

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ *See id.*

⁴² Illustration of Three Basic Designs of Geothermal Power Plants, U.S. DEP'T. OF ENERGY, available at <http://www.ucsusa.org/sites/default/files/images/2014/12/energy-renewable-geothermal-plant-designs-diagrams.jpg> (last visited Oct. 1, 2015).

⁴³ *How Geothermal Energy Works*, *supra* note 6.

⁴⁴ *Id.*

⁴⁵ *See id.*

⁴⁶ *See Plate Tectonics Map – Plate Boundary Map*, GEOLOGY.COM, <http://geology.com/plate-tectonics.shtml> (last visited Jan. 4, 2015).

In the United States, the major hotspots are located on the Pacific Rim, also called the Ring of Fire, because of its string of volcanoes from California to Alaska.⁴⁷ Although geothermal energy can be used anywhere in the United States, the western United States exhibits the best potential for geothermal energy closest to the surface.⁴⁸

D. Environmental and Global Impact and the Rise of Indonesia in the Geothermal Game

Many countries already use geothermal energy as an affordable, sustainable solution to reduce the dependence on oil and other fossil fuels.⁴⁹ Today, global operations generate more than 11,700 megawatts (MW) of large, utility-scale geothermal capacity, which can power nearly 6 million average U.S. households.⁵⁰ In countries like Iceland and El Salvador, more than 25% of electricity comes from geothermal plants.⁵¹ The United States currently produces 3,300 MW in about 8 states, making it the world leader in geothermal production.⁵² Although this capacity exists in eight states, almost 80% of this current geothermal capacity exists in California.⁵³ About 7% of California's electricity comes from geothermal energy.⁵⁴ Although these percentages seem low, the geothermal potential exists underground, and countries have just begun to tap into this resource.⁵⁵ Due to a rise in carbon dioxide in the atmosphere and the public health risks associated with fossil fuels, countries have started changing their laws to promote geothermal clean energy production.

In 2014, Indonesia's House of Representatives passed a new geothermal law that eliminated the legal barriers blocking the development of Indonesia's geothermal resources on protected lands.⁵⁶ Energy and Mineral Resources Minister, Jero Wacik, said that the new law marks a breakthrough in the development and definition of geothermal resources and production.⁵⁷ The new geothermal law, as Wacik explained, states that geothermal development will no longer be considered a mining activity equivalent to the exploration and production of nonrenewable resources,

⁴⁷ *Id.*

⁴⁸ *How Geothermal Energy Works*, *supra* note 6.

⁴⁹ *Id.*

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *Id.*

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ Cahyafitri, *supra* note 15.

⁵⁷ *Id.*

like oil, gas, minerals, and coal.⁵⁸ The Indonesian legislature is making an effort to fast-track production of renewable energy through legal reform.⁵⁹

The changes in Indonesia's laws mark a revision to the existing legislation around the country's geothermal energy, which is sourced from its many volcanoes.⁶⁰ The Indonesian government reassures its people that "[t]he new law reclassifies exploratory activities for energy hotspots, thus circumventing problematic environment protections."⁶¹ This reclassification also gives the Indonesian government the responsibility of "awarding licenses to investors wanting to explore sites, taking it away from local authorities."⁶² Altering the law so that geothermal development is no longer considered mining changes everything in Indonesia and the world. Since geothermal activities are no longer considered mining activities, geothermal resources can be collected and produced in Indonesia's forest conservation areas.⁶³ Under current Indonesian Forestry Law, mining operations are prohibited in protected forests throughout the country.⁶⁴

With its current geothermal resources, Indonesia could produce an estimated twenty-nine gigawatts of electricity.⁶⁵ Before this law change, Indonesia was only producing about 5% of that (or 1,341 megawatts).⁶⁶ Minister Wacik stated that the new changes in the law will help create a new era for geothermal energy, since previous laws have limited production due to environmental concerns.⁶⁷ Mining coal, oil, and other nonrenewable resources destroys the land by emitting large amounts of carbon dioxide into the air and taking away large amounts of forest space and land.⁶⁸ As mentioned earlier in this note, the geothermal production process is not like traditional "mining" because nothing is physically taken from the ground.⁶⁹ Water is simply heated and reheated from the constant warmth found underground.⁷⁰ Indonesia understood that its country sits on one of the largest hotspots in the world, and realized the potential to produce geothermal renewable energy.⁷¹

⁵⁸ *Id.*

⁵⁹ Andrea Nierhoff, *Indonesia Eyes Volcano-Powered Energy*, DEUTSCHE WELLE (May 9, 2014), <http://www.dw.de/indonesia-eyes-volcano-powered-energy/a-17903711>.

⁶⁰ *Id.*

⁶¹ *Id.*

⁶² *Id.*

⁶³ Cahyafitri, *supra* note 15.

⁶⁴ *Id.*

⁶⁵ *Id.*

⁶⁶ *Id.*

⁶⁷ *Id.*

⁶⁸ *See id.*

⁶⁹ *See supra* Part II.B.

⁷⁰ *Id.*

⁷¹ *See Nierhoff, supra* note 59.

Indonesia decided to take action against the overwhelming demand for oil and natural gas, and turn to a clean energy solution that will limit its carbon footprint while helping the country economically and environmentally.⁷² This is a very recent initiative, and other countries with similar laws and red tape should follow Indonesia's lead, especially the United States.⁷³

III. UNITED STATES STATUTES AND REGULATIONS AFFECTING GEOTHERMAL ENERGY DEVELOPMENT

The same legal barriers that previously existed in Indonesia hinder the United States' geothermal potential. Although Indonesia has always had the ability to supply up to 40% of the world's geothermal energy, conservation red tape around protected forests and national parks containing geothermal hotspots prevented the country from proceeding with this clean energy initiative.⁷⁴ Indonesia's new law removes the red tape and will allow Indonesia to become the world leader in geothermal energy, surpassing the United States.⁷⁵ As mentioned earlier, the United States' hotspots exist in the western part of the country, which is also home to some of the country's largest collections of protected national lands and parks.⁷⁶ Although geothermal energy is seen as clean energy worldwide, the United States still categorizes geothermal development with the development of natural gas, coal, oil, and even gold and silver.⁷⁷ After reviewing the agencies, statutes, acts, and federal regulations associated with building geothermal plants on protected land, this note will argue that the United States should change its laws to allow the production of geothermal energy on protected lands.

A. US Geothermal Energy Development Regulatory Overview

In regard to federally protected lands and parks under the Department of the Interior, the Bureau of Land Management serves as the federal

⁷² See *id.*

⁷³ See Cahyafitri, *supra* note 15.

⁷⁴ Nierhoff, *supra* note 59.

⁷⁵ See *id.*

⁷⁶ See U.S. Dep't. of the Interior, *supra* note 14.

⁷⁷ See generally *id.* (stating that the leasing process for geothermal resources on federal lands is similar to the process for leasing oil and gas on federal lands); see also Cahyafitri, *supra* note 15 (stating that Indonesia recently passed a bill removing geothermal development from the categorization of "mining activities," under which the production of coal, oil, and minerals fall).

government's leasing agent for geothermal resources on federal land.⁷⁸ Congress authorized two levels of protection for geothermal resources found in National Parks: (1) lands within all National Park System units are off limits to geothermal leasing; and (2) federal leasing outside the boundaries of the 16 park units with designated special thermal features triggers special mitigation measures, including a possible bar to lease issuance.⁷⁹ Protecting and conserving the land is one of the Bureau's highest priorities.⁸⁰ It is also worth noting that the Bureau treats oil and gas very similarly to geothermal development.⁸¹

B. Statutes Governing Geothermal Energy Development on Federally Protected Land and Parks

The Bureau of Land Management provides one act and three statutes that prevent national parks and other protected lands from being used to development almost any type of energy resource.⁸² The Geothermal Steam Act of 1970 "authorizes the Secretary of the Interior to issue both competitive and noncompetitive leases for geothermal resources on federal lands."⁸³ Certain lands, like national parks, are closed to federal geothermal leasing, and in 1988 Congress added amendments to the Act to protect thermal features outside the boundaries of the sixteen national parks.⁸⁴

The red tape around the national parks and the land beyond their boundaries compares to the red tape found in Indonesia before the 2014 law change.⁸⁵ With growing concerns about global warming, as mentioned in the beginning of this note, clean and renewable energy needs to be utilized.⁸⁶ Geothermal energy is clean energy, and the U.S. and Bureau of Land Management treat geothermal and nonrenewable resources the same.⁸⁷ This is a mistake. If the United States does not promote geothermal and other forms of clean energy soon, a lot of land, including national parks, will be gone forever.

In addition to the Geothermal Steam Act, three statutes also direct the Secretary of the Interior on how and where to develop geothermal resources:

⁷⁸ U.S. Dep't. of the Interior, *supra* note 14.

⁷⁹ *Id.*

⁸⁰ *See id.*

⁸¹ *Id.*

⁸² *See id.* (referencing 30 U.S.C. §§ 1001-1003; 1026(a),(d),(b) (1988) (amended 2005)).

⁸³ *Id.* (referencing 30 U.S.C. §§ 1001-1003 (1988) (amended 2005)).

⁸⁴ *Id.*

⁸⁵ *See* discussion *supra* Part II.D.

⁸⁶ *See supra* text accompanying note 2.

⁸⁷ *See generally* U.S. Dep't. of the Interior, *supra* note 14.

1. 30 U.S.C. § 1026(a) (1988) states that if the Secretary determines that the exploration, development or utilization of a potential lease would result in a significant adverse effect on a formally listed thermal feature in a park, the Secretary shall not issue such lease;⁸⁸
2. 30 U.S.C. § 1026(d) (1988) states that the Secretary shall include stipulations in all leases and permits necessary to protect the listed features in parks; and⁸⁹
3. 30 U.S.C. § 1026(b) (1988) states that the Secretary shall maintain a monitoring program for significant thermal features within units of the National Park System. As part of that program, the NPS in cooperation with the USGS shall carry out a research program to collect and assess data on the geothermal resources in parks, first focusing on significant thermal features near areas with current or proposed geothermal development.⁹⁰

These statutes illustrate the direct involvement the government has with leasing land where there is potential geothermal resources and energy cultivation. The Geothermal Steam Act specifically bars national parks from geothermal leasing, but the statutes state that the Secretary of the Interior shall maintain a monitoring program, including research and data analysis, for significant thermal features within the national parks.⁹¹ Pursuant to § 1026(b), the National Park System and the United States Geological Survey (USGS) shall conduct research with a primary focus on significant thermal features near areas with current or proposed geothermal development.⁹² With this statute, the United States has attempted to safeguard protected land by implementing a check on geothermal development near national parks.⁹³ If the natural features of the park, or the land itself, are not affected by the geothermal development nearby, the park should be allowed to develop geothermal energy. This note does not argue that the National Park System should build geothermal plants on every square foot of each park. Rather, national parks, like the expansive

⁸⁸ *Id.* (referencing 30 U.S.C. § 1026(a) (1988) (amended 2005)).

⁸⁹ *Id.* (referencing 30 U.S.C. § 1026(d) (1988) (amended 2005)).

⁹⁰ *Id.* (referencing 30 U.S.C. § 1026(b) (1988) (amended 2005)).

⁹¹ *Id.*

⁹² *Id.*

⁹³ *See id.*

3,472 square mile hotspot of Yellowstone National Park, should be open so that a tiny fraction of their land may be used to help promote green energy cultivation, like geothermal energy.⁹⁴ Parks like Yellowstone National Park contain large hotspots of geothermal resources.⁹⁵ If geothermal development were allowed within the borders of national parks, the world would see this energy source as a great, clean energy option. Presently, the ban on geothermal leasing makes it look like geothermal energy is nonrenewable and bad for the environment, which is certainly not true.

C. Following the Code: How the Bureau of Land Management regulates geothermal leasing via the Code of Federal Regulations

In addition to statutes, the Bureau of Land Management (BLM) follows specific regulations in regard to geothermal leasing on private land. The BLM's federal regulation sections "govern leasing on open federal lands, including lands managed by the U.S. Forest Service."⁹⁶ Park managers follow these provisions, and the BLM identifies the most important provisions as follows:

1. 30 C.F.R. § 3200 (2007) states BLM's geothermal leasing regulations. These regulations govern leasing on open federal lands, including lands managed by the U.S. Forest Service. The regulations in this Part use a Q and A format;⁹⁷
2. 30 C.F.R. § 3200.4 (2007) states that any action or operation under the regulations must comply with the Act. Includes above park protection provisions;⁹⁸
3. 30 C.F.R. § 3201.10 (2007) identifies what lands are available for federal geothermal leasing;⁹⁹
4. 30 C.F.R. § 3201.10(a)(2) (2007) states that BLM needs the concurrence of the Department of Agriculture before

⁹⁴ *Yellowstone Park Facts*, NAT'L. PARK SERV., <http://www.nps.gov/yell/planyourvisit/parkfacts.htm> (last visited Jan. 11, 2015).

⁹⁵ *Id.*

⁹⁶ See U.S. Dep't. of the Interior, *supra* note 14.

⁹⁷ *Id.*

⁹⁸ *Id.* (referencing 30 C.F.R. § 3200.4 (current version at 43 C.F.R. § 3200.4 (2007))).

⁹⁹ *Id.* (referencing 30 C.F.R. § 3201.10 (current version at 43 C.F.R. § 3201.10 (2007))).

issuing geothermal leases for lands (e.g., national forests) under that Department's jurisdiction;¹⁰⁰

5. 30 C.F.R. § 3201.10(b) (2007) states that if activities under a lease or permit might adversely affect a significant thermal feature of a NPS unit, BLM will include stipulations to protect the feature. This provision is operative when a lease or permit is issued, extended, renewed or modified;¹⁰¹
6. 30 C.F.R. § 3201.11(b) (2007) states that land within units of the National Park System are not open to federal geothermal leasing;¹⁰²
7. 30 C.F.R. § 3201.11(d) (2007) states that BLM cannot issue leases on lands where the Secretary has determined that geothermal development could reasonably likely result in a significant adverse effect on a significant thermal feature in a park;¹⁰³
8. 30 C.F.R. § 3204 (2007) governs noncompetitive leasing in which an interested party, on its own initiative, applies to the BLM for a lease;¹⁰⁴and
9. 30 C.F.R. § 3204 (2007) sets forth the provisions governing competitive leasing.¹⁰⁵

The Code provides more specific guidance on what the Bureau of Land Management should follow in regard to geothermal leases on federal protected lands than the statutes provide. As seen in the section above, the Code also identifies more red tape and a larger bureaucratic system, with additional checks needed by the Department of Agriculture.¹⁰⁶ The Code also contains contradictory language that is confusing, specifically the language found in § 3201.10(a)(2) and § 3201.11(b).¹⁰⁷ One regulation

¹⁰⁰ *Id.* (referencing 30 C.F.R. § 3201.10(a)(2) (current version at 43 C.F.R. § 3201.10(a)(2) (2007))).

¹⁰¹ *Id.* (referencing 30 C.F.R. § 3201.10(b) (current version at 43 C.F.R. § 3201.10(b) (2007))).

¹⁰² *Id.* (referencing 30 C.F.R. § 3201.11(b) (current version at 43 C.F.R. § 3201.11(b) (2007))).

¹⁰³ *Id.* (referencing 30 C.F.R. § 3201.11(d) (current version at 43 C.F.R. § 3201.11(d) (2007))).

¹⁰⁴ *Id.* (referencing 30 C.F.R. § 3204 (current version at 43 C.F.R. § 3204 (2007))).

¹⁰⁵ *Id.* (referencing 30 C.F.R. § 3205 (current version at 43 C.F.R. § 3205 (2007))).

¹⁰⁶ See *supra* text accompanying notes 96-105.

¹⁰⁷ Compare *supra* text accompanying note 100 with text accompanying note 102.

talks about issuing geothermal leases for protected lands (e.g. national forests), and the other states that land within the National Park System is not open to federal geothermal leasing.¹⁰⁸ It is confusing that the BLM would need the concurrence of an agency for something that it is legally not permitted to do in the first place. It would be in the best interest of the national parks, and the country, if the Code and the statutes were changed to allow the leasing and development of geothermal resources within protected federal lands and the surrounding areas.

The Code constantly points out the need to protect the national parks.¹⁰⁹ Conservation is the foundation for the National Park System, and protecting the parks from development that could adversely affect a park's thermal feature is a number one priority.¹¹⁰ However, the Code does not specify what should be done if the geothermal development does not adversely affect the thermal feature of the park. Also, the Code does not define what "could reasonably likely result in a significant adverse effect" means in § 3201.11(d).¹¹¹ This vague provision helps illustrate the point that unnecessary red tape is blocking this country from potentially fixing the "global warming problem." The Bureau of Land Management and the National Park System are too focused on "could reasonably" scenarios and aesthetic forest issues to see the big picture: protecting the *entire* planet rather than just a few thousand acres of national parks. Arguably, as discussed in the Introduction, if global warming is not stopped, or at least slowed down, there will probably not be any more national parks to protect. After all, global warming does "adversely affect" the National Park System. Therefore, it is time to make some changes to these provisions and statutes.

D. Bureau of Indian Affairs: Why American Indian Nations Need to help the Geothermal Cause

The Federal Indian trust enacts a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, resources, treaty rights, and assets.¹¹² The Court, in *Seminole Nation v. United States*, charged the United States with "moral obligations of the highest responsibility and trust" toward Native American tribes.¹¹³ Cases, like *Seminole Nation v. United States*, helped remedy the turbulent and conquering history between Native Americans and the United States. Over

¹⁰⁸ *Id.*

¹⁰⁹ See U.S. Dep't. of the Interior, *supra* note 14.

¹¹⁰ See *id.*

¹¹¹ See 30 C.F.R. § 3201.11(d) (current version at 43 C.F.R. § 3201.11(d) (2007)).

¹¹² See *Seminole Nation v. United States*, 316 U.S. 296, 296-97 (1942).

¹¹³ *Id.* at 297.

the last century, the United States attempted to help mend the bad blood and actually look after the country's oldest neighbors. Laws like the Minerals Agreement and the National Environment Policy Act declared Native American lands protected, meaning they were to be governed by the Native Americans as their own sovereign nations.¹¹⁴ This note will promote considering geothermal energy as an important resource for Native Americans, thus arguing that geothermal energy should fall under the United States' fiduciary obligation. This change will separate geothermal energy from other environmentally harmful activities, such as mining and oil extraction. Therefore, geothermal energy will be a clean environmental resource that Native American nations can utilize if they so choose.

Native Americans strive to maintain a clean and pure environment within the boundaries of their protected land. These lands also contain large amounts of rich minerals and nonrenewable resources.¹¹⁵ To heal the lasting wounds of the injustices suffered by Native Americans, the United States enacted the Minerals Agreement.¹¹⁶ The Agreement states that:

Any Indian tribe, subject to the approval of the Secretary and any limitation or provision contained in its constitution or charter, may enter into any joint venture, operating, production sharing, service, managerial, lease or other agreement, or any amendment, supplement or other modification of such agreement (hereinafter referred to as a "Minerals Agreement") providing for the exploration for, or extraction, processing, or other development of, oil, gas, uranium, coal, geothermal, or other energy or nonenergy mineral resources (hereinafter referred to as "mineral resources") in which such Indian tribe owns a beneficial or restricted interest, or providing for the sale or other disposition of the production or products of such mineral resources.¹¹⁷

Geothermal resources fall under the "minerals" umbrella,¹¹⁸ which is exactly what Indonesia considered geothermal energy to be.¹¹⁹ The Mineral Agreement does state that a Native American tribe has the authority to

¹¹⁴ U.S. Dep't of the Interior, *Frequently Asked Questions*, BUREAU OF INDIAN AFFAIRS, (Sept. 3, 2015), <http://www.bia.gov/FAQs/index.htm> (last updated Oct. 1, 2015).

¹¹⁵ *See id.*

¹¹⁶ 25 U.S.C. § 2102 (1982).

¹¹⁷ *Id.*

¹¹⁸ *See id.*

¹¹⁹ *See Cahyafitri, supra note 15.*

begin production of geothermal resources.¹²⁰ However, listing geothermal energy among nonrenewable minerals and fossil fuels perpetuates the misconception that geothermal energy is harmful for the environment. As mentioned earlier, geothermal plants do not extract materials from the Earth, like oil or gold activities do.¹²¹ The Minerals Agreement just adds more red tape for the United States and the Native American tribes, who own and may want to use this beneficial resource. The Secretary of the Interior must approve geothermal ventures on Native American land to determine if the intended development is in "the best interest of the Indian[s]."¹²² Although this seems promising, the Department of the Interior has equated geothermal energy with oil and natural gas, as seen in the Geothermal Steam Act mentioned above.¹²³ The United States needs to stop categorizing geothermal energy with mineral and fossil fuel extraction. This beneficial resource can not only help the environment, but it can also bring additional business and economic growth to individual Native American nations.

Native American public policy has focused on the need to promote the "beneficial" aspects of the environment, economy, and overall life of the tribes. The National Environmental Policy Act of 1969 contains multiple chapters that declare a policy encouraging productivity and enjoyment between people and the environment, especially on Native American land.¹²⁴ The Act also aims to support efforts to "prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man."¹²⁵ In addition, the Act sets up a Council on Environmental Quality to enrich the understanding of the ecological systems and natural resources important to the country as a whole.¹²⁶ The Bureau of Indian Affairs showcases this Act because it adopts the culture and lifestyle of Native Americans and connects the federal government directly to the Bureau of Indian Affairs and Native American programs in general.¹²⁷ Specifically, the Act states that "the Department of the Interior, in coordination with the Working Group, and, after consultation with tribal leaders, shall coordinate steps to be taken pursuant to this order that address Federally-recognized Indian Tribes."¹²⁸ This means that every environmental decision made goes through both the Department of the

¹²⁰ *Id.*

¹²¹ See discussion *supra* Part II.B.

¹²² 25 U.S.C. § 2102.

¹²³ 30 U.S.C. §§ 1001-1003 (1988).

¹²⁴ 42 U.S.C. § 4321 (1970).

¹²⁵ *Id.*

¹²⁶ *Id.*

¹²⁷ See U.S. Dep't of the Interior, *supra* note 114.

¹²⁸ 42 U.S.C. § 4321.

Interior and the Native American tribes before implementation. The majority of Native American-protected land exists in the Western United States, within all the noted hotspots.¹²⁹ The United States must utilize the National Environmental Policy Act to promote the use of the Native American's geothermal resources. The Act has created a bridge to encourage communication between the national government and the Native American tribes. The United States must cross this bridge and begin a dialogue with the public good in mind, while also promoting a clean environment and a world free from the clutches of global warming. Geothermal energy can help make this happen.

The United States created these statutes to keep the environment healthy and to give Native Americans a voice in what happens on the land that is finally theirs. In 42 U.S.C.A. § 4332, "Congress authorizes and directs that: (1) the policies, regulations, and public laws of the U.S. shall be interpreted and administered in accordance with the policies set forth in this chapter; and (2) all agencies of the Federal Government shall follow 9 steps outlined in the statute."¹³⁰ These nine in-depth steps illustrate how to achieve a collaborative end result with other agencies.¹³¹ This note argues that the Department of the Interior (Bureau of Land Management) must follow these steps with the Bureau of Indian Affairs to achieve beneficial outcomes for both sides. The national government and the Bureau of Indian Affairs both want to respect the land, keep it clean and healthy, and provide people with the resources needed to survive.

Geothermal power will not only affect the planet in a positive way, it will also positively affect Native Americans. Barbara C. Farhar, of the National Renewable Energy Laboratory, and Paul Dunlevy, of the U.S. Bureau of Land Management, state "the Navajo reservation in Arizona has the highest percentage of households without electricity (37%)."¹³² It is by far the largest reservation in the United States, accounting for 75% of all American Indian reservation households without electricity."¹³³ Over the past decade, the Jemez Pueblo (New Mexico) and the Pyramid Lake Paiutes (Nevada) tribes have been the only two tribes developing geothermal projects.¹³⁴ Although the United States offered financial assistance to help develop renewable resources on Native American land,

¹²⁹ See *Plate Tectonics Map – Plate Boundary Map*, *supra* note 46.

¹³⁰ 42 U.S.C.A. § 4332 (1970).

¹³¹ *See id.*

¹³² Barbara C. Farhar & Paul Dunlevy, *Native American Issues in Geothermal Energy*, U.S. DEPT. OF ENERGY, 1-2, <http://www1.eere.energy.gov/tribalenergy/guide/pdfs/grc030707.pdf> (last visited Jan. 21, 2015).

¹³³ *Id.* at 1.

¹³⁴ *Id.* at 2.

many Native Americans remain resistant to developing geothermal projects.¹³⁵ Tribal issues, like sacred burial grounds, spirituality, and natural beauty, are believed to be at risk under geothermal development.¹³⁶ Geothermal energy plants are not aesthetically pleasing; however, the clean energy produced should help counterbalance aesthetics. The thousands of Native Americans without electricity should have the choice to develop geothermal projects on their land. As mentioned earlier in this note, geothermal production does not take anything out of the ground, but rather uses the natural heat underground to conduct electricity.¹³⁷ The major benefits of geothermal energy will help more Native American nations see geothermal energy as a beneficial resource to utilize on their lands.

IV. CASE ANALYSIS: DIFFERENTIATING THE DEVELOPMENT OF FOSSIL FUELS AND MINERALS FROM GEOTHERMAL ENERGY PRODUCTION

The overwhelming number of steps and processes that must be followed in the statutes and regulations above are covered in endless red tape. Before even thinking about trying to develop a geothermal plant on Native American land or a protected park, one needs countless agency approvals, abundant research, environmental impact statements, fiduciary obligation reports, and various other formalities.¹³⁸ The National Environmental Policy Act and National Historic Preservation Act, which both need to be followed in geothermal development on protected land, have six steps to follow, not counting the amendments.¹³⁹ While these steps are here to protect the environment, they are rife with bureaucracy and excessive regulation. It is easy to see how difficult it may be for companies to follow each rule perfectly, and numerous lawsuits exist that illustrate this major problem. The government continues to include geothermal initiatives with nonrenewable resources, which needs to stop. This country needs to promote clean energy via geothermal energy, but to do this we have to change the process so that clean energy initiatives may go through government bureaucracy unscathed.

Pit River Tribe v. U.S. Forest Service illustrates the numerous steps that must be followed to develop geothermal plants on protected and/or Native

¹³⁵ See *id.*

¹³⁶ *Id.* at 3.

¹³⁷ See discussion *supra* Part II.B.

¹³⁸ See Farhar, *supra* note 132, at 6-7.

¹³⁹ 54 U.S.C. § 300101 (2014).

American land.¹⁴⁰ In this case, the U.S. District Court for the Eastern District of California and the Court of Appeals disagreed with one another over a lawsuit brought by the Pit River Tribe against the Bureau of Land Management, Department of the Interior, and the United States Forest Service.¹⁴¹ The tribe claimed that the steps “followed by the agencies in extending leases in the Medicine Lake Highlands, and the subsequent approval of a geothermal plant to be built there, 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).”¹⁴² The tribe also claimed that the federal land approved for the power plant had religious and cultural significance to the tribe.¹⁴³ The Circuit Court focused on the fact that the agencies in question did not file an Environmental Impact Statement (EIS) on behalf of Pit River.¹⁴⁴ This step had to be completed before extending the leases.¹⁴⁵ Because the agencies did not file the EIS before granting the development lease, the Circuit Court reversed the District Court’s decision and found for the Pit River Tribe. This note argues for improved communication on both sides, as well as for showing Native Americans the countless benefits of geothermal energy. While this note does not condone building on sacred land, compromises must be made to promote the public good of both Native Americans and this country. The U.S. needs to illustrate this in its statutes and regulations.

Amoco Production Co. v. Southern Ute Indian Tribe brought up an interesting question regarding an ambiguity in coal energy statutes.¹⁴⁶ The Coal Lands Acts of 1909 and 1910 stated that the Acts “reserved all rights to the coal contained in the subject properties to the United States.”¹⁴⁷ The Supreme Court, in a 7-1 decision, held that coalbed methane gas (CBM) is not the same thing as coal, as used in 1909 and 1910 Acts.¹⁴⁸ Thanks to major scientific advancements over the last century, the country has a better understanding of natural resources and the effect they have on the environment. Along with the clarifications found in energy statutes, geothermal resources must be separated from nonrenewable resources, like coal. A deeper understanding of the processes and development of geothermal energy shows that it is now a cleaner and healthier initiative.

¹⁴⁰ See *Pit River Tribe v. U.S. Forest Serv.*, 615 F.3d 1069 (9th Cir. 2010).

¹⁴¹ *Id.*

¹⁴² *Pit River Tribe v. U.S. Forest Serv.*, 469 F.3d 768, 772 (9th Cir. 2006).

¹⁴³ *Pit River*, 615 F.3d at 1073.

¹⁴⁴ *Pit River*, 469 F.3d at 788.

¹⁴⁵ *Pit River*, 615 F.3d at 1073.

¹⁴⁶ *Amoco Prod. Co. v. S. Ute Indian Tribe*, 526 U.S. 865 (1999).

¹⁴⁷ *Id.*

¹⁴⁸ *Id.* at 880.

Finally, *Yount v. Salazar* highlights the issues surrounding a mining ban around Grand Canyon National Park.¹⁴⁹ In *Yount*, an Arizona federal judge denied a bid from several mining groups to open more than one million acres surrounding the Grand Canyon to uranium mining.¹⁵⁰ The court decided that the U.S. Department of the Interior had adequately followed the necessary steps and consulted local governments before declaring the land surrounding the Grand Canyon off limits to the exploration of mining.¹⁵¹ The Department of the Interior said its decision was based not only on protecting water resources, but also on protecting air quality, wildlife, and sacred Native American land.¹⁵² As mentioned numerous times above, there needs to be a separation between renewable energy production laws and nonrenewable energy laws in regard to energy development in and around protected land. The federal government and companies that develop geothermal energy should be allowed to develop in these lands with no problems. Renewable energy, like solar, geothermal, and wind energy, does not harm the environment and does not destroy the land. The words “energy” and “production” have turned into loaded terms, bringing a negative connotation to anyone hearing these two words. U.S. laws need to both inform Native Americans of the benefits of clean energy, and realize that clean energy on protected lands is a necessity for this country.

V. RESOLVING ISSUES AND CONCLUSIONS: IT IS TIME TO SEE THE “BIG GEOTHERMAL PICTURE”

From learning how to develop geothermal resources to statutes and case law affecting production, this note prepares to illustrate the “Big Geothermal Picture.” The constant reiteration of a “need to allow geothermal development to break through unnecessary government red tape” finally reaches the top of a long hill thanks to Christopher Simon.¹⁵³ Simon simply asks the question, “Is Energy a Public Good?”¹⁵⁴ Simon

¹⁴⁹ *Yount v. Salazar*, 933 F.Supp.2d 1215 (D. Ariz. 2013).

¹⁵⁰ *See id.*

¹⁵¹ *Id.*

¹⁵² Felicia Fonseca, *Mining Ban Near Grand Canyon National Park Continues To Face Legal Challenge*, HUFFINGTON POST (Sept. 9, 2014), http://www.huffingtonpost.com/2014/09/09/mining-ban-grand-canyon_n_5792530.html; Juan Carlos Rodriguez, *Ban Upheld on Uranium Mining Near Grand Canyon*, LAW360 (Oct. 1, 2014, 4:41 PM), <http://www.law360.com/articles/582873/ban-upheld-on-uranium-mining-near-grand-canyon>.

¹⁵³ Christopher A. Simon, *Is Energy a Public Good?*, RENEWABLEENERGYWORLD.COM (July 2, 2007), <http://www.renewableenergyworld.com/rea/news/article/2007/07/is-energy-a-public-good-49201>.

¹⁵⁴ *Id.*

states that “pure public goods are neither rivalrous nor excludable—regardless of price, public goods cannot be denied because of their importance to individuals’ very existence in society and basic human rights.”¹⁵⁵ Simon says that potable water and clean air are examples of public goods.¹⁵⁶ If this is true, then a clean environment is also a public good. Right now, the only energy sources that lead to clean water and air are renewable resources, like geothermal energy. Therefore, geothermal energy can lead to the public good: a clean and healthy environment, perpetuating the existence of basic human rights, like clean water and air.

As Simon mentions, public goods cannot be denied from the public, not even by statutes or case law.¹⁵⁷ If geothermal development leads this country to the public good, then the red tape hiding protected federal land and Native American lands should arguably be cut away. Right now, global warming is causing continued destruction to an already severely damaged world.¹⁵⁸ Geothermal energy may be the answer to help heal and clean an almost broken Earth. The United States has a domestic and international obligation to help clean the environment, and to promote and cultivate the public good of a clean environment.

The fight to clean the environment, for the good of all people, is not a new idea. The Geysers Geothermal Field in California is one of the greatest success stories for geothermal and clean energy initiatives.¹⁵⁹ The Geysers provide 25% of all of California’s renewable electrical energy and has been in operation for over 47 years.¹⁶⁰ The Geysers hotspot and other California geysers are very large and produce a lot of heat. Generating geothermal energy around geysers can be complicated because the underground streams and water pressure changes dramatically if the plant decides to use the geysers’ water supply.¹⁶¹ To increase productivity, California began to tap into the geysers’ water and stream supply, which affected the underground pressure and heat. Tapping into the geysers’ water supply began to deplete water underground; however, California found a solution.¹⁶² At this time, the communities of Lake County, City of Santa Rosa, and other municipalities were trying to find solutions for their

¹⁵⁵ *Id.*

¹⁵⁶ *Id.*

¹⁵⁷ *See id.*

¹⁵⁸ *See* Anderegg, *supra* note 1.

¹⁵⁹ M. Ali Khan, *The Geysers Geothermal Field, An Injection Success Story*, DIV. OF OIL, GAS, AND GEOTHERMAL RESOURCES (2007), <http://web.archive.org/web/20110726135113/http://www.gwpc.org/meetings/forum/2007/proceedings/Papers/Khan,%20Ali%20Paper.pdf>.

¹⁶⁰ *Id.*

¹⁶¹ *See id.*

¹⁶² *See id.*

treated sewage waters.¹⁶³ In order to reuse the treated sewage waters in a renewable capacity, the communities decided to pump the treated sewage water into the underground reservoir, bringing the underground pressure and heat back to its former levels.¹⁶⁴ Pumping water back into the ground resulted in about 155 MW of additional electricity, extending the life of the field and providing a better way for disposing the local wastewater.¹⁶⁵ The United States should follow the innovative spirit of California and promote similar initiatives and solutions in all geothermal hotspots in the country. Using renewable energy causes people to think with the environment in mind. Clean energy with clean solutions. The United States needs to amend the existing acts and statutes listed in this note to allow geothermal energy. Acts, like the National Environmental Policy Act, need to contain a provision or an entire section on renewable energy. Geothermal resources are the future, and this country has plenty of heat underground.

CONCLUSION

In conclusion, this note argues that the United States would do well to follow Indonesia's lead and promote geothermal development on all land, federally protected or not. Indonesia considers a clean environment a public good, and it changed its laws to help benefit the environment and its people. The United States should follow Indonesia's progress and change its laws to match Indonesia's laws. To do so, the United States should allow geothermal development in nationally protected land. This note does not suggest that the government should lead a hostile takeover of National Parks and Native American lands. This note simply argues that the red tape and endless procedures required for mining and development in protected parks and Native American lands should only be for nonrenewable resources that have a negative effect on the environment and public good. To advance the public good, there must not be anything standing in the way of a clean environment with clean air and water. Therefore, laws should not block geothermal development on Native American land or national parks. Geothermal plants, and all other clean energy projects, attempt to fix the global warming problem. If global warming continues, a lot more environments will be destroyed, including Native American land and national parks. To achieve this red tape-free goal, the United States needs strong communication between government agencies and the Native American nations. They must to come together to

¹⁶³ *Id.*

¹⁶⁴ *Id.*

¹⁶⁵ *Id.*

help promote the public good, a clean environment, and a world free from the clutches of global warming. The United States needs to see the red tape preventing geothermal energy development as an opportunity for a Ribbon-Cutting ceremony. It takes one large snip to open up the land. A red-tape free clean initiative in the United States will be the “Doctors Without Borders” the Earth so desperately needs.