

Global impact of Trump's energy policy

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ABSTRACT: *During the US presidential election in 2016, Donald Trump proposed a series of campaign slogans, such as "America First", all the way through, attracting the general public, and successfully elected the 45th president of the United States. After the inauguration on January 20, 2017, according to the campaign promises, Trump proposed the US priority energy policy, and signed many related laws and regulations with the focus on two major points: first, the development of domestic fossil energies to ensure the energy autonomy; second, the ignorance of climate change and the withdrawal from the Paris Agreement. United States as the first strong in the world, President Donald Trump's energy policy to pursue the highest interests of the United States is as good as casting a bomb shocking the global energy situation. In this paper, author reviews Trump's major energy policy and addresses its possible impact on the world.*

KEYWORDS: *Energy policy; United States of America; Donald Trump; Fossil energy; Paris Agreement.*

I. INTRODUCTION

United States is the strongest country on earth. The energy policy of US president has far-reaching impact on the world. Donald Trump, the new president of the United States, proposes a new energy policy [1] that overturns former President Barack Obama's old energy policy. Trump's energy policy focuses on fossil fuels and ignorance of climate change [2]. It is like casting a bomb shocking the international energy situation. During the campaign, Trump proposed an "America First Energy Plan," showing his determination on deregulating the control of fossil energy exploration in the United States. Meanwhile, Trump vowed to withdraw from the Paris Agreement to achieve the US energy autonomy. On January 20, 2017, in the inauguration, Trump issued a clear message of a significant shift in energy and environmental policy as one of his "America First" governance projects. Furthermore, Trump announced plans to abolish the climate policy that mainly promotes the domestic renewable energy development. Meanwhile, a number of controversial administrative orders were also signed. After election, Trump appointed Rex Tillerson, the former president of Exxon Mobil, as Secretary of State, and Scott Pruitt, a climate skeptic who has always been anti-environmental, as Secretary of Environmental Protection Agency. It means a big turn for the US's energy and climate policies. In addition to the main energy policy put forward by Trump, the possible impacts are also addressed in this paper.

II. THE MAJOR ISSUES OF TRUMP'S ENERGY POLICY

Trump believes that the crude oil production and refinery control program proposed by the presidential candidate Hillary Clinton and the carbon emissions reduction plan of former President Barack Obama for 2050 will cause high burden to the United States and the impacts will last for 30 years. Meanwhile, the Clean Power Plan causes high electricity prices and has no practical effect on the climate change. In addition, Trump believes that the expansion of energy sector will reduce the dependence on energy imports. Trump advocates if controls were comprehensively removed from the energy sector, the energy sector would have more opportunities for development. On the day when Trump took office, he vowed to lift the restrictions on the development of the US existing industries of coal, shale oil and gas, hoping to boost the energy industry to create more jobs for the American [3]. In the future, Trump will continue to relax many relevant restrictions on the development of crude oil industry.

Trump supports the petrochemical industry, but he talks not much about solar energy, wind power and other renewable energies. In the America First Energy Plan, Trump did not mention renewable energy, but Trump pointed out that the governmental subsidies cannot only focus on renewable energy. During the 2016 campaign, Trump criticized, "Renewable energy is too expensive, solar energy is running poorly, and wind turbine will harm birds [4, 5]." Basically, if Trump supported fossil fuels and denied climate change, the US would reduce the use and subsidy of renewable energy in the future [6]. The main energy policies of the United States and Trump are construed as follows.

(A) Actively developing shale oil and gas and lifting the ban on offshore oil exploration : During the campaign, Trump proposed the America First Energy Plan, hoping to lead the US to the maximization of resource use. Trump has promised to relieve the energy dependence on the Organization of Petroleum Exporting Countries (OPEC). Trump also criticized Saudi Arabia, and even said US would stop buying crude oil from Saudi Arabia and other Arab countries. At the same time, Trump said that the US would actively develop energy cooperation with the Gulf allies. Trump, very clear in supporting the American shale oil industry, emphasized that the safe hydraulic fracturing technology should be applied in the oil and gas extraction and in the appropriate federal land to produce energy [7]. Trump said that the United States is located on the unexplored energy treasury (see Fig. 1). Under the federal lands, the reserves of high-value shale oil and gas are abundant and the coal mines are available for hundreds of years. Trump also plans to cancel the US energy production control, such that wealth can flow into the US society.

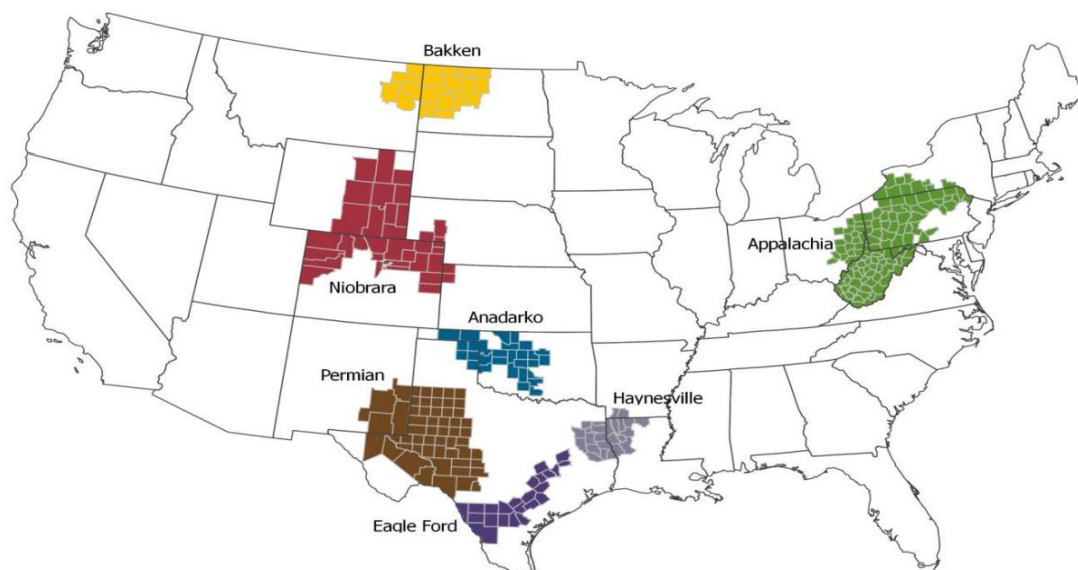


Fig. 1 The US shale oil and gas mining area illustration

Source: Drilling Productivity Report, EIA, September 2017,

<https://www.eia.gov/petroleum/drilling/pdf/dpr-full.pdf>

In 2016, the Obama administration, on the basis of environmental reasons, ordered the ban on drilling activities in parts of the Arctic and Atlantic seas. However, during campaign, Trump advocated the development of offshore oil in the Arctic waters of Alaska. On April 28, 2017, Trump signed an administrative order to open the US seas for oil exploitation, which ends the previous Obama's ban for the United States to explore the oil and natural gas in the Arctic waters and the Atlantic Ocean and others.

(B) Reviving the Keystone XL pipeline project: In recent years, the Keystone XL pipeline has become a symbolic topic relative to the US energy security and climate change [8]. On the second day of his taking office, Trump immediately signed an administrative order to revive the Keystone XL pipeline project proposed by Canadian oil pipeline company (TransCanada) [9]. Although the environmental groups strongly opposed the order, they were still futile. The Keystone XL pipeline is planned to extend from Canada directly to the refineries in Mexico. Through the pipeline, 830,000 barrels of crude oil are transported daily. On the same day, Trump also signed the Dakota Access pipeline program. Trump argued that the oil pipeline built in the United States should be made of US steel as well, since the United States has imported many oil pipelines from other countries. In the future, the production of oil in the United States will increase. In addition to more oil pipelines built, Trump argued that more US-made steel should be also used. It means to create more employment opportunities for the Americans.

Trump's revival of the Keystone XL pipeline project completely overturned former US President Barack Obama's rejection of the Keystone XL project in 2015. Part of the reason for Obama's opposition was based on the environmental considerations; namely, the pipeline construction would damage the status of the United States as a leading country for climate change.

(C) The development of fossil energy and the revival of the coal industry :In the America First Energy Plan, Trump repeatedly referred to the importance of energy autonomy, advocated the development of local fossil energy industry, and strived to make the United States as a net energy exporter. Trump was of the opinion that the fossil energy industry of the United States has long been subjected to a number of laws and regulations. Especially the coal industry under the pressure of long-term restrictive policy cannot get the room for development, leading to the deterioration of the US coal industry. Trump paid special attention on fossil energy industry to promote the US energy self-sufficiency. In addition to actively develop the shale oil and gas as well as to revitalize the coal industry and nuclear power generation, Trump also committed to the development of clean coal technology. After taking office, Trump announced the abolition of the provision that the companies of oil, natural gas, and mining should publish the outlay paid to the local foreign government.

(D) Withdrawing from the Paris Agreement and rationalizing the carbon emissions : In addition to the development of fossil energy, Trump's energy policy is also to ignore the climate change. According to the Paris Agreement, the US carbon emissions need to be reduced between 26-28% by 2025. However, Trump is of the opinion that in the Agreement, China can be just carbon reduced until 2030, India even has no carbon reduction schedule, and especially, the developing countries can neglect the carbon emissions regulations to manufacture products with lower production costs to acquire the international trade advantages, resulting in the reduction of the corporate competitiveness and employment opportunity of the US, which is very unfair to the Americans.

Trump questioned the scientific nature of climate change and was of the opinion that the climate change is a hoax fabricated by China; the purpose is to weaken the competitiveness of the US manufacturing industry. During the US presidential election in 2016, Trump said many times that the climate change was only a natural phenomenon, and for those who advocated the warming of the earth, the aim was simply to persuade the government to devote more resources to the clean energy research and development.

During the 2016 election period, Trump declared the withdrawal from the Paris Agreement with the reason to help the US oil and coal industries. Shortly after the inauguration of Trump, the White House website issued a statement that Trump promised to eliminate such as the Climate Action Plan¹ and other unfavorable and unnecessary policies. In early June (2017), Trump officially announced the US's withdrawal from the Paris Agreement that has been passed in the 21st Conference of the Parties (COP 21) held under The United Nations Framework Convention on Climate Change (UNFCCC) at the end of 2016. Meanwhile, Trump claimed to cease the performance of all non-binding commitments in the Agreement, with an aim to renegotiate a new agreement that would not harm the US economy and labor.

Trump's expansion of the infrastructure policy will provide an active pipeline to promote the US shale oil and gas production, and the announcement of the withdrawal from the Paris Agreement will rationalize the increase of carbon emissions in the US. Trump said that the Paris Agreement would bring the United States into poverty and result in losing gross domestic product (GDP) of 3 trillion US dollars and 6.5 million jobs. As the

¹The Climate Action Plan was initiated by former President Barack Obama.

United States itself has an abundance of oil and gas reserves, there is no need for the development of clean energy, since it would lead the US to increase the dependence on imported oil and sometimes involve in the overseas geopolitical disputes. So for the previous Obama administration's promise to allocate US\$ 3 billion to the Green Climate Fund²(US\$ 1 billion has been invested), Trump said that the United States would not perform any financial commitment or measure implementation with respect to the emissions reduction in the US territory^[10].

(E) To levy the Border Adjustment Tax : The Border Adjustment Tax³ is a corporate tax reform plan proposed by the Republican Party of the US House of Representatives in the last year (2016). Trump plans to impose Mexico import duties to finance the construction of the border wall between the United States and Mexico, so that this tax reform plan that hitch-hikes the "America First" has attracted attention. The effect of levying a border adjustment tax would be a 20% tax for the all imported energy products and a 20% subsidy for the exports, which will narrow the trade deficit and increase the export competitiveness of the US domestic producers. That is, the large exporters may be significantly benefited and the simple domestic sale companies will be also benefited from the tax cuts, but the industry that sells imported products or relies on imported parts may be hit.

(F) Planning to sell the Strategic Petroleum Reserve (SPR) : The scale of the United States SPR is first in the world. The current US SPR is about 688 million barrels, equivalent to the global oil demand for one week. In order to balance the governmental budget for the next decade, on May 23, 2017, the White House announced a budget proposal to sell the SPR from October 1, 2018, and it is expected to generate US\$ 500 million revenue in 2018. The SPR sale will increase year by year, and close to the highest level of nearly 3.9 billion US dollars in 2027. In 2018-2027, the sales will reach about 16.6 billion US dollars in total.

III. THE IMPACTS OF TRUMP'S ENERGY POLICY MAY CAUSE

Trump proposed many energy-related policies, such as: to encourage the development of shale oil and gas, to restart the offshore oil and gas exploration, to augment the oil imports from Canada, to revive the coal industry and nuclear power generation, to exit the Paris Agreement, and others, which will lead the United States to the energy autonomy, affect the global energy situation, and impose a certain degree of impact on the world, which are construed as follows:

(A) While US enhances oil and gas exploitation, OPEC gradually loses the dominance in global crude

² In 2009, countries held the 15th session of the United Nations Framework Convention on Climate Change (COP15) in Copenhagen, Denmark, and decided to set up the Green Climate Fund. The signatories will invest US\$ 100 billion annually by 2020 to assist the developing countries switch to the clean energy and strengthen the precautionary measures to mitigate the impact of climate change.

³ The so-called "Border Adjustment Tax" is not an independent tax on the imported goods at the border, but one of the taxations of the US companies. To eliminate the tax incentives of moving out the US companies and to encourage the US enterprises return their production to the United States, Republican Representatives proposed to reduce the corporate income tax from 35% to 20% in large scale; in addition, during the annual levy of corporate income tax, the goods imported must be taxed, and the goods exported is tax-free.

oilmarket: In early May 2017, US Secretary of State, Rex Tillerson, declared that the United States would no longer impose its own ideology on other countries, and in the future, the priorities of the US will be the pursuits of security and economic interests of the US, rather than the human rights and the democracy in other countries. Trump's augment of the domestic demand is expected to accelerate the growth of US oil products consumption. Thanks to the increase of feedstock on production side, the demand for crude oil refineries is expanded. While the US commercial crude oil stocks gradually decline, the international crude oil prices rise.

According to the statistics of Energy Information Administration (EIA) of the US Department of Energy (DOE), the US shale oil production began to decline in April 2015, resulting that the average daily crude oil production in the United States down to 8.78 million barrels/day in December 2016, compared to the peak production of 9.63 million barrels/day in April 2015, there was a reduction of 850,000 barrels/day. However, since Trump announced the "relaxation of US shale oil exploitation restrictions" as one of his energy policies, the United States shale oil production has risen from the bottom, such that the total US crude oil production continued to grow. According to the statistics in July 2017, the US crude oil production had been approaching the historical high since April 2015. Meanwhile, the peak value of shale oil, accounting for about 58% of the total output of crude oil, also set a record. In addition, in the Drilling Productivity Report (DPR) published on August 14, 2017, EIA estimated that the total daily production of 7 US shale plays in September would be more than August. In other words, the total shale oil production was 614.9 million barrels/day in September, with an increase of production of 11.7 million barrels/day or an increase rate of 1.94 percent, compared to August. The shale oil production in the US was increasing nine months in a row and continuing to refurbish the historical record since 2007 [11].

In the mining technology for the exploration of shale oil and gas, in addition to the hydraulic fracturing method⁴, a new oil-mining technology-Enhanced Oil Recovery (EOR)⁵ with a scientific name of the S-BTF (Baric-Thermal Flow) also emerges recently. Thanks to the combination of the research and development of US crude oil industry and the new mining technologies, the shale oil production is boosted successfully, while the exploration costs are reduced significantly. The expansion of the US shale oil production capacity is expected to continue. Based on the continuous augment of the shale oil and gas production, the US shale oil enterprises actively develop the Asian markets. The volume of crude oil exported from the United States to China and Japan has increased notably. In the case of balanced supply and demand, since the international crude oil prices are difficult to pick up in a short period of time, the United States will be substantially converted into a net crude oil exporter, while the OPEC and other oil-producing countries will gradually lose their dominant positions in the crude oil market in the world.

(B) Rebooting the pipeline project will deepen US-Canada relationship: Reviving the Keystone XL pipeline

⁴ Hydraulic fracturing method is to inject water mixed of sand and chemical into the deep underground, fracturing rock composition to extract oil and gas.

⁵ S-BTF is a combination of S-WEPT and S-BRPT. The S-WEPT utilizes the wavelengths of the impulse waves to reflect the location and geology of the wells to obtain the difficultly explored shale oil to maximize the oil production. S-BRPT is a method suitable for the exploration of crude oil in special terrain.

project can further strengthen the energy interdependence between the United States and Canada. Not only the expansion of crude oil imported from Canada can make the Canadian oil be more likely sold to US refineries or exported to foreign countries, the crude oil can also be transported by pipeline cost-effectively, instead by rail. Trump is of the opinion that when the United States begins to build oil pipeline, the US-made steel should be also used, which will enhance the domestic steel demand and create more employment. After the completion of the construction of the Keystone XL pipeline, which is 1,900km long, it will deliver oil from Canada to the refineries in Texas, playing an encouraging role for the Canadian oil sand industry. At the same time, the project will create 4,500 employment opportunities, which will deepen the relationship between the United States and Canada [12,13]. See Fig. 2.



Fig. 2 Proposed Keystone XL pipeline

Source: TransCanada Pipeline Ltd.

(C) The effectiveness to revive the coal industry might be not as good as expected and could be counterproductive: Trump attributed the long decline of coal industry to the numerous regulatory restrictions, vowing to revive the long-deteriorated US coal industry. Barry Worthington, the executive director of the US Energy Association in Washington, said in a statement about Trump's energy policy, "President Trump's energy policy ensures and expands the US energy supplies and also consolidates US as the status of a big country in the world's energy supply, to which we give applauses." But the environmental groups criticized by saying, "Trump pays too much attention on the economic development, and ignores the energy strategy of environmental protection, which is not only short-sighted but also has serious adverse effects on the environment."

Basically, the coal recession in the US is due to many factors, and regulatory restrictions are only parts of them. Renewable energy prices and shale gas revolution force the coal-fired power generation no longer competitive, which is also the main reason for the decline of the US coal industry in the past 30 years. It is afraid that

Trump's simpler reduction or abolishment of the carbon emission restrictions would be still unable to save the coal industry. On the contrary, due to the active promotion of shale oil and gas, the process of coal substitution will be further accelerated. Hausk, a researcher at the World Resources Institute (WRI), has pointed out that the recovery of the coal industry would not be seen even the US withdrew from the Paris Agreement.

(D) The withdrawal from the Paris Agreement might lead the US to lose the leadership role in the world: The Paris Agreement, a global climate governance agreement accomplished by a long series of tough negotiations, is also a historic consensus constituted by more than 200 countries for the first time. However, Trump has announced the withdrawal and asked to renegotiate. At the end of June (2017), in a speech in the US Department of Energy, Trump confirmed his decision in early June to withdraw from the Paris Agreement. At that time, Trump also praised the EPA's revoking of the Clean Water Rule proposed by former President Barack Obama. Looking to the future, the United States will move to different ways with other countries on the climate change issues that are related to the survival of mankind. In addition to mass demonstrations and international condemnations for Trump's decisions, some countries also reduce their willingness to cut carbon emissions as well, due to the effect of "Broken Window Theory"⁶.

In accordance with Article 28 of the Paris Agreement, any signatory who wishes to withdraw from the Agreement shall make the proposal after three years of the Agreement entering into force; thereafter, for a further year, the application will be effective. So, the time for the United States to complete the procedure of exiting the Paris Agreement will be no sooner than November 2020. Inferentially, the main purpose for Trump's declaration to withdraw the Paris Agreement at the present stage is to highlight the legitimacy of the agreement to rationalize his own policies. As the Intended National Determined Contribution (INDC) of the Paris Agreement is not legally binding to the signatories, Trump may be negatively enforce the obligations committed in the INDC. Although the INDC is not binding, other countries still may make unilateral penalties to whom doesn't comply the commitments; for example, France has threatened to impose carbon taxes on US goods.

For the US, the withdrawal from the Paris Agreement is expected to push up the domestic fossil fuels demand. In the future, if the United States made a substantial reduction in clean energy investment, the fossil fuels would dominate the energy market. On the point of view of renewable energy industry, cutting funds might lead the renewable energy industry to face the dilemma of shortage of funds; but a small number of good physical industries might have the opportunity to come to the fore and acquire the initiative of renewable energy market. KPMG believes that the withdrawal of the United States from the Paris Agreement may lead the United States to

⁶Broken Windows Theory is a theory of criminology. This theory addresses that the bad phenomenon in the environment, if let any exist, it will induce people to follow, or even be intensified. Take a broken window as an example. If the broken window is not repaired, it may cause more damage to the other many windows. Eventually, even someone breaking into the building unbound and discovering it inhabited, people may reside or set fire. Another example is that there is a piece of garbage on the sidewalk, and soon there will be more garbage, and ultimately people will naturally discard more garbage on the ground. These phenomena are the so-called "Broken Window Effect" in criminal psychology.

lose the leading role in the world; regarding that the climate change is a false issue, the follow-up of Trump thinking about what to exchange it with countries is the focus that should continue to observe.

(E) Levying the Border Adjustment Tax will widen the crude oil prices difference between WTI and Brent:

Although the Border Adjustment Tax can increase the tax income, it is still possible to have a direct impact on the US consumer and business. Moreover, people concerns that it will bring a disaster to the global economy, and even cause a "Global Trade Carnage". Trump plan's to impose a 20% border adjustment tax on the imported goods may be described as "Anything is a double-ed." Although the main purpose of the Border Adjustment Tax is to suppress imports and attract the manufacturing industry back to the United States, it also possible to increase the price of imported goods, including the crude oil price, for example. Goldman Sachs argues that if Trump fulfilled his promise to levy the Border Adjustment Tax on imported goods, the price of crude oil produced in the United States would also surge, so that WTI's crude oil price would cost about US\$ 15 a barrel more than Brent.

(F) Selling strategic petroleum reserve (SPR) has a limited impact on the oil market :

For a balanced budget, the United States proposes a plan to sell 270 million barrels of SPR in 10 years from October 2018. More specifically, the US plans to reduce the commercial crude oil inventories of Organization for Economic Cooperation and Development (OECD) from 3.025 billion barrels to 5-year average (2.85 billion barrels). Theoretically, it will damage OPEC and other oil-producing countries such as Russia, resulting in the extension of oil production agreement and the stagnation of oil prices. Moreover, it will increase the oil supply about 74 thousand barrels a day in the next 10 years, accounting for only 0.075% of the current global crude oil production (i.e., 98.5 million barrels/day). Therefore, the impact on the oil market is expected to be limited.

IV . CONCLUSIONS AND POLICY IMPLICATIONS

During the campaign, Trump made some stunning speeches in the areas of internal and foreign affairs, the international trade and economic cooperation [14]. The degree of global discussion on Trump is far more than any modern American president. As a political rookie, Trump's election speech and policy implementation together with the subsequent consequences can be characterized as "creating dangers with endless disputes for the universal beings."

All in all, the aggressive domestic energy exploration acts proposed by Trump are: first, abolishing the environmental protection norms and energy development restrictions formulated in the previous Obama era; second, actively exploring the shale oil and gas resources by opening the federal land and offshore areas; and third, revitalizing the coal industry. Obviously, the objectives of Trump's energy policy are: to ensure the energy independence of the United States, to reboot the local industries, and to create the job opportunities, such that wealth can be left in the United States [15]. Especially, in line with the US's priority, Trump also focuses on the issues, such as the withdrawal from the Paris Agreement; the ignorance of global warming response issues; no longer to develop clean green energy and application technology.

As the strongest country in the world, the US new energy policy will doubtlessly cause a major impact on the global energy structure and market. The consequences of many energy policy changes made by the United States are worth our continuous observation.

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REFERENCES

- [1] Trump's Energy Policy: 10 Big Changes,
<http://www.forbes.com/sites/jamestaylor/2016/12/26/trumps-energy-policy-10-big-changes#c85df8718aae>
- [2] Here Are the Races to Watch if You Care About Global Warming,
<http://www.motherjones.com/environment/2016/11/climate-election-results-guide/#>
- [3] Obama Adds Last Minute Anti-Coal Regs Before Trump Takes Office,
<http://dailycaller.com/2016/12/19/obama-adds-last-minute-anti-coal-regs-before-trump-takes-office/>
- [4] U.S. wind turbines kill 1.4 million birds and bats every year,
<https://www.heartland.org/news-opinion/news/us-wind-turbines-kill-14-million-birds-and-bats-every-year>
- [5] New administration rule would permit thousands of eagle deaths at wind farms,
<http://www.foxnews.com/politics/2016/05/04/new-administration-rule-would-permit-thousands-eagle-deaths-at-wind-farms.html>
- [6] James Taylor, Economic and environmental costs of carbon dioxide restrictions,
<https://www.texaspolicy.com/library/doclib/Panel-IV-J-Taylor.pdf>
- [7] Oil & Gas Leases on Federal Lands Down 17% Under Obama,
<https://www.cnsnews.com/news/article/joe-setyon/leases-oil-gas-federal-lands-down-17-under-obama>
- [8] Trump gives OK to Keystone XL and Dakota Access pipelines,
<http://www.cbc.ca/news/business/trump-keystone-dakota-access-pipelines-1.3949629> · 2017/01/24
- [9] Alberta Premier Rachel Notley applauds Trump's Keystone XL approval,
<http://www.cbc.ca/news/canada/edmonton/alberta-premier-rachel-notley-applauds-trump-s-keystone-xl-approval-1.3950036>
- [10] Full-Spectrum Analysis Challenges 'Green' Energy,
<http://sparkoffreedomfoundation.org/2016/09/14/full-spectrum-analysis-challenges-green-energy/>
- [11] Drilling Productivity Report, EIA, DOE, Aug. 2017.
- [12] Trudeau welcomes Trump's Keystone XL decision,
<http://www.cbc.ca/news/politics/trudeau-cabinet-keystone-xl-1.3949754>
- [13] A chronological history of controversial Keystone XL pipeline project,
<http://www.cbc.ca/news/politics/keystone-xl-pipeline-timeline-1.3950156>
- [14] 'Wildcard' Trump could affect markets, economic outlook in 2017,
<http://www.cbc.ca/news/business/markets-economy-2017-lookahead-1.3916631>
- [15] Did Donald Trump just create 8,000 jobs?

<http://www.cbc.ca/news/business/donald-trump-jobs-claim-1.3915798>