The US sustainable energy policy during Obama Administration

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Abstract. In recent years, global issues such as energy and global climate change have played an increasingly prominent role in international affairs. The Obama administration of the United States has launched a sustainable energy policy, which highlights "green", promotes the transformation of the energy industry, develops new and renewable energy, and improves the efficiency of energy use to lead a new wave of energy technology development. The "shale gas revolution" in the United States has achieved great success, freeing the United States from the current economic difficulties, alleviating the employment problem of the United States, injecting vitality into its economic recovery, and having a greater impact on the international economic landscape.

1. Introduction

In recent years, global issues such as energy and global climate change have played an increasingly prominent role in international affairs. The green and sustainable development of energy policies in various countries has had a significant impact on the formation and development of the new world order. The prerequisite for future changes in the international order is the world's energy structure. The leading countries of the international system are competing for the innovative advantages of new energy and low-carbon economy[1], in order to obtain a more favourable space for economic development, which in turn affects the transfer of world power. Developed countries in Europe and the United States use their technology and their dominant position in the international order to seize the energy market and greenhouse gas emission quotas through energy and climate change negotiations, and to achieve control of low-carbon economies. Therefore, the issue of green sustainable development energy policy has become the focus of politics and economy in various countries.

2. The Obama Administration's Green and Sustainable Energy Policy

Since coming to power, US President Barack Obama has launched a new energy policy while responding to the international financial tsunami. The policy highlights "green", promotes the transformation of the energy industry, develops new and renewable energy, and improves the efficiency of energy use to lead the new wave of energy technology development. The extension of Obama's Green New Deal from the IT revolution to the energy revolution has also driven the development of industries such as automobiles, construction, new materials, and communications. This is an energy-led global revolution in new technologies and new industries. Its main breakthrough is to vigorously develop wind energy, solar energy, geothermal heat, and tides. Energy is the "blood" of modern industry and one of the main material foundations that promote social and economic development. The energy industry has a large economy, high stock value, strong internal demand, strong pull on GDP, and close integration with finance, trade, transportation, and new technologies [2].
It plays an important role in promoting production development and increasing employment. Energy and climate change issues are closely related. Because carbon emissions are generated during the use of energy, and carbon emissions cause climate change issues; therefore, the essence of climate change is energy issues.

The United States is a world leader in new energy technologies such as nuclear power technology, solar energy, bioenergy, and liquefied natural gas. Obama’s new energy policy is supported by its strong technical strength, and its strategic intent is to use this to lead the new energy technology system in the new century. Obama's new energy policy is based on its advanced energy technology systems: nuclear power, solar energy, bio-energy and other new energy technology systems, liquefied natural gas technology systems and carbon dioxide underground storage technology systems. The industrialization of these technology systems is closely related to the reduction of carbon dioxide emissions.

Obama signed the American Recovery and Reinvestment Act on February 17, 2009, which reinvigorates the U.S. economy by investing $787 billion, focusing on the development of new energy and job security. This act vigorously develops new energy sources, including the development of high-efficiency batteries, smart grids, carbon storage and carbon capture, and renewable energy sources such as wind and solar energy. The most important aspect of energy saving is automobile energy saving [3]. On February 26, 2009, Obama announced the 2010 Annual Budget of the United States, proposing three measures for the US version of the climate strategy. First, set an upper limit on the total amount of greenhouse gas emissions in the United States, introduce a market trading mechanism, and use "individual emission reduction quotas" for emission sources (enterprises) exceeding a certain scale, and promote market compliance through market transactions. Regarding the distribution of total emission quotas, the Obama administration decided to use “quota auctions” to raise financial resources, reward good behavior and punish laziness, and promote the development and use of low-carbon technologies. Second, clarify emission reduction targets. By 2020, to reduce US greenhouse gas emissions by 14% of 2005 levels (equivalent to reducing carbon emissions to the 1990 levels by 2020) and reduce carbon emissions below 83% of the 2005 levels by 2050 (equivalent to 69% of the 1990 level of reducing carbon emissions by 2050). Third, the US version of the base year is set, emphasizing the year of 2005 as the base year instead of the EU-based year of 1990.

In March 2011, President Obama promulgated the Blueprint for a Clean and Secure Energy Future, outlining the US energy strategy: (1) Expanding domestic safe energy supply: increasing capital investment, innovation and development, and technology research and development to develop more domestic resource, developing the US energy to the forefront of the national energy economy; (2) Providing consumers with options to reduce costs and save energy. Unstable energy prices give consumers a clear signal that energy innovation is necessary. People will become more and more able to purchase vehicles with higher energy efficiency or use public transportation more conveniently. Through these methods to achieve the purpose of saving money and protecting the environment, support for such measures can reduce dependence on fossil energy and help create job opportunities. (3) Pioneering the future of clean energy: The United States should become a leader in the field of clean energy for time, open up markets for new clean energy technology innovation, and support research in the development of narrowly defined energy technologies[4].

3. All-of-the-Above Energy Strategy

The text of your paper should be formatted as follows: In January 2012, President Obama pointed out in his State of the Union Address that the United States had natural gas (mainly shale gas) that met 100 years of need. The US government would take all possible measures to safely develop shale gas to provide cars and factories with cleaner and cheaper energy. This industry would bring more than 600,000 jobs to the United States in the next 10 years. And it put forward the All-of-the-Above Energy Strategy, and put forward three main goals: (1) to support economic development, and create jobs, (2) to improve energy security, (3) to develop low-carbon technology to lay the foundation for future clean energy [5]. This strategy is that the United States produces more oil and natural gas, uses
renewable energy such as wind and solar energy to produce more electricity, consumes less oil, and promotes economy and energy security, reduces carbon dioxide emissions in the energy sector, and responds to the challenges of climate change [6]. This is a "cleaner, cheaper, new job opportunity strategy". This strategy is known as the blueprint for maximizing the use of US energy resources. As part of the Obama Administration’s All-of-the-Above Energy Strategy to expand safe and reliable domestic energy production, the US Department of the Interior and the Bureau of Ocean Energy Management (BOEM) finalized a five-year (2012-2017) offshore oil and gas leasing projects. The project utilizes the most promising offshore oil and gas leasing resources, focusing on renewable oil and gas resources in the outer continental shelf of the United States, and has initially set 15 5-year offshore platform leasing contracts, of which 12 in the Gulf of Mexico and 3 in Alaska. Among them, six projects in the Gulf of Mexico have already been in operation [4].

On June 25, 2013, Obama announced a comprehensive climate action plan to combat climate change. The plan is divided into three parts and outlines the steps to reduce carbon emissions, including not only the standards for existing and new power plants, as well as preparatory measures to combat climate change, but also to lead the global plan to combat climate change. This plan consists of a series of executive action clauses, with three main pillars:

1. Reduce domestic emissions: ① Standardize the emissions of existing and newly-built power plants through the Air Cleanliness Act. ② Develop clean energy. Develop renewable energy through domestic R&D production or government purchases, support clean energy innovation for biofuels and batteries, and carbon capture and storage. ③ Reduce the waste of energy, and strengthen the policy support for improving energy utilization in construction, supply chain and heavy transportation. ④ Focus on typical greenhouse gas emissions: such as freon and methane emissions.

2. Respond to the impact of climate change: ① Work with local institutions to improve the resistance of community infrastructure, including the adaptability of infrastructure in areas affected by hurricane Sandy to coastal flooding. ② Provide combat readiness data and tools. ③ Help farmers adapt to drought to maintain agricultural productivity.

3. Lead the international community to deal with climate change: ① Bilateral and multilateral (UNFCCC) climate negotiations. ② Stop financial support for coal power plants in developing countries. ③ Use science and technology to manage the impact of climate.

The United States is committed to realizing global greenhouse gas emission reductions through practical actions, and has strengthened preparations for climate change through international initiatives with concrete incentives, including those with China, India, and other major greenhouse gas-emitting countries. The plan also calls on the United States to prepare for the effects of climate change, including checking for loopholes in the energy industry and enhancing the ability of energy infrastructure to withstand risks. The plan also calls on the international community to pay attention to international climate change through bilateral initiatives with other major emitters, and calls on the United States to stop using public industry funds to support new overseas coal power plants (unless it is a high-energy-utility coal power plant in the world’s poorest country or projects that use CCS technology (CO2-capture and storage, CCS); to strengthen the global ability to respond to climate change.

4. The shale gas revolution

With a series of technological innovations and maturity improvements such as the horizontal well of United States and the integrated fracturing technology, it has laid the foundation for the commercial exploitation of unconventional natural gas such as shale gas. Using this technology, oil and gas resources in shale formations that were previously considered impossible to be exploited can be exploited in large quantities. US domestic oil and gas production has grown rapidly since 2008. From 2008 to 2011, the average annual growth rate of natural gas production in the United States reached 4.49%, and the year-on-year growth rate in 2011 was 7.81%. 44% of natural gas production comes from unconventional natural gas [7]. In 2011, the United States surpassed Russia to become the
world's largest natural gas producer. According to the forecast of the US Energy Information Administration, shale gas production in the United States will increase from 9.7 trillion cubic feet in 2012 to 19.8 trillion cubic feet in 2040, and the proportion of shale gas in natural gas in the United States will rise from 40% in 2012 to 53% in the year of 2040 [8]. U.S. oil production has also increased. Since 2009, the United States has reversed the decline in oil production. In 2012, U.S. crude oil production reached 6.5 million barrels per day, a year-on-year increase of 13.8% [9]. Total oil production reached 2.38 billion barrels in 2012. In the same year, the United States crossed the inflection point where both net oil imports and import dependence rose, and began to show a downward trend [10].

| Year | Oil(thousands of barrels per day) | Gas(billion cubic metres) |
|------|----------------------------------|--------------------------|
| 2012 | 18490                            | 649.1                    |
| 2013 | 18961                            | 655.7                    |
| 2014 | 19106                            | 704.7                    |
| 2015 | 19531                            | 740.3                    |
| 2016 | 19687                            | 727.4                    |
| 2017 | 19958                            | 745.8                    |
| 2018 | 20456                            | 831.8                    |

The "shale gas revolution" in the United States has achieved great success, freeing the United States from the current economic difficulties, alleviating the employment problems of the United States, and injecting vitality into its economic recovery. In 2012, the production of shale gas and shale oil created 800,000 jobs in the United States. Within five years, the revenue of the shale gas and shale oil industry alone can increase the annual GDP growth rate by more than one percentage point and newly created 3 million jobs. At the same time, the decline in natural gas prices can reduce per capita spending by nearly US$1,000 per year [12]. "Shale gas revolution" is promoting the American industrial revival; the proportion of natural gas power generation in the United States jumped from 17.1% in 2001 to 24.7% in 2011; thanks to low natural gas prices, some companies with high energy consumption of the United States are returning to their home countries, and US companies plan to add up to $72 billion in investments in industries such as paper making, chemical, scrap, steel, aluminum, tires, and plastics. These investments create 1.18 million jobs in the United States [13]. Increased shale gas and shale oil production in the United States also helps reduce its fiscal deficit and government debt. With the development of domestic oil and gas resources in the United States, especially the large-scale exploitation of unconventional oil and gas resources such as shale oil and shale gas, the United States will gradually reduce its dependence on imported energy and may gradually achieve its goal of "energy independence." This means that the United States will save a lot of money, and its deteriorating fiscal deficit and government debt will also be eased [14].

5. Impact of U.S. Green and Sustainable Energy Policy
The purpose of the Obama administration’s sustainable energy policy is to launch a "green revolution" to initiate a global reform of the global energy industry cluster centered in the United States and create a new energy industry as the basis of the US economic structure, as well as axis and the driving force of the US economic rise [15]. So as to ensure that it regains the highest end of the global economy. The new energy strategy will not only benefit the US from economy, diplomacy, and environment, but also create new export industries. Obama's ultimate goal is to allow the United States to significantly reduce its dependence on oil in the Middle East, Venezuela and other countries through energy
transformation, and rely less on fossil energy to achieve the reconstruction of the international order and promote global economic transformation.

Figure 1. US Net energy imports (quadrillion British thermal units) [16]

The US green sustainable development energy policy has a greater impact on the international economic landscape: (1) The US green sustainable development energy policy advocates the vigorous development of new energy, renewable energy, smart grids, and low-carbon technologies in an effort to innovate the global energy industry system, which will trigger a revolution in global energy technology. (2) The United States has put forward a solution idea centered on "carbon emission caps and carbon trading policies". This policy has trade protection risks and will have a great impact on the foreign trade industries of other countries. (3) The U.S. green sustainable development energy policy vigorously develops renewable energy, trying to get rid of the transitional dependence on oil from OPEC countries. The U.S. energy policy will affect the entire global oil market pattern, which in turn will affect the oil production plan of the oil exporting countries and international oil prices [17].

The sustainable energy policy of the United States is not only conducive to the recovery of its economy, but will also have a huge impact on the geopolitical pattern of global energy. With the large-scale development of shale gas and shale oil in the United States, the world's oil and gas landscape has undergone new changes. The new energy line starts from Alberta in Canada, passes south through North Dakota and southern Texas, and then passes a newly discovered large oil field off the coast of French Guiana, and finally reaches the offshore large oil field discovered near Brazil. The center of the world’s oil map shifted from Middle East and Central Asia to the Western Hemisphere [18]. The world will form the “Eastern and Western Polar Energy Supply Pattern” of the Eastern Hemisphere Conventional Oil and Gas Energy Center with the Middle East and Central Asia as the core and the Western Hemisphere Unconventional Oil and Gas Resource Center with the Americas as the core [19].

6. Conclusion
The US green sustainable development energy policy is conducive to its economic recovery, gradually reducing the dependence of imported energy and achieving its "energy independence". Moreover, the United States will also lead the innovation and development of the world's technological system, triggering a shift in the focus of global geopolitical strategies. With the U.S. shale gas revolution in full swing, the resumption of U.S. influence in the Middle East, East Asia, and Central and South America, the formation of U.S. atomic cooperation with India and Japan, and the development of Japan and Russia’s LNG in Sakhalin, the Asia-Pacific region will become the center of the global energy order and games. The international energy landscape is undergoing major changes, forming a
dual-axis, multi-center energy supply sector in the Middle East and North America, and an energy demand sector centered on Europe and Asia-Pacific.

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References
[1] Yang Jiemian., e.d. (2009) World Climate Diplomacy and China's Response (Beijing: Current Affairs Press).
[2] Cao Haidong (2009) Reviving the United States, why did Obama lock in the green revolution? Southern Weekend, February 12, C15.
[3] American Recovery and Reinvestment Act of 2009, http://en.wikipedia.org/wiki/American_Recovery_and_Reinvestment_Act_of_2009.
[4] IEA, (2014) Energy Policies of IEA Countries the United States 2014 Review.
[5] Remarks by the President in State of the Union Address United States Capitol, January 24, 2012. http://www.whitehouse.gov/the-press-office/2012/01/24/remarks-president-state-union-address.
[6] Jason Furman, Jim Stock, (2014) New Report: The All-of-the-Above Energy Strategy as a Path to Sustainable Economic Growth, May 29, 2014, https://obamawhitehouse.archives.gov/blog/2014/05/29/new-report-all-above-energy-strategy-path-sustainable-economic-growth.
[7] IEA, (2014) Energy Policies of IEA Countries the United States 2014 Review. Zhang Kang, (2012) The Profound Influence of American Energy Independence and the Shale Gas Revolution, Chinese and Foreign Energy, Issue 12, 1-16.
[8] EIA, (2014) Annual Energy Outlook 2014, April 2014, p. Mt-23.
[9] Qian Xuming, (2014) The Impact of ‘Energy Independence’ of United States and Its Enlightenment to China, Theoretical Perspective, December.
[10] EIA, (2013) Annual Energy Outlook 2012, p. 2.
[11] BP, (2019) BP Statistical Review of World Energy, p. 18-32.
[12] Roger Altman, (2012) The US Economy May Surprise Us All, September 3, http://www.ft.com/cms/s/0/17ec3e66-f5ae-11e1-bf76-00144feabdc0.html/axzz2DDwVPqSh.
[13] American Chemistry Council, (2012) Shale Gas, Competitiveness and New U.S. Investment: A Case Study of Eight Manufacturing Industries, http://www.american-chemistry.com/policy/energy/shale-gas-competitiveness-and-new-US-Investment.pdf.
[14] Kong Xiangyong, (2014) The ‘Shale Gas Revolution’ in the United States and Its Influence-Concurrently on the Enlightenment to Shale Gas Development in China, International Forum, Issue 1.
[15] Cao Haidong, (2009) Reviving the United States, why did Obama lock in the green revolution?”, Southern Weekend, February 12, C15.
[16] EIA, (2020) Annual Energy Outlook 2020, January 2020, p. 12, https://www.eia.gov/outlooks/aeo/pdf/AEO2020%20Full%20Report.pdf
[17] Yang Yufeng, (2009) The Obama Administration's New Energy Policy and its Potential Impact, China Energy, Volume 31, Issue 6, 7.
[18] Daniel Yergin, (2011) Oil’s New World Order, The Washington Post, October 28, http://www.washingtonpost.com/opinions/daniel-yergin-for-the-future-of-oil-look-to-the-americans-not-the-middle-east/2011/10/18/gIQAxDrW7L_story.html.
[19] Li Yang, (2012) The Status Quo of Unconventional Oil and Gas Resources Development and the New Global Energy Pattern”, Contemporary World, 50.