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# RATIONAL CHOICE THEORY IN THE STUDY OF DEEPWATER HORIZON OIL SPILL

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**Abstract.** The Deepwater Horizon oil spill was the worst environmental disaster in US history. The oil spill reflects the dependence of the United States on the exploitation of fossil fuels. President Barack Obama seeks to bring about significant changes in US energy policy by promoting and expanding clean energy. However, the new policy faced resistance from Congress and the oil companies. This study aims to determine the impact of the Deepwater Horizon Oil Spill on US energy policy using rational choice theory. To achieve the expansion of rational choice theory in the Deepwater Horizon oil spill study, the researcher used qualitative methodology and case study method. The result of this study is that the Deepwater Horizon oil spill became a stepping stone for the transformation of US energy policy. The findings of this study are the linearity of clean energy development and US political commitment in developing the clean energy industry.

**Keywords:** deepwater horizon; barrack obama; rational choice theory; clean energy.

## INTRODUCTION

The 2010 deepwater Horizon oil rig tragedy was the largest oil spill in the ocean in history. The tragedy resulted from an oil rig explosion, which caused the oil spill over the sea. It was called the Deepwater Horizon oil spill or the Mexican Gulf oil spill. Deepwater Horizon is an oil rig owned and operated by an offshore drilling company and was rented by a British Petroleum (BP) oil company. The oil rig is located in the prospect of Macondo oil in Mississippi Gorge, clay in the continental shelf. The oil well is located on a 4,993-foot sea bed (1,522 meters) subsurface and was extended by 18,000 feet (5,486 meters) (Ismail et al., 2014); (Skogdalen, Utne, & Vinnem, 2011). As a result of the tragedy, 11 of its workers were declared dead, and 17 others were injured.

Deepwater Horizon oil spill have had a significant impact in several commercial fishing sectors, tourist industries, wildlife, natural environment, and other economic activities in areas around the Gulf of Mexico. The Gulf of Mexico is the most productive fishing ground in the United States. About 40% of the bay waters were closed after the incident. It is caused losses for anglers in the Gulf waters surrounding the Gulf. An estimated \$4.36 billion in losses was incurred by the country's fisheries industry around the Gulf of Mexico. Deepwater Horizon's oil spills caused a disturbance to Gulf tourists for a minimum of 15 months with a loss of revenue of \$7.6 billion to a maximum of 36 months with a loss of revenue of \$22.7 billion (Smith, Smith, & Ashcroft,

2011); (Huang, Keisler, & Linkov, 2011);

(Alhashimi & Aktas, 2017).

The US Department of Justice [DOJ] sued BP in the New Orleans civilian court in December 2010 for violating the Clean Water Act and Oil Pollution Act. CWA and OPA are the leading federal legislation in the United States regulating water pollution and oil spills. In March 2012, BP agreed to resolve claims made by the claimant, acting responsibility for victims of an oil spill incident of \$7.8 billion. In November 2012, BP reached an agreement with the DOJ to be convicted of 14 criminal charges, including 11 counts of premeditated murder and Clean Water and Migratory Bird (Britannica 2010). The agreement fines more than \$4.5 billion in penalties, in which nearly \$1.26 billion will be used for the DOJ-supervised discredit funds. In addition, BP also agreed to pay more than \$1.5 billion to the Securities and Exchange Commission as a responsibility to the shareholders resulted in an oil spill (Beyer, Trannum, Bakke, Hodson, & Collier, 2016); (Barron, 2012).

The relevant international law to evaluate the impact of the Deepwater Horizon disaster is the United Nations Convention on the Law of the Sea (UNCLOS). UNCLOS directly regulates international rules about fixed and offshore drilling platforms such as the Deepwater Horizon, but the country has to issue domestic legislation monitoring pollution from the permanent bridge. UNCLOS also does not have definite procedures for application-holding, guaranteeing compensation, and enforcing the adoption of international rules. It happens if spilled or blasts caused by a country could affect another country (Hajdini, 2014).

The United States concluded the Deepwater Horizon oil spill based on its national law and does not use UNCLOS international law as its prejudice. The decision was made by the United States indeed based on rational reasons. According to the rational choice theory, there are two basic assumptions about the government's policy on certain issues namely the actor and the resources. Actors in this research are countries with goals and interests that then act maximally to achieve those goals and interests. Meanwhile, resources are something controlled himself, and it depends on the ability of the actor to do considerable consideration by the actors ([Arjawa](#), 2014).

Prior studies are looking into how UNCLOS regulates oil spills, such as the Deepwater Horizon incident of an oil rig. The research is "The Impact of the Deepwater Horizon: The Evolving International Legal Regime for Offshore Accidental Pollution Prevention, Preparedness, and Response," written by Sergei Vinogradov. Under his panel, Vinogradov said the UNCLOS does not provide detailed rules about pollution accidents caused by offshore activities. However, UNCLOS provides several guiding principles and emphasizes the most important issues that the parties concerned have to deal with. He concluded that despite the general rules of UNCLOS, there is no binding global instrument that defines a minimum standard and procedure for offshore safety, including construction, equipment, and operations of offshore drilling units ([Gunter, Hill, O'Connor, Retzer, & Lincoln](#), 2013).

Another study, called "Offshore Oil and

Gas Exploitation," written by Henning Jessen, also had similar opinions. He said that Article 208, 214 of UNCLOS maintains that every country seeks to align their policies about the likelihood of pollution by the seabed activity under national jurisdiction at the international level. However, the resulting legal situation can be said to be confusing in various coordination and discussion forums. No forum received universally or even organizations on the regulation on oil and gas activities offshore ([Mäkitie, Normann, Thune, & Gonzalez](#), 2019); ([Mendes, Hall, Matos, & Silvestre](#), 2014).

President Obama was elected in 2008 and confronted with the Deepwater environmental crisis. President Obama visited affected areas and met with affected communities to get accurate data on the damage inflicted by the Deepwater oil rig and expressed Obama's anger over BP Oil. President Obama's outrage was seen in various statements and behaviors that had requested the BP Oil be fully responsible for the impact of the Deepwater disaster. Obama's role in Deepwater's handling raises a question on power centralization in disaster mitigation in environmental politics of the United States.

In handling disasters and natural resource management, the United States government also has a role in budget allocations, establishing environmental standards, and regional spatial. The environmental politics of the United States are determined jointly by the President, Congress, and the Federal Government ([Aklin & Urpelainen](#), 2014). Still, in some cases like the Clean Power Plan and ratification of the Paris Agreement, there

are conflicts between the federal government and the president of the United States. President Obama was ambitious in implementing New Green Deal by establishing a higher environmental standard than the US president had previously and boosting renewable energy-based industries (Konisky & Woods, 2016).

President Obama is a Democratic Party politician who became a senator from Ohio, the State of Illinois. Through his book *Audacity of Hope*, President Obama shares his incredible struggle for a career in the political world. Obama stunned the popularity of minority and young people, recalling his identity as a black US citizen and was born out of an African father. President Obama also was able to be a professional speaker who lured the attention of various circles. Obama campaigned for higher taxes for wealthy families, universal health insurance, improved education, and renewable energy development. Obama and Democrat Party members were often named the United States socialist party by a Republican member.

After President Obama took office for eight years (2008-16), President Trump replaced Obama in 2016. Clinton, a Democrat, is not the president of the Democratic Party, could not defeat President Trump. As a result, various Obama policies were abolished, including under-sea mine supervision policy (The Washington Post 2020). Mr. Trump fully supports the exploration and exploitation of oil in the United States, included in the deep-sea area in the Gulf of Mexico. The difference in oil mining management

policies between Obama and Trump reflected the difference in the political environment of the United States. Obama emphasized government regulations, surveillance, and oversight, while Trump believes in private initiatives to manage haul resources.

Through this research on Deepwater Horizon's handling, the regulation-based Obama strategy is becoming more evident. The deep water environmental disaster is a disaster for BP and a political disaster for the Republican Party, which has been reliant on corporate freedom in its business activities. Obama did not use the International Court of Justice because it did not significantly influence the Obama political strategy and the Democrat Party. Through Obama's various policies, Democratic Party's aggression in organizing corporations, especially the oil industry, became apparent.

#### LITERATURE REVIEW

To understand the role of governments in environmental disasters, the authors reviewed four highlighting the role of political leaders in changing the landscape of the environmental politics. The first article highlights the conflict between the European governments and Indonesia. Kurniaty (2020) argued that Presiden of the Republic of Indonesia played unique role in fighting the EU's restriction on the Indonesia palm oil. By establishing the concept of Indonesia sustainable palm oil, President Joko Widodo argued that the EU's restriction is an act of discrimination.

In Japan, Ministry of Trade and Industry and Keidanren dominated the decision-making process of environmental policies.

Pajon (2010) showed the stark comparison between the Liberal Democratic Party (LDP) and the Democratic Party of Japan (DPJ) government on climate changes issues. LDP consistently emphasized the traditional approach in pursuing climate change mitigation meanwhile DPJ government showed its ambition to cut national emissions significantly.

Obama's policy on energy supply shows a contradiction. In one hand, Obama wanted to increase the production of clean energy but in other hand, Obama provided bigger opportunities for fossil fuels expansion. Lin (2014) argued that the Obama's "All-of-the-Above" energy approach didn't provide clear transition to clean energy and didn't engage with the public adequately. Climate change priority is not clearly reflected in the Obama's policy.

There is a different interpretation of Obama's energy policy. According to Nyman (2018), Obama has pushed the Congress to end tax breaks and subsidies for oil companies. Not only that, Obama has linked energy security and climate change. By keeping the oil consumption high, the greater security of the United States is at stake. Nyman highlighted the significant change between Obama and his predecessors and successors.

To understand Obama's policy, the researchers used Rational Choice Theory. According to James Coleman, the Rational Choice Theory holds two basic assumptions for actors and resources. Coleman explained that actors were seen as rational actors who had the purposes and interests to be attained. Actors are doing their best to reach their goals and their interests

(Arjawa 2014). According to Diekmann in Gross and Heinrichs, actors can choose between at least two alternatives. In addition, the theory contains a rule of decree stating which actions (Liebe dan Preisendörfer 2010) were selected.

The second basic assumption is the resource. Coleman said resources were something the actor could control. Control of resources is highly dependent on the actor's ability, based on considerable considerations. In this case, the government is the absolute decision-making actor (Arjawa 2014).

Concerning this research, a rational actor playing the Deepwater Horizon case study is the United States Government led by Barack Obama. The United States government is sensible in response to the Deepwater Horizon oil rig accident. This rational attitude was indicated by using valid national law in the United States, such as the Clean Water Act and Oil Pollution Act, to impair British Petroleum. The United States also did not ratify the 1982 United Nations Convention on Law Sea [UNCLOS] but only established it as a law of habit. Consideration - the United States' consideration to settle the Deepwater Horizon incident by attaining the national interest of the United States. The United States has full power to control the sea resources established in the Gulf of Mexico and the surrounding states. Also, if their problems or conflicts in the Gulf of Mexico, the United States is entitled to act as a nation with national law enforcement in its country. Violations of the worker's safety regulations, the rules of exploitation of sea mines, and compensation by British Petroleum have been charged by a high

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court in the United States. This sentence also has to look at the national interest of the United States as it recovers the coastal area and around the Gulf of Mexico.

According to Graciela Kincaid and Rober Timmon (2013) President Obama conducts transformative leadership within the second term of his government and the global leadership within the first period of her government. It was apparent from the funding of climate change issues coming out of the two governments. In the first period of Obama, Kincaid and Roberts produced a label "talk the talk" and, over the second period, Kincaid and Roberts, labeled "walk the walk."

The president is a leader who is capable of transforming into the management of natural resources. In environmental politics, a president can carry out transformative leadership or transactional leadership. Transformative leadership generates awareness of joint responsibility and urgency of cooperation in creating a conservation culture and environmental protection. The transactional leadership focused on protecting the status quo and did not implement ambitious commitments that had already been agreed upon about joint responsibility.

President Obama is trying to direct the United States was moving from fossil energy use to renewable energy. This transformation can be explained by using a derivative of the RCT, which is called game theory. The game theory demonstrates the four choices that a specific person or institution can choose from in dealing with a problem or phenomenon. These four choices range from choices that benefit all parties to choices that hurt all parties. Liebe

and Preisferendor (2010) gave an example of games theory.

The game theory can explain the Obama policy that pushed the transformation of the U.S. energy use from fossil energy to clean energy. In a question on the media, executive director of Sierra Club Michael Brune said, "This disaster changes everything. We have hit rock-bottom in our fossil fuel addiction. This should be a wake-up call" (Merry 2014). This assertion is a manifestation of the worst situation in games theory. Obama delivered his vision that clean energy was the best situation in the United States would have an incredible investment shot and increase the number of jobs in the clean energy industry. Obama believed that oil mining would reach a saturation point, and the United States had to focus on developing clean energy.

Obama provided a successful example of China's successful transformation in clean energy use. China is the most advanced country in the use of clean energy. Through the Paris Agreement, the United States cooperates with developed countries and develops clean energy technology. Obama had the vision of making the United States a frontline country in the utilization of clean energy. This transformation certainly caused a rivalry with the fossil energy industry, which has a significant influence on the domestic politics of the United States. The dewater horizon disaster became momentum for Obama in transforming the political environment of the United States by focusing on developing clean energy.

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## METHODS

The researchers used qualitative methodology and case-study research method to understand the implementation of rational choice theory in the case of Deepwater Horizon oil spill. The problem of Deepwater Horizon oil spill has impacted various dimensions including theoretical development. The focus of this research is to understand the development of rational choice theory.

There are various data to be used in this research. Firstly, the researchers used President Obama's speech regarding clean energy and Deepwater Horizon oil spill. The researchers also used public reports regarding the impact of Deepwater Horizon oil spill. The researchers also joined a couple of webinars including the webinar held on August 18, 2020, regarding marine pollution by ships loaded with crude oil in Mauritania. In this webinar, Donald Boesch from the University of Maryland presented his views on BP's handling of Gulf of Mexico pollution. The last component of data is the academic journals and books to understand the complexity of Rational Choice Theory.

## RESULTS AND DISCUSSION

After an oil spill incident in Mexico, Obama responded by forming the Initial Comprehensive Plan. The bill imposes a one-year schedule to develop a comprehensive plan to illustrate how the Board will restore the Gulf Coast's ecosystem and economy. The purpose of the Initial Comprehensive Plan, among others, is to recover and preserve habitat,

restore water quality, restore and protect the lives of coastal and sea resources, improve community resilience, and revitalize the Bay area economy (Varughese & Shin, 2010).

Obama's desire to convert to clean energy use of fossil energy has strengthened after the explosion of an oil rig in the Gulf of Mexico. He wanted to be made by Obama through his June 15, 2010 speech. He said the United States would switch to clean energy use when a recession was successfully handled in his remarks. He said by turning to the use of clean energy, US would potentially grow his country's economy and create jobs for the middle class (Kessler, Mahoney, Randolph-Seng, Martinko, & Spector, 2019).

President Barack Obama's desire to push for real-life energy use was in his office as President of the United States in 2009. President Obama and Congress are working together to combat a severe economic recession by bringing out a full-scale stimulus plan (Johnston & Goggin, 2015); (Hashemi Shahraki, 2020). This is shown by the signing of The American Recovery and Reinvestment Act of 2009. The signing of the ARRA occurred to improve the significant recession occurring in 2008. Seven components focus on discussion inside the ARRA, namely financial assistance for family, infrastructure, alternative energy sources, health care, education, small business, and scientific research and development (Somwanshi et al., 2016)

ARRA not only saved the U.S. from recession, but it also helped drive the clean energy revolution from technological innovation and market power. With the



signing of the ARRA, private entrepreneurs have also obtained capital to bring competitive new technologies to the market and help reduce carbon emissions and promote sustained economic growth. Critically, the main reason for extending public money in the energy sector is to boost investment change. The business has had a lot of incentive to invest in energy, and its challenge is to make them invest in a socially likable area, such as low carbon energy.

ARRA upgrades the country's capacity to domestically produce wind turbines, electric vehicles, batteries, and other clean energy components. The ARRA has authorized its 30% tax credit for investment in more than 180 advanced energy manufacturing projects and provided \$2.3 billion for renewable energy plants, energy storage, progressive transmission, energy conservation, renewable fuel refinement or mixing plug-in vehicles, and carbon and storage capture. In addition, the funding helped in supporting dramatic increases in the wind turbine components produced in the U.S. from 25% in 2006-2007 to 72% in 2012.

Before President Obama took office, there was no single photovoltaic solar power plant (P.V.) on a utility scale in the United States more prominent than 100 megawatts. The utility-scale generates enough electricity to power an average of 100,000 American homes.

Starting in 2009, when funding was unavailable, the U.S. Department of Energy Loan Office spent more than \$4.6 billion on loan guarantees from ARRA funding to help build five of the first utility-scale P.V. solar facilities in the United States. Over the next

five years, the loan guarantees help reform the production of U.S. energy and pave the way for the fastest-growing solar industry. In 2016, 28 utility-scale P.V. power plants across the United States were privately funded, producing more than 6,870 MW.

In 2015 Obama announced The Clean Power Plan, which aims to reduce carbon pollution from U.S. power plants. Power plants that were still used are considered the most significant pollution contributor in the U.S. The U.S. The Environmental Protection Agency (EPA) then issued Clear Power Plan finals under the Clean Air Act that a U.S. fundamental air pollution law. The EPA adopted Clean Power Plan under Clean Air Act which, according to the Supreme Court's decision in 2011, gives the legal authority to control carbon pollution. According to the independent Solar Foundation, global solar jobs double in the last five years (Hirtenstein 2016).

The oil spill in the Gulf of Mexico at the Deepwater Horizon incident affected various aspects and subjects. Whether it's from the environmental part — especially to the animals and the water habitat there and the economy-directly impact the U.S. government, even to people located on the shores of the Gulf of Mexico. The immediate effect is the environmental impact. Further, a large amount of oil polluting the sea and its coastal beaches has made a significant change that will eventually affect the economic growth of many countries on the northern shores of the Gulf of Mexico.

Previously, the Gulf of Mexico was the ninth-largest body of water globally and the region rich with its marine biodiversity. Chen (2017, 869) said various demersal fish,

server, sharks, and coral reefs in the Gulf are large. Geographically, the seat of the Gulf is a strategic place because it's a migratory route for various fish. The marine ecosystem food chain wheel continues to turn here and add to the dynamics in the Gulf of Mexico. About 4.6% of flaps in the Gulf of Mexico are endemic fish there (Ibid., 1004). In addition to its biodiversity wealth, the Gulf is home to a vast water body by extensively receiving river drainage from five countries, namely Canada, Cuba, Guatemala, Mexico, and the United States—including two-thirds of the United States. The water stream being delivered is from more than 150 rivers. Including 20 is the primary river system, like the Mississippi River. And so, the function of the Gulf of Mexico is a productive fishery, storm protection, flood risk reduction, carbon absorption, water quality improvement from its wet lands, and the places of the sea habitat. For the U.S. people themselves, the Gulf is the economic wheel of their economy because it is a livelihood for 20 million people and gives its annual revenue of \$234 billion.

These make the Gulf a significant role because it has a diverse wealth of biodiversity, both fauna and flora at sea, and land on the shores of the Gulf of Mexico. It is one of the world's world's most productive maritime, maritime ecosystems. However, since the leaks have occurred in the Gulf of Deepwater Horizon, many changes have occurred. They have impacted several U.S. states (such as Florida, Alabama, Louisiana, Mississippi, and Texas) that have been on the shores:

First, the change in the quality of the environment in the United States — mainly

the coastal of the Gulf of Mexico that is seen in the quality of life of the animals and habitat of those waters, the attitude of communities down the coast of the Gulf of Mexico and the general public of the United States and health. Pollution is an immediate effect, which has been geographically eroding, the quality of water in both the surface and the terrain, the quality of air is tainted. The emission generated from an explosion in an oil rig is air pollution in the atmosphere. The leakage and burning of oil from the above scale caused an estimated 0.63 to 2.07 million kilograms of black carbon to be evacuated to the atmosphere. Lots of Hydrocarbons (H.C.) evaporates from oil that surfaces. H.C. is polluting the air quality because it consists of compounds measured in it are dangerous pollutants and can poison ocean habitat and atmosphere. This erosion, which is one of the impacts of the leakage, is caused by a lack of oil deposits in wet areas off the coast. So this has made it easy for the high tide, and it's also hard to produce oxygen. Biological, The impact of this pollution causes many animal habitats to be polluted and died. The National Wildlife Federation report of the United States (2015, 3) reported in 2010 that 27,000-65,000 Kemp sea turtles died, and their number is declining every year. About 12% of the Brown Pelican Birds and 32% of the seals in the North Bay of Mexico are considered dead. Then, the mortality rate of dolphins and whales in Louisiana increased four times larger than its standard rate.

Because of changing the quality of the environment, human health—the workers who serve clean oil at sea—were also

affected by the events. The long-term effects of exposure to oil leaks for workers are symptoms of long-term illness in lung and heart functions. D'Andrea and Reddy (2018, 7) researched workers who worked directly to clear oil in the sea. Research results showed a majority of workers having chronic details and respiratory channel dysfunctionality, even heart disease. Apart from health-affected workers, children were affected by the health of the oil leaks.

The change in the quality of the environment is a change in people's attitude in response to the pollution of the domain. In a study carried out by Bergstrand and Mayer (2017, 4), 45% of the people have changed behavior to help reduce pollution there. Of that percentage, 16% reduced driving vehicles, 30% reduced their total amount of energy and fuel in their homes, and another 30% saved their water.

Second, the change in U.S. income<sup>5</sup>—both locally and federal income. The Gulf of Mexico has been one of the most productive places in the United States, serve a lot of ocean wealth that has become the American economy. It was estimated that tourist losses incurred in 2013 were about \$22.7 billion. Biological wealth in the Gulf of Mexico, a source of local livelihoods, had to stop and lose because of oil leaks. The fisheries industry has suffered a loss of about \$247 million (Ibid). The failure to the fisheries industry sector from 2011 to 2013 ranged from \$285 to \$428 million in full time the workers were working (Bureau of Ocean Energy Management 2016, 157).

Any condition change described above, one of Obama's existing visions as

President is an effective use of clean energy in the United States to reduce the likelihood of damage such as the Deepwater Horizon in the Gulf of Mexico. Any carbon emission resulting from fires and oil leaks on these events gives a distinct blow to the public and government<sup>4</sup> of the United States of America. Reflecting on the Deepwater Horizon oil leaks in the Gulf of Mexico, using clean energy could reduce air pollution caused by excess carbon evaluation, improve the quality of public health, and minimize the impact of climate change. So in his speech, Obama had the ambition to change the dependency of the United States from fossil energy to equally clean energy by 69% in 2035 (Gimon 2020). (Gimon 2020) Through the ARRA, some of the achievements Obama had made through clean energy were stabilizing the economy, preserving and recovering work, and assisting suffered (Executive Office of the President of the United States 2016, 7) industry. Additionally, Obama's ambition to drive the United States to use clean energy is to achieve energy independence and unreliance on other countries in energy sources, which the United States of fossil energy has relied on Middle Eastern countries.

Deepwater Horizon contributed so much to the environment as the total loss was estimated at US\$36.9 billion. The Deepwater Horizon incident's environmental impact also had<sup>9</sup> an economic impact on states around the Gulf of Mexico. About 40% of the Gulf waters were closed due to the 2017 Deepwater Horizon (Simon and Hayes 2017) spill. This impacted the economy of the United States

at the time; based on World Bank data, 2010 GDP of the United States was 2.6%, the year after the Deepwater Horizon GDP incident in the United States declined to 1.6% (World Bank 2021). In addition, the U.S. Travel Association predicts that the economic impact of this incident would exceed 2.3 billion on tour pari sector and would last three years later.

Obama, in his speech, delivered that the Deepwater Horizon oil spill was hit by an economic disaster and environmental degradation, which caused the loss of wet and habitat land. The Deepwater Horizon incident has been one of Obama's primary momentum in visioning his vision of clean energy use, Clean Energy Savings for All Americans to an American environment. Obama designated the American Recovery and Reinvestment Act as one of the efforts to promote clean energy. ARRA has created the application of low-carbon technology and utilized about \$150 billion for clean energy investment.

Quoting Obama's speech on the Deepwater Horizon incident, he said half a year of his tenure focused on the clean energy industry. The United States is beginning to experience a significant transition. The use of clean energy and energy efficiency conserves consumers' money, improves the energy sector's performance, and creates new job opportunities. Defunct factories opened to produce wind turbines and energy-efficient windows and solar panels.

The use of alternative energy has been a wrong attempt by Obama in running Clean Energy Savings for All Americans. This has been shown by the increasing use of wind and solar power since Obama took

office. Together with Congress, Obama provides tax loans for investment and production of renewable energy, Investment Tax Credit (ITC) for solar, and a production Tax Credit (PTC) for wind and other alternative energy. It reduces the cost of electricity used for new wind and solar power generation projects. The Obama government also promoted the research and development of clean energy technology. The U.S. Department of Energy expenditures from the 2008 budget year to about US\$1.24 billion in 2016 were specified for energy efficiency. Of the total costs above, there was a 57% increase or about 337 million by 2016 used for solar and wind efficiency. By 2008 only about 215 million was used for the efficiency of solar and wind.

The graph below shows a significant increase in the amount of electricity generated by the wind compared to the water power (Simon dan Hayes 2017). That's a four-fold increase from 2008 to 2016 at wind power stations—the United States as a whole, from 55.4 million megawatt-hours to 226.9 million megawatt-hours. The growth puts wind power plants as the resources used after water power stations.

In addition to the use of wind energy, the Obama administration also focuses on solar energy. Solar power in the United States increased more than 40 times by 2008 to 2016 from 864,000 megawatt-hours to 36,754,000 megawatt-hours. That's comparable to the pre-Obama administration, not solar plants more prominent than 110 megawatts are in operation.

Obama also focused on reducing



carbon emissions, which is one of the biggest problems in the neighborhood of the United States. Electricity use from 2008 to 2016 has had a significant effect on the production of carbon dioxide emissions. The source of the carbon emission from power plants contributes about 35% of U.S. carbon emissions. With wind and solar power usage over the past eight years, the carbon emissions produced by the power plant in 2008 were about 2.373 million metric tons, down 23% to 1.821 million metrics by 2016. The Obama government earned \$4 billion in commitment and private action in using technology to reduce carbon emissions.

Enhancing clean energy and energy efficiency saves consumers money, improves the energy sector's environmental performance, and creates new job opportunities. The upgrade was estimated at 2.2 million jobs in the first quarter of 2016 and then increased to 7% in 2017. In the first quarter of 2016, of the 6.5 million construction workers of the United States, some 21% are working to construct or install energy-efficient technologies. Solar power contributed to the second largest category of clean energy jobs, with a 24.5% increase between 2015 and 2016. Wind power stations contributed slightly more than 77,000 workers in 2015 and rose in 2016 to 102,000 workers. The boosting job opportunities in the wind and solar sector became evidence of the effectiveness of clean energy in the industrial sector. The Obama administration also launched Solar Ready Vets, an initiative to serve its transitional veterans to enter the solar-based workforce.

With the Deepwater Horizon incident, Obama noted the seriousness to which such an incident has occurred, which could impact the environment and the economy of the United States. With his aggressiveness, Obama made a clean energy response to facing environmental problems in the United States. Over the two periods of Obama's tenure, the United States succeeded in making use of existing opportunities and innovations with public desire to reduce carbon emissions and improve renewable energy efficiency and its technology. Skeptical which is emerging concerning clean energy changing when Obama with clean energy projects changes the skepticism into a crucial phase, which then becomes the fundamental element of the energy system in the United States.

## CONCLUSIONS

Deepwater Horizon oil spill is the worst environmental disaster in the United States' history. The disaster attracted a worldwide attention due to the scale of the impact and the involvement of global oil corporation, the BP Oil Corporation.

The problem of Deepwater Horizon oil spill reflected the dependency of the US on the oil mining. The US is still the biggest oil miner in the world. However, the Obama administration attempted to bring new changes in the US' environmental policy. Clean energy is the main priority for Obama and the Democrat Party. To understand the impact of Obama's policy on clean energy expansion, the researchers analyzed the President's speech, official reports, and experts' opinion.

Based on the analysis of Obama's policy

and responses toward the Deepwater Horizon oil spill, the researchers concluded that the Deepwater Horizon oil spill became the stepping stone for the transformation of the US' energy policy. The American Recovery and Reinvestment Act of 2009 became more effective after the public responses toward the oil spill.

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