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Oil in the Context of the U.S. Energy Security

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Statement of authenticity

I hereby declare that the Master's Thesis presented herein is my own work, or fully and specifically acknowledged wherever adapted from other sources. This work has not been published or submitted elsewhere for the requirement of a degree program.

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student's signature

Abstract

Oil is the world´s most valuable energy resource without which no highly industrialized society can survive and whose availability must be guaranteed, if necessary by military. This thesis contributes to supporting this reality by analyzing the role of oil in the process of providing for the energy security in the United States. The framework introduces the concept of oil in the economy and its position in providing for the energy security.

Key words

Oil, Energy, Security, Petroleum, OPEC, United States, Oil Market

Abstrakt

Ropa je najcennejším svetovým zdrojom energie, bez ktorého nemôže žiadna vysoko industrializovaná spoločnosť prežiť, a ktorého dostupnusť musí byť v prípade potreby zaručená vojensky. Táto práca prispieva k podpore tejto skutočnoti tým, že analyzuje úlohu ropy v procese zaistenia energetickej bezpečnosti v Spojených štátoch. Rámec zavádza koncept ropy v ekonomike a jej postavenie v zabezpečovaní energetickej bezpečnosti.

Kľúčové slová

Ropa, Energia, Bezpečnosť, OPEC, Spojené štáty americké, USA, Trh z ropou

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Introduction

At the threshold of the 21st century globalization[1] and modernity bring about the challenges the sovereign states incorporated into bilateral and/or multilateral interaction processes are faced with. Within the profound economic and social transformation on a global scale, the position of any state is largely affected by the amount of the energy resources it abounds with. Pascual and Elkind (2010; 1) posit energy[2] is at the heart of economic development in every country. It moves us and powers our factories, government and office buildings, schools, and hospitals. It heats homes and keeps perishable food cold. Its centrality explains its complexity. Energy is the source of wealth and competition, the basis of political controversy and technological innovation, and the core of an epochal challenge to our global environment. The extent and the form of energy usage is subject to a man´s decision. In Fanchi´s view (2011; 1) we decide how much electricity we will use to heat or cool our homes. We decide how far we will go every day and the mode of transportation we will use. We create budgets to support new energy initiatives or maintain a military (capable of defending energy supply lines) by proxy. These decisions affect global consumption of energy and demand for available natural resources.

According to Fanchi (2011; 2) sources of energy include biomass (firewood), fossil fuels (coal, oil, natural gas), flowing water (hydroelectric dams), nuclear materials (uranium), sunlight, and geothermal heat (geysers). He classifies energy sources as renewable and non-renewable (further elaborated in the next chapters/subchapters). Despite the fact fossil fuel supply is aging modern society demands ever-increasing quantities mainly of this source of energy, because transitioning to renewables will not only diminish ecological impacts renewable energy optimists advocate, but it will have new consequences, too (Murphy; 2012; 1 in Butler et al.).[3] Accordingly, Rutledge (2005; 1) argues oil is the world´s most valuable energy resource without which no highly industrialized society can survive and whose availability must be guaranteed, if necessary, by military force. This source of energy accounts for 33 percent[4] of the world energy

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[1] One world many places; many worlds one place (O´Keefe, O´Brien, Pearsall; 2010; xvi)

[2] Energy is the ability to do work. It can be classified as stored (potential) energy, and working (kinetic) energy. Potential energy is the ability to produce motion, and kinetic energy is the energy of motion (Fanchi, 2011; 1).

[3] For example, both solar and battery technology in their current iterations depend on rare metals and other natural resources that are unevenly distributed around the world. A full-scale switch to renewable energy may merely supplant one dependency for another (Murphy; 2012; 1 in Butler et al.).

[4] Murphy; 2012; 4 in Butler et al.)

use/balance. As a result, the oil market, where supply and demand match, is being paid the thoroughgoing attention to. The former represents the oil-producing countries holding the substantial oil supplies and trying to make the biggest trading profits possible. The latter represents the oil importing countries trying to get oil at the lowest price possible. The concurrence of supply and demand largely affects the buying price of oil, the world economy progress and finally yet importantly the prospective security of oil supply.

Bearing in mind the economic globalization represents the increased flow of goods, services, information, money or people even a short term of oil production deficit can result in the oil market price volatility or economic growth slowdown. Baumann (2008; 4) argues "Any longer interruption of a steady and plenty flow of energy would massively harm a nation´s economic output, political stability and the personal wellbeing of its citizens". For this reason the meaning of the oil industry and its three integral parts, namely exploitation, transformation and distribution, is dependent on the level of the international energy security provision the respective states themselves contribute to by their own means.

In the previous years, the energy security of the states accounted for the home interest only because this subject matter was bearing signs of largely national political traits. Protecting their sovereignty the states thus preferred national approach in the field of solving imminent crises as well as long term stability of domestic energy markets. The states were willing to negotiate joint steps in connection with the real threat to their energy sovereignty only (Machytka; 2012; 134-138, 144). Given globalization linked economies more integrally and we are more dependent on global trading partners for continued development at the threshold of the 21st century (Pascual and Elkind; 2010; 2), the very states started pointing to the necessity of mutual cooperation and broader integration. As a result, they have entered the close relationship with the globalized economy events. Consequently, in the course of the current global economy crisis period the energy security has become one of the realms whose stability is to be ensured by the adequate representation of the states. Nevertheless, over the past several years it is national policy agendas around the world the energy policy has assumed a prominent role on (Florini in Pascual and Elkind; 2010; 149). Consequently, there has been remarkably little effective coordination across borders on energy issues. Florini further posits it is unlikely that any national government will be able to develop and sustain energy policies that can balance the competing objectives of affordable energy services, reliable supply, environmental sustainability, and geopolitical security (Ibid; 149). Irrespective of the fact the historical context pushed two of the major global energy consumers, namely the European Union and the United States into an open and dynamic dialogue about cooperation (contributing to stability and reinforcement of the energy security), the world economy trends strengthened by the abating signs of the global economy crisis in relation to political unrests within the raw material producing countries endanger their sovereignty. Bearing in mind the events at international level as well as geopolitical changes over time may threaten long term access to energy resources, the respective states have not ceased to pursue their own energy policy completely.

In Jewell´s (2013; 64) view many contemporary energy security policies focus on regional or global energy systems rather than merely national ones, because a nation´s energy security is affected by its regional and global context.

The United States has been debating energy security since the oil crises of the 1970´s. In January 2001, Vice President Cheney ensured he would oversee the formulation of a national energy policy America had not seen since Jimmy Carter´s presidency (Rutledge; 2005; 66). By applying the three energy security strategies the United States has tried to diversify the sources of oil supply away from the Persian Gulf in order to replace the Gulf supplies with oil from domestic sources, neighboring „hemispheric" suppliers – Canada, Venezuela and Mexico - and from the Caspian region of the former Soviet Union. These strategies had already been initiated during the 1990s. Cheney himself had played a key part in one of them (the Caspian strategy). What Cheney was therefore advocating in early 2001, was a deepening and strengthening of these strategies and this was because, even to date, they had only been partially successful. Indeed, there were some ominous signs that the advances on these three fronts might even be running out of steam (Rutledge; 2005; 68). As a result, America was soon thrown back upon a growing dependence on the Persian Gulf (Rutledge; 2005; xiv).

In the final months of 2013, this trend abruptly reversed as a result of increasing domestic oil supplies and, on the other hand, falling domestic demand for oil. Kleinman asserts (cited in Bowler; 2015) the US domestic oil production (representing the current boom) has been predominantly distinctive because of fracking, where conventional oil is extracted from shale formations using unconventional drilling technique known as hydraulic fracturing.[5] Based on the evidence at the time of writing, the war of nerves

[5] In hydraulic fracturing, or "fracking" wells are drilled vertically and then turned horizontally to run within shale formations. A slurry of sand, water, and chemicals, together referred to as hydraulic fluid, is then injected into the well to increase pressure and break apart the shale so that the oil is released (C2ES; 2015).

between US shale producers and Persian Gulf powerhouses (the biggest members of the Organization of Petroleum Exporting Countries (OPEC)) intensifies as oil market price has fallen down below $50 a barrel.[6] There is a widespread recognition that fracking is one of the main drivers of the rapid fall in oil prices. Kleinman also asserts, “Shale has essentially severed the linkage between geopolitical turmoil in the Middle East, and oil price and equities”. Even though many US shale oil producers have far higher costs than conventional rivals, many need to carry on pumping to generate at least some revenue stream to pay off debts and other costs. As a result, the world is in the midst of either depression or jubilation over this situation. In Rogoff´s view, most oil consuming countries are indeed somewhat less vulnerable to oil price shocks of this nature. On the other hand, oil price volatility remains a huge problem for oil-producing countries (2006; 24).

According to Gerri and McNabb (2011; 70) oil´s unique properties, its high energy density, capacity to be fractured into many distillates suitable for specialized applications, and a relative ease of transport, have made it particularly valuable for modern industrial societies. These attributes have resulted in oil´s being called a strategic commodity.

This fact as well as my personal interest contributed to my decision on the object of study for writing this thesis. This study´s endeavor focuses on emphasizing the role of oil in the world economy in general and its role and meaning in the process of providing for the US energy security in particular, given oil production together with national as well as food security represents the forefront objective.

In order to confirm or refute the strategic character of oil in the world economy in general and more importantly the US economy in particular we formed the hypothesis drawing on rhetorical questions as uttered by Geri and McNabb (Ibid; 70) pertaining to the strategic role of oil. Accordingly, in the process of exploring the very role of oil we started focusing on the premises that oil is worth going to war over; it is worth perceiving to be especially rare and valuable for national competitiveness; and it is worth thinking of its supplies in a zero-sum context (meaning your control of a new source of supply is my loss), so that countries believe they should engage in complex games to „win“long-term access to reliable supplies.

[6] From 2010 until mid-2014, world oil prices had been fairly stable, at around $110 a barrel. But since June 2014 prices have more than halved. Brent crude oil has now dipped below $50 a barrel for the first time since May 2009 and US crude has also fallen below $50 a barrel (Bowler, 2015).

If we disregard these (original) rhetorical questions were not to obtain the information they asked for, there is every reason to believe they presupposed positive answers. Given the assertion „the most frequently observed pattern which emerges from a study of US foreign policy over the past eighty years is a fundamental and an abiding concern for, and involvement in, the geopolitics of oil“ (Rutledge; 2012; xi), the topicality of the following statement by John D. Rockefeller[7] as far back as in 1870s „those who can achieve control over oil will be very rich“ (Rutledge; 2005; 3) have not faded away. Of great importance, too, is the declarative sentence by the US Department of Energy (2001) that „Oil is the lifeblood of America´s economy“. This statement will be used as the prism in the process of exploring (to what extent the above mentioned statements comply with) the role of oil in the course of providing for the energy security (following domestic oil production of the United States surpassed its imports) will proceed through. The answers to the respective premises will be looked for in the next chapters in order to attain the final picture of the thesis objective.

The principal guide to the analysis is the assumption that the above mentioned premises bear signs of strategic significance. As a result, the behavior of the United States is supposed to reflect upon their substance accordingly.

The benefit of this thesis is intended to reside in the summary perspective on oil issues and the appreciation of oil role in the context of the US energy security.

The present thesis is organized into 5 chapters. The respective chapters start with opening remarks reflecting the main topics consequently discussed.

Chapter One introduces the research topic, its overview and its significance. The chapter characterizes the oil as a feedstock, clarifies its role in the world economy, in the current energy landscape and in the US economy.

Chapter Two presents in the form of the literature review the interdisciplinary framework which has been used to bring sources to grasp the research topic underpinning this thesis. Considering the first chapter introduced oil as the object of the study, this chapter explores the area of interest, namely the US energy security. Accordingly, this chapter explores such associated notions as those of energy security, elements of energy security and threats to energy security.

[7] An American business magnate and a co-founder of the Standard Oil company which dominated the oil industry and was the first great U.S. business trust.

Chapter Three focuses on foreign oil supply to the USA. Consequently, global oil market, its attributes and main suppliers (individually as well as those forming OPEC) are clarified. And finally, US dependence on foreign oil and its impact on its foreign policy are dealt with.

Chapter Four concentrates on US domestic oil supply. Conventional (unconventional) sources and their impact on global oil market and domestic economy will be discussed.

Chapter Five explores the plausible scenarios that might occur with reference to the role of oil in the context of US energy security. Given the majority of oil is made use of in the transport industry, the respective chapter accordingly discusses possibilities of reducing US dependence on foreign oil and depicts viable alternatives of energy sources for the transport industry. As a result, the chapter draws on the observations and arguments and points out new perspectives for oil policies and strategies which arose from the analysis.

1. Oil and its Role in the Economy

The physical infrastructure of modern society forming part of the global economy requires a massive flow of energy to run on every single day predominantly in the form of fossil fuels which are cheap but powerful (Butler et al. (2012; 2). Gerri and McNabb (2011; 70) explain oil has been a highly sought after commodity ever since the first commercially drilled well struck oil in Pennsylvania (USA) in 1859. But its initial exploitation/utilization dates back to a long time ago. According to Yergin (1992) cited in Fanchi; 2011; 15-18) oil has been made use of since the time of Egypt and Mesopotamia as early as 3000-2000 B.C.E. In the course of that period, oil was used in building construction, waterproofing boats and other structures, setting jewels, and mummification. Arabs started using oil to create incendiary weapons as early as 600 C.E. By the 1700's, small volumes of oil were being used in Europe for medicinal purposes and in kerosene lamps. Producing larger volumes of oil was hindered by lacking adequate drilling technology in Europe.

As Gerri and McNabb (Ibid; 70) note its discovery, development and unflagging current global desirability contributed to its appraisal of a strategic commodity. In Warner´s view (2013) oil (also called black gold) is the basic feedstock, or energy source for much of today´s economic prosperity and wealth. It is the lifeblood of most gainful economic activity. In addition, the business of war is undeniable too, given the role oil plays at the military-strategic level. Buchan (2010; 193) consequently argues oil has been the lifeblood of war (armies, navies and air forces run on it) ever since the major powers´ navies converted to oil just before World War I. Oil fields have therefore been a prime target in war. During World War II, getting hold of the oilfields of Romania and southern Russia was a vital goal for the Germans, and loss of them after 1944 helped seal Germany´s fate. When US and UK troops invaded Iraq in 2003, one of their priorities was to seize Iraq´s oil fields. Just as oilfields are a prime target in war does not mean that they are necessarily a prime cause of war. However, oil certainly can, and has been, the trigger for war.[8]

Rutledge (2005; 1) argues oil is so prized because it has the best physical characteristics of any energy resource. According to Clô (2000; 2-3) oil is a dense, viscous

[8] Chaco region, being wrongly thought to hold oil, was the reason for going to war over by Bolivia and Paraguay in 1930. Oil is considered to have been a motive behind the Japanese attack on Pearl Harbor (USA) in 1941 (Buchan; 2010; 193).

mixture[9] of hydrocarbon compounds, varying considerably in its chemical composition. Its quality varies by region of the world, among other factors. Higher quality crude oil contains less water, sulfur, and organic matter (such as dirt) and more of the components that are easier to burn (like propane and butane)(CBO; 2012; 6).

Over the years different theories have emerged to explain the genesis of oil. Today, the most accredited theory is the organic theory[10], whereby oil is the process product of the anaerobic carbonization of mainly aquatic animal organisms. Despite the fact oil is formed through processes which may take millions of years, the rapidity of its depletion rate in relation to the time of its reproduction has made this a limited and exhaustible resource. This finiteness has periodically fuelled fears and worries about its imminent exhaustion. Therefore, as soon as the very costly tip of the drill first bores through the reservoir rock to find oil the extent of the oil field and its potential for technological and economical exploitation start to be subject to discussion. But the actual size of any oil field is only known after the oil has been extracted.

Oil can be found almost anywhere on earth representing wide range of environments such as permanently frozen subsoil in arctic regions, continents, seas and oceans. The largest oil deposits are located in the region of the Persian Gulf, Europe, Russia, North and South America where oil exploitation is on the rise. While Butler et al. (2012; 2) emphasize continual finding and successful exploiting the new sources they also stress the transition to new sources will be far from seamless. As a result, unconventional fossil fuels come with greater economic and environmental costs, significantly reducing their energy benefit, while renewables fall short at matching many of the characteristics which are generally valued in fossil fuels.

Kumhof and Muir (2012; 13-14) note the main uses of oil in today´s economy are as a liquid transportation fuel and as a feedstock for the chemical industry. But the most important use of oil today is in transportation, because the properties of oil are superior to the alternatives. Buchan (2010; 13) too, posits of all fossil fuels, oil is the most convenient because we are currently locked into using it for the majority of our transport. The second main use of oil today is as a feedstock of the chemical industry. Oil products are in virtually every single product we consume, either directly, or in the mining of the

[9] A mixture of hundreds of different chemicals (CBO; 2012; 6).
[10] Many scholars have been positively inclined towards this theory.

respective raw materials, in transportation or in processing. A small portion of total oil consumption goes into plastics, synthetics, medicines and foods.

In order to thoroughly understand developments in the oil industry Clô (2000; 37-38) accentuates the interconnectedness of different academic disciplines, namely that of economics and politics. This is attributed to the fact that the countries which previously dominated the industrial economy became progressively dependent on other countries for their energy supplies, causing both economic and political vulnerability. With oil, energy ceased to be a purely economic matter and became a motive and arena for political conflicts, whether between importing countries, between importing and exporting countries, or between companies and governments in a quest for acquiring direct control of oil resources; increasing the security of supplies; consolidating one´s own position with respect to other countries; and making a healthy profit. Despite the fact the interaction between economics and politics has differed in the oil industry over the years (depending on the specific state of the international relations involved, geographical areas to which they refer and the parties involved) it must be given due importance because in Clô´s view the respective combination increases the level of uncertainty in our appreciation and understanding reality.

According to Bahgat (2011; 16-17) interdisciplinary approach is needed to address the challenges connected with what happens „above ground“ (characterizing geo-policy) opposite to what is available „underground“ (characterizing geology). What happens „above ground“ is more likely to shape global energy markets than what is available „underground“. The above-ground challenges may include relations between producers and consumers, investment policies, and environmental issues, among others.

For the reality to be properly appreciated as well as understood some notable scholars (interested in how social practices are discursively shaped and enacted) bring us the theories to draw on. Fairclough (1992; 2000), for example, posits there is no social practice whose activity excludes language. Political communication is conceptualized as a type of social practice accordingly. Chadwick (2001; 42) asserts political language is political reality. Consequently, Fairclough (Ibid) argues, it is precisely language that can simultaneously reveal and disguise reality. This can be presented to the audience (recipients) in the form of ideas/principles that can be based both on the facts, pretended facts or covert/disguised aims. That is why to tell what was real and what was just a pretense we are thrown back on constant evaluating different representations which best fit reality because as Wodak puts it (2001, 36) language utilization is formed by and forms itself the social and political reality.

Regarding the energy policy Geri and McNabb (2011; 57) point out to a new way of thinking which is more grounded in people´s concerns and lived experience. In this context Hajer (2003; 89) suggests that policy proposals from political leaders and others make people aware of what they are part of through dialogue with others to build a sense of collective identity (cited Ibid). In order for people to become better and more discerning readers of the big picture they are confronted with in their daily lives the respective theory can become instrumental.

1.1. Oil in the Current Energy Landscape

According to ConocoPhillips[11] (2015) global energy environment is changing to such an extent that yesterday´s perceived energy scarcity has given way to a new era of energy abundance. The global energy landscape is evolving at a rapid pace and so are expectations for our energy future.

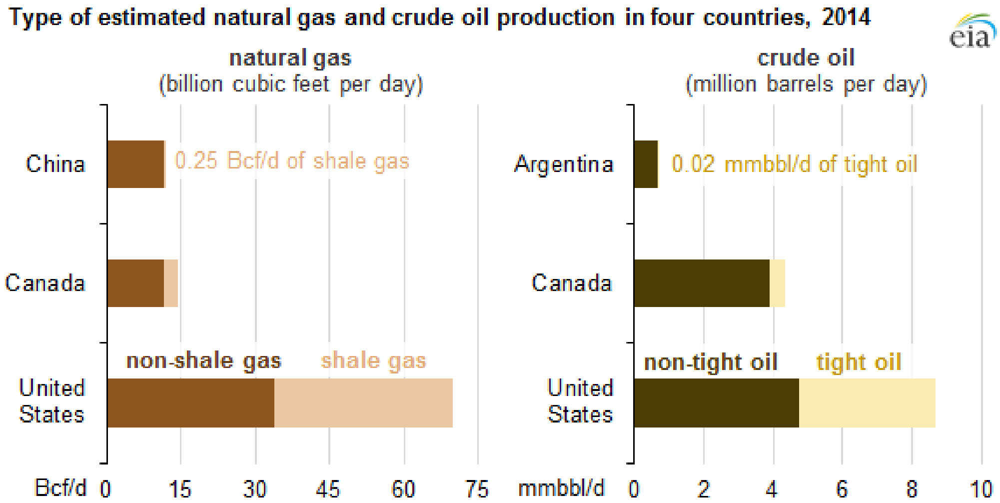
This fact can be attributed to the unprecedented boom in energy production the United States has been experiencing since October 2013. It was at that time the United States became the world´s largest producer of energy liquids (to include crude oil, natural gas liquids, and biofuels). Of the respective liquids, tight oil production (shale oil) scored the largest output of over three million barrels per day[12] (see Figure 1). The United States has become a dominant producer (both of shale gas and) tight oil.

Total U.S. crude oil production was estimated to average 9.3 million barrels per day (bbl/d) in March 2015. Given EIA's price forecast, projected total crude oil production averages 9.2 million bbl/d in 2015 and 9.3 million bbl/d in 2016, close to the 9.6 million bbl/d highest annual average level of U.S. production in 1970. The EIA expects U.S. crude oil production to average 9.2 million barrels per day (bbl/d) in 2015, up 0.5 million bbl/d from 2014. However, this forecast remains particularly sensitive to actual prices available at the wellhead and drilling economics that vary across regions and operators (EIA; 2015a,e; 2). In 2013, US crude oil and lease condensate (clarified in Chapter 4) proved

[11] (US exploration and production company)
[12] EIA estimates the U.S. tight oil production to have averaged 4.2 million barrels per day (EIA; 2015f; online tables).

reserves [13]increased to 36.5 billion barrels - an increase of 3.1 billion barrels (9.3%) from 2012 (EIA; 2014b,c).

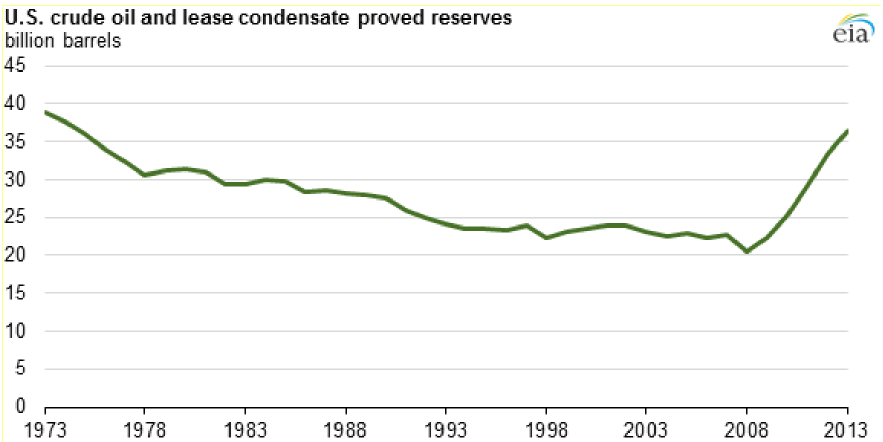
Figure 1: Type of estimated natural gas and crude oil production in four countries, 2014



Source: EIA (2015b)

U.S. proved reserves of crude oil and lease condensate have now risen for five consecutive years (as demonstrated in Figure 2), and exceeded 36 billion barrels for the first time since 1975.[14]

Figure 2: U.S. crude oil and lease condensate proved reserves



Source: EIA (2014c)

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[13] Refer to Annex B for explanation of the term.

[14] (EIA, 2014c)

Consequently, the changing energy landscape means greater ability for the world to meet the needs of its growing population, with reduced risks of price volatility and greater economic stimulation and job creation.

In the course of the current energy renaissance (transforming the ways in which it is produced, distributed and consumed) the changing energy landscape also includes other than (conventional) fossil fuels[15] (coal, oil, natural gas), be them uranium (it is not a fossil fuel, but it is classified as a nonrenewable fuel), biomass (wood and wood waste, municipal solid waste, landfill gas and biogas, ethanol and biodiesel), hydropower (hydroelectric dams), nuclear materials (uranium), solar, wind or geothermal (geysers) These energy sources are classified as non-renewable and renewable, respectively. Renewable energy is obtained from sources at a rate that is less than equal to the rate at which the sources are replenished. Examples of renewable energy include solar energy and wind energy. Non-renewable energy is obtained from sources at a rate that exceeds the rate at which the sources are replenished. Examples of non-renewable energy sources include fossil fuels and nuclear fission material such as uranium (Fanchi (2011; 2).

However, to date it is the low market prices of ubiquitous and dominant fossil fuels that have encouraged high levels of energy consumption per capita and generally discouraged the development of alternative sources of energy. Hydroelectric and nuclear power are exceptions to this trend. In addition to their low market costs physical and chemical properties of fossil fuels contribute to their particular use, too: oil for transportation; natural gas as an industrial feedstock, for residential and commercial space heating, and, more recently, as a fuel for electric-power generation; and coal for the generation of electricity and a feedstock for some industrial processes (NAS; 2009; 14).

In the latest BP Statistical Review of World Energy BP Group Chief Executive Bob Dudley (2014; 1) posits emerging economies[16] continue to dominate global energy demand (consumption) (accounting for 80 percent of the global increase in energy consumption in the year 2013) despite the stagnant global economic growth. While energy consumption growth accelerated globally, energy consumption growth was below average everywhere regionally, except North America (USA, Canada, Mexico) because the United States saw

[15] Fossil fuels have supported economic prosperity since the latter part of the 19th century.
[16] Top 5 fastest growing key emerging economies in 2014 were China, Nigeria, Philippines, Bangladesh and India (Boumphrey; 2014).

the world´s largest increase in oil production driven by massive investment in shale and other tight formations. Global primary energy consumption increased as a result of growth in demand for oil, coal and nuclear power. But global growth remained below the 10-year average of 2.5 percent. Over and over, growth was below average for all regions except North America. Oil remains the world´s leading fuel with 32.9% of global energy consumption. Coal is still the fastest-growing fossil fuel. Coal´s share of global primary energy consumption reached 30.1%, the highest since 1970. Globally, natural gas accounted for 23.7% of primary energy consumption. Hydroelectric output accounted for 6.7% of global energy consumption. Nuclear output accounted for 4.4% of global energy consumption, the smallest share since 1984. Renewable energy sources reached a record 2.2% of global energy consumption.

Despite the fact renewable energy technologies are supposed to play an increasingly important role in fulfilling future energy needs Butler et al. (2012;1) assert "It would be foolish to assume that transitioning to renewable energy will solve all our energy and environmental problems". Given dominant representation of fossil fuels in the energy economy the current status of fossil resources is unlikely to change even in the years to come. As the world population and their incomes are increasing, the amount of energy necessary to sustain our society is ever increasing accordingly.

In addition, the very energy continues to shift east and almost 90% of Middle East oil exports are likely to go to Asia (Ebbut; 2012). Yergin (2006) and Klare (2008) cited in Jewell (2011; 17) point out that demand in China, India and other emerging economies was rapidly growing in the first decade of the 21st century. While the United States was the world´s largest oil consumer and third oil producer (after Saudi Arabia and Russia) in 2010[17] (Bahgat; 2011; 21), in September of 2013 China started surpassing this major player in the global energy system to become the world´s largest net importer of oil (Sage; 2014; 6). Yergin (2006; 72; Yergin and Frei 2006) posits (cited in Jewell; 2011; 17) the rapidly growing Asian demand affected the energy security landscape in two main ways: First, it caused a „demand shock" which induced the annual oil demand growth rate twice that of the previous decade. Second, it meant that a lot of oil-consuming nations did not hold strategic petroleum reserves (SPR) under the auspices of the IEA.

[17] The largest natural gas consumer and second producer (after Russia); second largest coal consumer and producer (after China); largest nuclear power consumer and third hydroelectricity consumer (after Canada and Brazil) (Ibid; 21).

Murphy (2012; 4 in Butler et al.) posits a graphic look at world energy consumption suggests the scale of effort that will be required to dramatically reduce fossil fuel use and ramp up renewables. Considering the constraints already limiting large-scale renewable energy development (most sites suitable for hydropower have been developed; the large land foot-prints for some industrial solar, wind a biomass plants have stoked intense opposition), it is hard to see to what extent the balance of world energy sources will change without serious conservation efforts – that is, efficiency and curtailment. What Butler et al. (2012;1) do not fail to accentuate is "a full-scale switch to renewable energy may merely supplant one dependency for another". In order for this switch to be fully visible in practice now that a substantial amount of oil is being produced and supplied globally (because of the shale oil boom in the United States and increased production in both OPEC and non-OPEC countries) much effort will have to be made not only by the oil-consuming countries but also oil-producing ones.

Given the nature of the current energy landscape there is every reason to assert this policy is unlikely to become topical in the near future as will be clarified in the following subchapter.

1.2. Role of Oil in the USA

The most frequently observed pattern, which emerges from a study of the United States´ foreign policy over the past eighty years is a fundamental and abiding concern for, and involvement in, the geopolitics of oil (Klare; 2001; 27 cited in Rutledge; 2005; xi).

In order to explain the fundamental reason for this assertion the historical narrative is worth presenting to clarify the role and importance having been affixed to oil in the course of underscoring the importance of oil production to the US economy.

Since the time the internal combustion engine was introduced[18] thus making it possible for oil to replace coal as a fuel for transportation, this energy fuel has become the primary energy source representative (Fanchi; 2011; 15). According to Yergin (1992; 20 cited in Fanchi; Ibid) in 1854 the modern oil industry started by George Bissell of the United States realizing that rock oil - as oil was called in the 19th century to differentiate it from vegetable oil and animal fat - could be used as an illuminant in lamps. He gathered a group of investors together in the mid-1850´s. The group formed the Pennsylvania Rock

[18] 1870s

Oil Company of Connecticut and commissioned Edwin L. Drake to drill a well in Oil Creek, near Titusville, PA. The project that started in 1857 encountered many problems. By the time Drake struck oil on August 27, 1859, funds were to be cut off (Van Dyke, 1997 cited in Fanchi; 2011; 16).

As a result, Drake's well caused the value of oil to increase dramatically. Within fifteen months of Drake's strike, Pennsylvania was producing 450,000 barrels of oil a year from seventy-five wells. By 1862, three million barrels of oil were being produced and the price of oil dropped to ten cents a barrel (Kraushaar and Ristinen, 1993 cited in Fanchi; Ibid).

The invention of the electric light bulb (1882) caused a short-lived drop in the demand for kerosene but the increased amount of oil was soon necessary for fuel and lubrication due to quickly expanding automobile industry. As a result, in the early twentieth century new sources of oil were discovered in Ohio and Indiana, and later in the San Fernando Valley in California and near Beaumont, Texas. The world's first gusher, drilled at Spindletop Hill near Beaumont, produced as much as 75,000 barrels of oil per day. The well named Lucas-1, bore the name of Anthony F. Lucas, its driller and an immigrant from the Dalmatian coast (now Croatia).

In this well a rotary drilling (a modern drilling technique) was first used to largely facilitate oil production. Consequently, oil has become an energy source on a global scale. Industrialist John D. Rockefeller began Standard Oil in 1870 and by 1879 the company held a virtual monopoly over oil refining and transportation in the United States. Rockefeller's control of the oil business made him rich and famous. The Sherman Antitrust Act of 1890 was used by the United States government to break Rockefeller's grip on the oil industry. Standard Oil was found guilty of restraining trade and a Federal court ordered the dissolution of Standard Oil in 1909. The ruling was upheld by the United States Supreme Court in 1911 (Yergin; 1992; Ch. 5 cited in Fanchi; Ibid).

By 1909, the United States produced more oil than all other countries combined, producing half a million barrels per day. Up until 1950, the United States produced more than half of the world's oil supply. Discoveries of large oil deposits in Central and South America, and the Middle East led to decreased domestic production. The very production peaked in 1970 and was declining till October 2013 as US domestic oil production surpassed US oil import (Fanchi; Ibid).

Consequently, oil demand in the United States and elsewhere in the world has continued to grow. From 1948, the United States imported more oil than it exported. Today, the United States imports about half of its oil needs (Fanchi; Ibid).

Until 1973, oil prices were influenced by market demand and the supply of oil that was provided in large part by a group of oil companies called the "Seven Sisters." This group included Exxon, Royal Dutch/Shell, British Petroleum (BP), Texaco, Mobil, Standard Oil of California (which became Chevron), and Gulf Oil. Rutledge (2005; 3-4) posits these companies carved up the world oil market between them and maintained their control from the 1920s to the 1960s. Before the 1970s these major oil companies had access to the almost limitless reserves of Middle East oil. In the 1970s these huge reserves were removed from their control and nationalized by the OPEC revolution.[19] It was the Organization of Petroleum Exporting Countries (OPEC) that became a major player in the oil business by raising prices on oil exported by its members. This rise in price became known as the "first oil crisis" as prices for consumers in many countries jumped.

Since the mid-1940's, America has been largely dependent on oil from the Middle East and has employed its military to ensure unfettered access to oil from the region. This pattern developed toward the end of World War II. As an essential commodity to the Allied campaigns around the world during the war, refined petroleum was used across the spectrum of military operations (Klare, 2004 cited in Michaud et al.; 2014; 1). On February 14, 1945, with the World War II coming to a close, President Franklin Delano Roosevelt and Saudi King Abdulaziz Ibn Saud brokered a deal whereby the United States would receive consistent access to inexpensive dependable oil that was critical to America´s new role as a world superpower in exchange for military protection for the Kingdom. The requirement to support the House of Saud in exchange for an oil supply would serve as an underpinning for the employment of the military for the next (six) decades (Lippman, 2005 cited in Michaud et al.; 2014; 2). This policy was never developed in national security strategy documents (Klare, 2004 cited in Michaud et al.; 2014; 1).

America's alliance with Israel collided with its reliance on Middle Eastern oil in October of 1973, when Iran and the Arab members of the Organization of Petroleum Exporting Countries (OPEC) cut off all oil exports to the United States in retaliation for U.S. support of Israel during the Yom Kippur war. Oil prices quadrupled in months and

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[19] As a result, the major oil companies concentrated their search for new giant oil fields with more than 500 million barrels of reserves (Ibid).

Americans waited for hours in line at gas stations only to be greeted with signs reading, "Sorry, no gas." The embargo was an international embarrassment for America; without oil, America was seen as a paper tiger (Luft & Korin, 2013).The embargo had both short and long-term impacts on national security strategy, with immediate plans to place more naval assets in the Arabian Gulf. The embargo's impact on the military lasted more than 35 years. U.S. military policy in the Middle East hinged largely on the requirement for the United States to secure its flow of oil, ensuring the world's shipping chokepoints remained secure. This policy remained largely undocumented until 1979 with the codification of the Carter Doctrine, which underpinned the employment of strategic military assets for two decades. The doctrine, as articulated during President Jimmy Carter's 1980 State of the Union Address, made clear that the United States would employ military force to secure oil from the Arabian Gulf region if necessary (Carter, 1980 cited in Michaud et al.; 2014; 2).

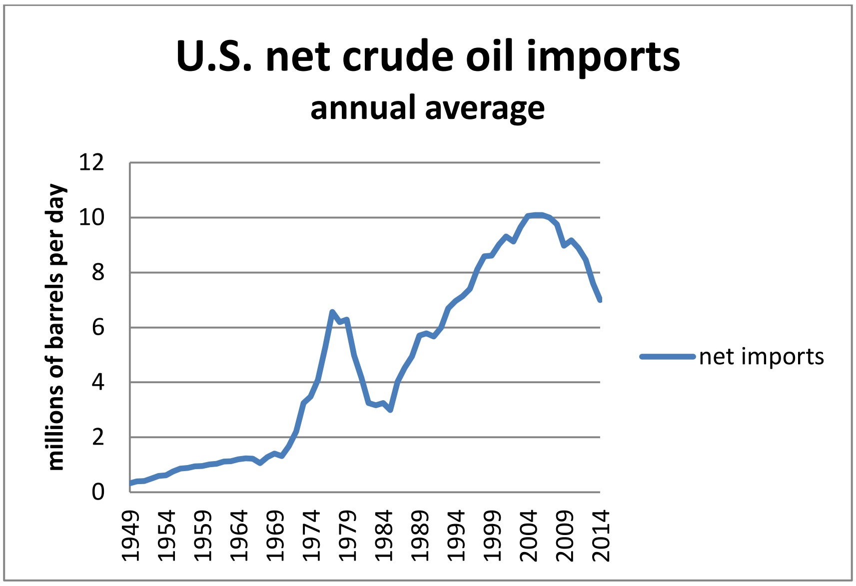
Buchan (2010; 205-207) posits the blockage of any major oil route would raise the cost of oil affecting the United States accordingly. Buchan deals with the protection of sea lanes around the world being the principal justification for maintaining such a large US navy but also other fleets to help keep the Suez and Panama Canals, and the Malacca straits open to shipping in general and oil and Liquefied Natural Gas (LNG) tankers in particular. A very high proportion of tankers are vulnerable to attack either on the high seas or as they have to pass through the Strait of Hormuz to exit the Gulf, and then – depending on whether they are west or eastbound – either the Bab-el-Mandeb entrance to the red Sea and the Suez Canal or the Straits of Malacca between Indonesia and Malaysia.

The U.S. Department of Defense forward presence, facilitated by the U.S. military force structure, secured oil in fear that at any given moment a foreign country could interrupt America's supply. Throughout conflicts in Iraq and Afghanistan, assured access to reliable and sustainable supplies of energy was critical to meeting operational requirements (Voth, 2013 cited in Michaud et al.; 2014; 2). In the course of the last five years, however, shale oil extraction around the country created the potential to engender American energy independence and facilitate some freedom of military assets. Shale oil allows the United States to continue in the process of evolving its economic and military position based on world oil dependence dynamics.

Sullivan (2014; 3) argues the United States has stationed its 5th Fleet in Bahrain. It operates the massive Al Udeid Air Base, which is jointly run by Qatar. The United States has other military interests in the region. It seems far-fetched to think that the United States will pack up and leave the region due to its greater energy security in oil. Even if it were not to import a single drop of oil from the Middle East and North Africa, it would still benefit from being there to protect sea lanes of communications for trade. These sea lanes are important for US investments in the region, but also in Asia, Europe, and globally. The Middle East and North Africa have some of the most important trade and shipping choke points in the world, such as the Strait of Hormuz, the Suez Canal, and the Bab al Mandab off Yemen, the Strait of Aden, the Strait of Gibraltar, and more.

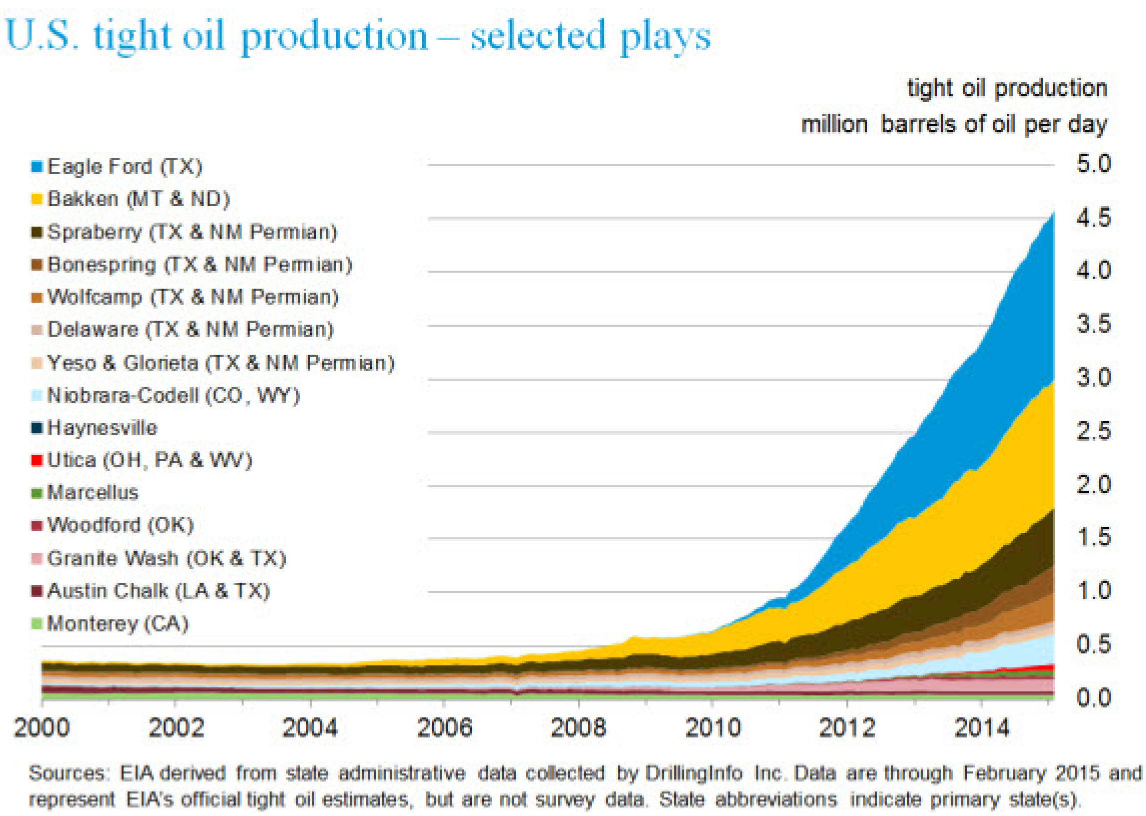
While every president from Nixon to Barrack Obama publicly espoused the notion of ending American reliance on foreign oil as a means of strengthening US strategic position in the world, drilling for shale oil was only recently widely implemented. While much of the technology required for capturing shale oil existed in some form since the early 1900’s and the first recorded act of hydraulic fracturing, rather complicated and environmentally messy process necessary for extraction of shale oil occurred in 1947. Shale oil, however, was neither economically nor politically viable until the late 2000’s. In 2008, as global oil prices rose to an all-time high, "Drill, baby, drill!" became the Republican campaign slogan introduced at the Republican National Convention by then-Maryland Lieutenant Governor Michael Steele (Carnevale, 2008 cited in Michaud et al.; 2014; 2). The wholesale price of oil was an incredible $150 per barrel, a 12 percent jump in less than one year. To put this in perspective, the previous record was $96 per barrel in 2003, a 14 percent increase over the previous year spurred by the onset of the war in Iraq and the Venezuelan coup attempt (Kliesen, 2008 cited in Michaud et al.; 2014; 2). At a cost of production at approximately $86 per barrel, shale oil was now economically feasible and America found itself shifting to a new energy paradigm (Francu et al., 2007 cited in Michaud et al.; 2014; 2). By 2012 the gap between U.S. oil production and oil consumption reached its smallest level in two decades, with 92 percent of the increase in production resulting from shale oil drilling (Ratner & Tiemann, 2014 cited in Michaud et al.; 2014; 2), as demonstrated in Figures 3 and 4.

Figure 3: U.S. net crude oil imports



Source: EIA (2015; online tables)

Figure 4: U.S. tight oil production through 2/2015



Source: EIA (2015d)

They assert without a reliance on Middle Eastern oil, the U.S. is less inclined to conduct military intervention within the region, as domestic oil production allows the U.S. to serve other interests. It is worth noting that the extraction of shale oil is politically and environmentally complex with many considerations for its evolution over the next several decades. With impact on air quality, water consumption, water contamination, and local communities, shale oil's future within the U.S. is a subject rife with contention. Controversy and environmental impact notwithstanding, the more oil the U.S. produces domestically, the less the country is required to rely on oil from outside its borders. Shale oil is promising and the current American oil boom is the initial manifestation of its potential. Being in the midst of a debt crisis the United States heavily relies on shale oil production because it has the potential to improve the U.S. balance of trade and generate job growth and revenues in producing states (Michaud et al.; 2014; 4).

1.2.1. Strategic Considerations

According to Cherp (2012; 360-361) irrespective of the United States' being among the world´s top ten producers of oil, coal, natural gas and electricity from nuclear and hydroelectricity this country has its own set of energy security problems. The United States too, makes its own choices about how to optimize its own energy security position. The most dominant problem being faced by the United States represents its dependence on foreign supplies of crude oil. As a result, every US president from Nixon to Obama, has set targets, put forward proposals, commissioned reports, and signed legislation in an effort to stem crude oil imports and improve energy security (US DOE; 2010).

According to World Energy Council (WEC) (2014) the role of unconventional energy sources in the United States is very important. It is being ascribed to technology advancements, which led to the commercialization of shale gas and oil. Consequently, increase in domestic energy production is supposed to lead to a real potential for the United States to become a net energy exporter.

Given the Energy Policy and Conservation Act (enacted by Congress in 1975) has been ever since effective, all exports of domestically produced crude oil are banned. The respective act allows the President to make exemptions to the crude oil export ban if it is in the national interest (in recognition of free trade relations with Canada and Mexico) Weiss and Peterson (2014; 1-2).

When running for president George W. Bush criticized the outgoing Clinton-Gore administration for allowing an energy crisis to take shape. He promised to reduce reliance on foreign oil and complained that the United States had no comprehensive energy policy (Elkind; 2010; 119). In 2006 he even declared that the USA is “addicted to oil” (Bryce; 2010). In Elkind´s view (Ibid) the current problems facing the U.S.A. in relation to energy are no less challenging. Projections of future energy challenges dwarf the headaches that countries are dealing with today. Given voters called for change in the 2008 presidential and congressional elections,[20] the question of the moment is how the administration of President Barack Obama is performing. As a successor of George W. Bush, Barack Obama and his administration made an ambitious decision to change US energy policy and economy in such a way as to be more effective, more competitive and friendlier to global climate. In his view the transition to clean energy has the potential to grow the economy and create millions of jobs (Bryce; 2010). One is advised (Ibid) of the fact that nine out of ten units of energy consumed in the US and the rest of the world come from fossil fuels. On an average day, US consumption of coal, oil and natural gas amounts to 41 million barrels of oil equivalent. That is equal to the average daily output of five Saudi Arabias. Obama did not have the answer on where to find such a huge amount of carbon-free energy which was expected to make the America free (from the evils of hydrocarbons), strong and more employable. Despite the fact nothing comes close to oil in terms of flexibility, cost or convenience, Obama appealed for replacing it; what is more, he appealed for replacing natural gas and coal too.

1.2.2. Recent Development

Mitchell (2013; 1) posits the trend of rising US dependence on imports of foreign oil has been abruptly reversed, as a result of falling domestic demand for oil and increasing domestic supplies. While oil imports from outside North America will diminish, the United States will continue to trade oil with Canada and Mexico. The United States will remain a substantial oil importer for at least a decade, and cannot be indifferent to the stability and security of global oil markets.

Though it does not export oil[21] (except in certain limited circumstances),[22] it now imports much less, creating a lot of spare supply. According to Elkind (2010; 126) the

[20] Every American voter feels pain when gasoline prices rise, thus what is meaningful is the price per gallon.
[21] According to Banzhaf (2014) OPEC's embargo generated long gas lines and high tensions in the United States. In response to this predicament, Congress enacted the Energy Policy and Conservation Act of 1975 (EPCA), which made it illegal to export U.S. crude oil except in certain limited circumstances. Because the nation was hardly in the oil export business anyway, for as many as forty years this was a gratuitous law with

United States (as a member of the IEA) is required to maintain a minimum of 90 days of net crude oil imports in reserve in case of a large scale interruption of global supply as a result of the lessons learned in the 1970s. As Bahgat (2011; 25) puts it the uncertainty regarding sufficient indigenous oil production in conjunction with real and potential disruption of foreign supplies laid the ground to create the strategic petroleum reserve (SPR). The SPR of the United States is the largest stockpile of government-owned emergency crude oil (to be sold on the market during times of crisis) in the world. It is considered the nation´s first line of defense against an interruption in petroleum supplies.

The SPR reserves are held in a group of five hundred caverns along the coast of the Gulf of Mexico and have the capacity to hold a maximum of 727 million barrels[23] of crude oil (Rutledge; 2005; 153). The location was chosen as an oil storage site because it is also the location of many US refineries and distribution points for tankers, barges, and pipelines (Bahgat; 2014; 25). At the present time, the United States holds 691 million barrels of crude oil in the Strategic Petroleum Reserve[24]. In his State of the Union address in January 2007, President George W. Bush declared his intention to double the size of the SPR to 1.5 billion barrels (Elkind (2010; 126). The SPR prepared a plan to expand to one billion barrels and conducted a site selection process to construct additional storage facilities. However, efforts to expand the SPR to one billion barrels were terminated in 2011 because prior appropriated funds were rescinded, and no new funds proposed (DOE; 2015).

The role of the SPR in pursuing energy security strategy has been accordingly advocated as well as opposed. According to Bahgat (2011; 26) it is popular with politicians because it is seen as a national protection against a future oil embargo. It is popular with many economists because it is seen as a hedge against the economic impact of future supply disruptions. In recent years opponents of the SPR have asked whether the SPR should be used during a national emergency only or just occasionally as a means to

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little impact. All that changed with the shale revolution to such an extent that the crude oil produced domestically has bumped up against the capacity of US refiners to run it into gasoline or other final products. This means there is more oil than the United States can make use of. Given EPCA has not been lifted yet, one has to believe the United States is in a state of oil shortage irrespective of the fact this is no longer the case (Sullivan; 2014; 5).

[22] The current US law only allows such exports to Canada, Mexico, and countries with existing free-trade agreements (Sage; 2014; 19). Current export includes finished petroleum products, unfinished oils, gasoline blending components, fuel ethanol, and NGPLs and LRGs.
According to EIA Weekly Petroleum Status report as of 4 March 2015 the respective export accounted for 478,000 barrels per day. US EIA. "Weekly Petroleum Status report", 3/4/2015, Accessed March 6, 2015, http://www.eia.gov/petroleum/supply/weekly/.

[23](US DOE, 2015)

[24] Source: EIA (Ibid)

alleviate high domestic oil and gasoline prices. Some argue the SPR is the world´s costliest system of oil caches and it is a tremendous waste of money. Some argue the idea of having a government-owned-and-operated inventory has lost any attraction due to the increasing globalization of oil markets. They also think using oil as a weapon to achieve political goals is outdated because oil will always be available to those willing to pay the posted price[25] in global spot markets.[26]

With reference to the SPR Rutledge (2005; 153), too, accentuates the problem of decision making process associated with the exact time frame of releasing oil supplies from the SPR during situations of short-term supply disruptions. He points out the controversial use of the SPR during the 1990-1991 Gulf War when world oil prices briefly spiked at around $40 per barrel in October 1990. On 16 January 1991, President George H. W. Bush authorized the release of 33.75 million barrels from the SPR. In the event, only 17.5 million barrels were released and sold to 13 companies because, in the meantime, world oil supply and demand had stabilized. The President was criticized for not authorizing the SPR deliveries sooner.

The SPR's second emergency drawdown occurred after Hurricane Katrina caused massive damage to the oil production facilities, terminals, pipelines, and refineries along the Gulf regions of Mississippi and Louisiana in late August 2005. On 2 September 2005, President George W. Bush directed to draw down and sell 30 million barrels of crude oil from the SPR to the U.S. markets. Most recently, in June 2011 President Barack Obama directed a sale of 30 million barrels of crude oil to offset disruptions in supply due to Middle East unrest (DOE; 2015). Rutledge (Ibid; 153) also doubts the utility of the SPR during long-term supply disruptions. Since the creation of the SPR (1975) the increasing motorization of American society raised the nation´s daily petroleum consumption from 16 million barrels per day to 19.6 million in 2001. Its net imports of crude oil raised from 5.8 million barrels per day to 10.6 million barrels per day and in recent months declined to 6.793 million barrels[27] per day. Given the respective amount the SPR content of 691

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[25] The published price that a company will sell a commodity for, when the commodity is not traded on an official exchange. Posted prices are generally averaged by rating companies to establish postings, or average market prices for that commodity. "Posted Price." What Is Posted Price? Definition and Meaning., Accessed March 20, 2015, http://www.investorwords.com/15614/posted_price.html.

[26] A market in which commodities, such as grain, gold, crude oil, or RAM chips, are bought and sold for cash and delivered immediately. "Spot Market." What is Spot Market? Definition and meaning., Accessed March 20, 2015, http://www.investorwords.com/4661/spot_market.html.

[27] EIA, US. "Weekly Petroleum Status report" 3/4/2015, Accessed March 6, 2015, http://www.eia.gov/petroleum/supply/weekly/.

million barrels would have covered over 100 days, which fully complies with the number decided on by the IEA. Rutledge argues some GAO´s experts do not think the SPR is large enough to play a significant role in large or long-term disruptions because such disruptions would greatly exceed the capacity of the reserve to affect the world oil market. As a result, the existence of the SPR does not remove the vulnerability of the United States to serious and long-term threats to its oil supply – and hence to the way of life of its motorized citizens. Because of the relative absence of public transportation (Elkind; 2010; 128) the heads at the White House and oil companies would be brought the sort of execration experienced by Presidents Nixon and Carter on by the curtailment of motor gasoline supplies (Rutledge; Ibid; 153).

The existence of the SPR gives the Administration an extremely useful cushion against the brief supply disruption and rise of oil prices that might be expected during a short and successful war against a Middle East adversary. However, in order to avert a long-term threat to the everyday life of the American metropolis the very existence of the SPR does not in any way diminish the possibility that the United States might feel it necessary to strike pre-emptively (Ibid; 153). As the United States still depends on the continuous flow of oil to fuel its economy for transportation and everyday life, it cannot ignore the ever rising imminent threats on its supply (Baumann; 2008; 9). Given a preemptive strike is based on the assumption that the enemy is planning an imminent attack[28] the above mentioned utterances bear signs of goal-orientation without any fixed set of rules, hence the form of political realism.

Despite the fact the preemptive strikes do not represent a novum in the international politics and have provided a solution not being talked about to date, in the aftermath of 11 September 2001 a new emphasis on preemptive use of force was incorporated in a document entitled The National Security Strategy of the United States of America (White House, 2002) also referred to as the “Bush doctrine”[29] which served as the policy framework for the US invasion of Iraq in 2003 (Gupta; 2008; 182). This foreign policy initiative of President George W. Bush has become controversial as it marked the beginning of a new phase of American hegemony-seeking in world affairs (Ibid).

[28] Pertaining to bar for preemption Crawford (2003; 33) asks questions: ”How much and what kind of evidence is necessary to justify preemption? What is a credible fear that justifies preemption?”

[29] According to Dosal (2005, 253-261) the Bush doctrine draws on the politics and praxis applied by the United States against Latin America. Neo-conservatives draw inspiration from procedures and praxis by Theodore Roosevelt having preemptively exercised his big stick policy in the Caribbean.

Condoleezza Rice, Donald Rumsfeld and Richard Cheney declared foreign policy of the United States should follow the national interest (Yordán, 2006, 15). To understand its behaviour the basic concepts of international relations describing the international system can be instrumental. According to Mearshimer (1995) the states are rational actors and they extend their influence by means of the offensive strategy under favourable international conditions. According to Geri and McNabb (2011; 167-168) nation states are sovereign states but their sovereignty has eroded over the past few decades, in both the economic and political arenas because of the very nature of the global system they are part and parcel of. Despite the fact states are no longer the sole actors important to global affairs most of them believe they need to protect their national interests. Consequently, they seek to survive and to further their national interests through the use of diplomacy, backed by military and economic force, and often engaged in balance-of power tactics to keep the peace. This realist framework is based on deep suspicion of the motives of other countries.

Re-nationalization of resource deposits, infrastructures and energy corporations placed the energy sector in OPEC and non-OPEC countries under state control. Currently, national oil companies (NOCs) hold most of the world´s reserves and account for a share of world oil production expected to rise to 62 percent by 2030. In the Middle East oil production is rigorously controlled by governments which are usually members of OPEC. Buchan (Ibid; 14) argues priorities of the state companies are frequently very different to the majors. NOCs are almost always in less of a hurry to develop their oil fields than outside companies and may pursue a more cautious policy on the rate of extraction from oil fields. NOCs may have fewer means to invest in extraction than their private-company counterparts. They are liable to be told by their government shareholder to subsidize fuel prices out of their profits or divert oil profits to other parts of the economy (Buchan; 2010; 14).

Pertaining to the United States Buchan (Ibid; 194) posits oil matter has always been a public-private partnership. Unlike most countries, the United States has never had a national state-owned oil company, but its public authorities have always been closely involved in regulating oil. For most of the twentieth century, regulation of production was conducted at the state level – by the two main producing states of Texas and Louisiana individually, and by the two states together in the Interstate Oil Compact Commission. Protection from imports (to prevent US producers being undercut by cheaper imports) was provided at the federal level – by an oil-import tariff imposed in 1932 and by oil-import quotas that lasted from 1959 until they were removed in 1973.

Buchan (Ibid; 202) posits the Administration of President George W. Bush had accordingly engaged right from the start. According to Rutledge (2005; 7, 197) the inauguration of the Bush Administration in January 2001 signified the arrival of a government more heavily dominated by oil and energy corporate interests than ever before in the nation´s history and at a time when competition for the world´s oil reserves had been intensified by significant changes in the corporate structure of the world oil industry. Indeed, oil capitalism was now at the very heart of US power.

The nationalization of the energy business hinders the workings of economic rules and enables that political motives become predominant which causes that state-owned companies do not always respect market rules and may instead be involved in domestic or even international politics. What is more, growing import addiction, a rising number of net-consuming states and the inevitable depletion of fossil fuels in the years to come are framing a new great game of Realpolitik (Baumann; 2008; 8). Indeed, the above mentioned practical notions formed a prescriptive guideline on the world policy-making, currently being practiced without any sentimental illusions. The United States being part and parcel of the global energy security, the US oil industry policy is being affected accordingly. Given an already glutted global oil market (at the time of writing) there is every reason to agree with Bryce (2010) that hydrocarbons play the irreplaceable role in the global energy economy in general and the United States in particular. In his view the United States is not addicted to oil. Nor is it addicted to fossil fuels. What the United States is addicted to is prosperity. Given US energy policy draws on (reflects) the results of the complex relations between the federal government and those of the respective states of the Union., decision making processes are accordingly fragmented because of the many participants representing the respective levels being engaged (Elkind; 2010; 119-120; 128).

2. Energy Security

According to Barrett et al. (2010) all Governments express the need for a secure energy sector. They are fully aware of the fact that the electoral and economic cost of prolonged interruption in energy supply is enormous and therefore strive to provide for the thorough security of the respective energy supply. Baumann (2008; 4) posits not only private households, but also the business sector and even public authorities and governmental agencies are in the dire need of energy to function properly. Elkind (2010; 130) argues each country faces a distinctive energy security position. One country´s position in relation to the availability and affordability of energy services may be favorable, but it may face challenges in relation to reliability and sustainability. Within a given country, even individual regions and socioeconomic groups may have different positions because their location or economic condition means that they either do or do not have sufficient energy services at their disposal. According to Cherp and Jewell (2014; 416) variations in energy security priorities and policies between different entities do not necessarily mean the existence of different concepts of energy security although they may result from the usage of this term by those who seek to increase the priority of other policy agendas by calling them a matter of (energy) security.

Irrespective of the fact the United States has been debating energy security since the oil crises of the 1970s its attention to energy security typically reaches a fever pitch when global energy prices spike or international conflict threatens to disrupt energy trade. What is more, its efforts have been episodic rather than systematic (Pascual and Elkind; 2010; 1).

Bahgat (2011; 21) too, posits Washington has never fully articulated a comprehensive energy strategy. For decades different administrations have sought to respond to specific crises, but once these crises had been averted, political will evaporated. Acccording to NAS (2009; 26) the United States has never implemented a truly comprehensive set of national policies for obtaining and using energy to meet national goals for sustainability, economic prosperity, security, and environmental quality. Instead, the US energy system has developed in response to an array of uncoordinated market forces and shifting public policies.

For many American leaders, energy security means producing energy at home and relying less on foreigners (Mallaby; 2006). According to Schapiro (NAS; 2009; xi) all postwar US presidents have focused some attention on energy-supply issues, US growing dependence on imported oil and the environmental impacts of fossil-fuel combustion. As

Buchan (2010; 207) puts it, calls for energy or oil independence have become a mantra of successive presidents: Nixon, Ford, Carter, Reagan, George W. Bush and now Barack Obama. It is a theme that resonates well with US public opinion – it is more persuasive than climate change as a motivation for practicing energy conversation and promoting alternative energy. But September 11, 2001 added a new dimension to the ongoing debate about U.S. energy security. Now, that the world stage and the global energy landscape have both changed dramatically (Elkind; Ibid; 120), Pullitzer Prize winner Daniel Yergin (2006) argues the real energy security requires setting aside the pipe dream of energy independence and embracing interdependence. In a world of increasing interdependence energy will depend much on how countries manage their relations with one another, whether bilaterally or within multilateral frameworks thus getting rid of nationalistic approach because the nationalistic conception of energy security is worse than useless. It follows that reducing energy independence can enhance energy security. According to Baumann (2008; 5) absolute security is never within reach, but if the right policies are enacted a priori, the looming impacts of an energy crisis could be attenuated. In addition, Baumann does not fail to stress that due to increasing independencies, no nation-state alone will be autonomous enough to fulfill these duties alone. Thus a precondition for energy security is global or at least regional cooperation. Mitchell (2013; 1) posits energy security is losing strength as a policy justification because US dependence on imports of foreign oil has been abruptly reversed as a result of falling domestic demand for oil and increasing domestic supplies. Despite all that the International Energy Agency (IEA) argues ensuring energy security is as urgent as ever. Because oil security remains a cornerstone of the IEA, the Agency has strengthened and sharpened the emergency response mechanisms created to counteract short-term oil supply disruptions (2014; 13).[30] In spite of the fact energy security priorities are changing, the need to be prepared remains constant (Ibid; 3). Luft and Korin (2009; 157-158) point out the constant reminders of the vulnerability of the American way of life to energy supply disruptions. They also accentuate energy security can only be achieved through a common sense of insecurity.

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[30] Florini (in Pascual and Elkind; 2010; 149-150) argues the International energy Agency (IEA), despite its name, is actually a creature of the Organization of Economic Cooperation and Development (OECD); it addresses only a small portion of the energy issues. The IEA has no regulatory powers and is ill-equippped to play any oversight role given energy needs are largely met through market forces (often heavily distorted by government policies) and global energy markets are extremely volatile and poorly regulated.

2.1. Defining Energy Security

The challenge of energy security has been the topic of decades-long debate because it goes to the heart of each nation´s economy and so many existing relationships around the globe (Pascual and Elkind; 2010; 6). The proper definition of the term „energy security“ is no simple issue too (Ibid; 2). It can be attributed to the fact that in the course of the history the problem of energy security was accordingly reflected by academia. As early as in 1961 Harold Lubell dealt with energy policy (in Western Europe). However, following the stabilization of oil prices and receding threat of political embargoes in the late 1980s and 90s energy security ceased to be of any interest to academia. It re-emerged in the 2000s driven by the rising demand in Asia, disruptions of gas supplies in Europe, and the pressure to de-carbonize energy systems (Cherp and Jewell; 2014; 415).

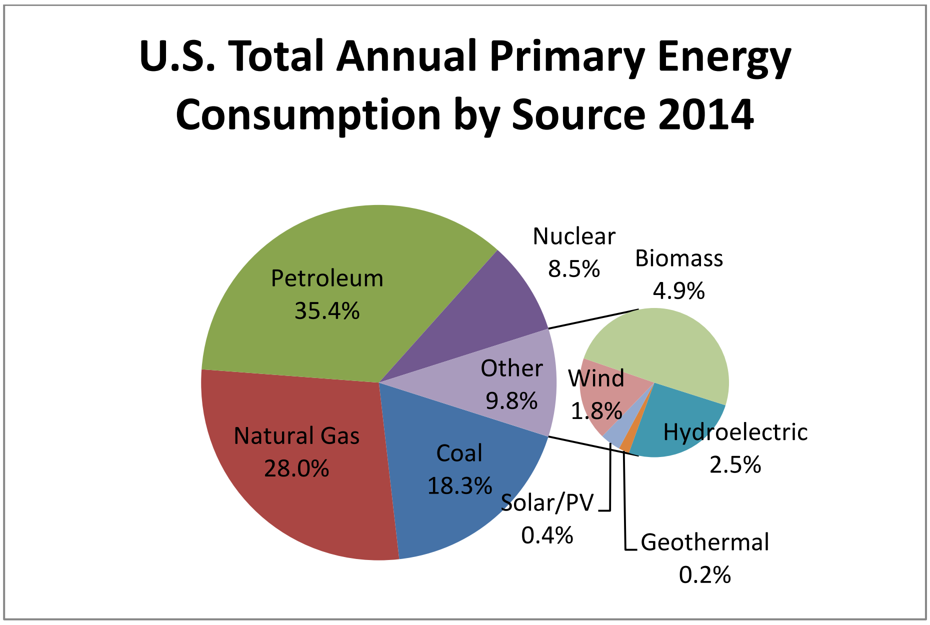
Cherp and Jewell (Ibid; 415) differentiate contemporary from classic energy security studies. The latter concept (typical for 1970s and 80s) covered a stable supply of cheap oil under threats of embargoes and price manipulations by exporters (Colglazier and Deese, 1983; Yergin; 1988; cited Ibid; 415). The former concept encompasses a wider range of issues extending beyond oil suplies (Yergin; 2006; cited Ibid; 415). In addition, energy security is now closely entangled with other energy policy questions such as providing equitable access to modern energy and mitigating climate change (Goldthau; 2011 cited Ibid; 415). As a result, the concept of energy security implicit in the classic studies has become a subject of intense re-examination.

According to Baldwin (1997; 23 cited in Cherp and Jewell; 2014; 416) economic security, environmental security, identity security, social security and military security are different forms of security, not fundamentally different concepts. As a result, a valid concept of energy security should be based on a concept of security in general. Baldwin, building upon Wolfers (1952), defines security as a low probability of damage to acquired values.

Yergin, the father of modern energy security conceptions, (2006; 70-71) defines energy security as reliable supplies at a reasonable price.

Given different countries interpret what the concept of energy security means for them differently the United States Congressional Budget Office (CBO) report of May 2012 (pp.II-10) defines energy security as the ability of U.S. households and businesses to accommodate disruptions of supply in energy markets. Households and businesses use energy from oil, natural gas, coal, nuclear power, and renewable sources (such as wind and the sun) to generate electricity, provide transportation, heat and cool buildings and for industrial processing. The United States is more secure with regard to a particular energy source if a disruption in the supply of that source creates only limited additional costs for consumers. The vulnerability of the U.S. economy to disruptions in the supply of a particular energy source depends on the importance of that energy source to the economy.

Figure 5: U.S. Total Annual Primary Energy Consumption in 2014 by Source



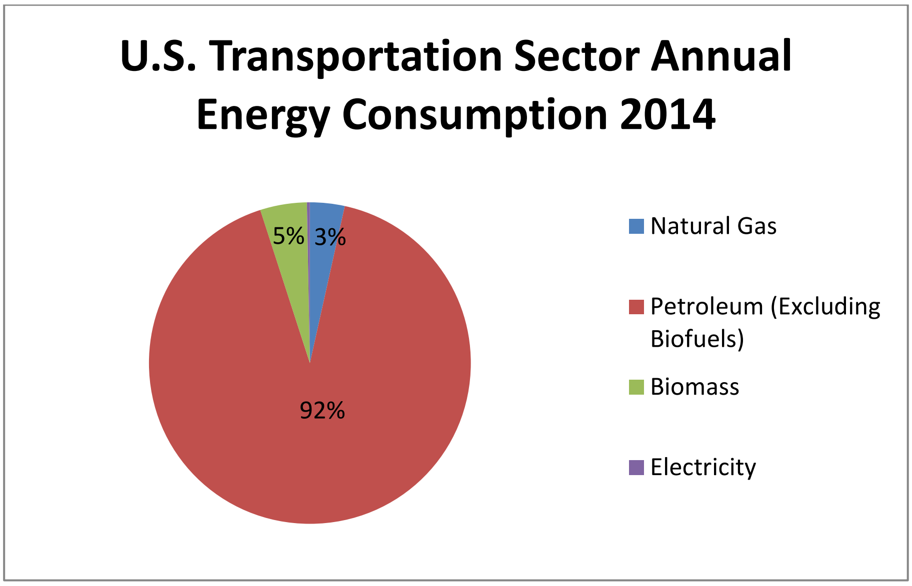
Source: EIA (2015; online tables)

More than 80 percent of the energy consumed in the United States comes from oil, natural gas or coal (as depicted in Figure 5). For each source, several factors determine how vulnerable the nation is to a disruption in its supply:

- The extent to which disruption occurring anywhere in the world affect energy costs in the United States,
- The likelihood of disruptions and the ability of energy suppliers to respond to disruptions if they occur, and
- The ability of energy consumers (including electricity producers, oil refineries, household, and businesses) to shift to other, less expensive sources of energy.

The two largest energy-consuming sectors of the U.S. economy are electricity and transportation. Electricity is generated from multiple sources (coal, natural gas, nuclear power and renewable fuels) that are primarily supplied in regional markets made up of one or more countries. On the other hand, the transportation sector in the United States is powered almost exclusively by oil, which is supplied in a global market (see Figure 6). Consumers and the economy are more vulnerable to disruptions in oil markets than they are to disruptions in other energy markets. Similarly, disruptions in the supply of oil have a much higher effect on prices than interruptions in the supply of other energy commodities. Although the global nature of the market for oil makes U. S. consumers vulnerable to price fluctuations caused by events elsewhere in the world, it also benefits those consumers by lowering the price of oil relative to what it would be in a regional oil market.

Figure 6: U.S. Transportation Sector Annual Energy Consumption 2014



Source: EIA (2015; online tables)

The market for oil has the following key characteristics:

- A substantial amount of oil is produced in countries that are vulnerable to geopolitical, military, or civil disruptions,
- Oil is supplied in a global market that rapidly transmits the effect of disruptions to the prices paid in all oil-consuming nations, regardless of the amount of oil those nations produce domestically,
- Most oil-producing countries have a limited spare capacity to increase production over the short term in response to such disruptions, and
- The United States has very little ability to affect the world price of oil by increasing the supply of oil to the market.

Even though the notion of energy security has traditionally been concerned with securing the supply of fossil fuels, the level of security is not determined by supplies alone but the immediate balance between supply and demand and the longer term trade-off between more energy security and environmental considerations (e.g. more wind farms vs. open spaces or more nuclear power vs. global security and nuclear proliferation) (Barrett et al. 2010).

The IEA (2014; 13) defines energy security as “the uninterrupted availability of energy sources at an affordable price”. Energy security has many dimensions:

- Long-term energy security mainly deals with timely investments to supply energy in line with economic developments and sustainable environmental needs.
- Short-term energy security focuses on the ability of the energy system to react promptly to sudden changes within the supply-demand balance.

Lack of energy security is thus linked to the negative economic and social impacts of either physical unavailability of energy, or prices that are not competitive or are overly volatile. In cases such as the international oil market, where prices are allowed to adjust in response to changes in supply and demand, the risk of physical unavailability is limited to extreme events. Supply security concerns are primarily related to the economic damage caused by extreme price spikes. The concern for physical unavailability of supply is more prevalent in energy markets where transmission systems must be kept in constant balance, such as electricity and, to some extent, natural gas. This is particularly the case in instances where there are capacity constraints or where prices are not able to work as an adjustment mechanism to balance supply and demand in the short term.

The ability to respond collectively in the case of a serious oil supply disruption with short-term emergency response measures remains one of the core activities objectives, which called for promoting alternative energy sources in order to reduce oil import dependency. The IEA continues to work to improve energy security over the longer term by promoting energy policies that encourage diversification, both of energy types and supply sources, and that facilitate better functioning and more integrated sources, and that facilitate better functioning and more integrated energy markets (Ibid; 13).

Elkind (2009; 121-130) posits traditional definitions of energy security have included availability, reliability and affordability. However, a contemporary approach to energy security places emphasis on environmental sustainability of energy services, too.

Availability requires the existence of commercial energy markets in which buyers and sellers trade available energy goods and services, markets that take shape only when parties agree on terms that accommodate the commercial, economic, political, strategic, and other interests of buyers, sellers, and shippers. Mutuality of interest among the players in the value chain is therefore a prerequisite for energy security. As a result, the idea of availability is not quite as simple as it may seem at first glance.

Reliability involves the extent to which energy services are protected from interruption. Given energy is an essential building block of economic activity enabling daily life, interruptions jeopardize the ability to run factories, illuminate hospitals and heat homes continuously. In certain cases energy reliability can be a matter of life and limb.

Affordability accounts for the energy affordable in absolute terms only, or rather the energy that can be used. The energy prices in general and their volatility in particular, are even more central, because price shocks often cause serious humanitarian or economic hardship, political instability, as energy consumers struggle to cope with unexpected financial burdens. Prices reflect market circumstances and signal market expectations, which in turn influence consumer choices and investment decisions, whether in favor of consumption or conservation. Even in wealthy countries consumers find it hard to make rapid changes in their energy consumptions when prices deviate seriously from established expectations.

Sustainability represents the ability to maintain the qualities that are valued in the physical environment (Sutton; 2004; i). According to Elkind (2009; 121-130) this is done for several reasons: Energy infrastructure typically is long-lived. As a result of this, decisions made today have long-term implications for how long energy is produced, converted, stored and used. Promoting energy security without including sustainability will promote the use of technologies and practices that will exacerbate climate change and, accordingly, climate change will clearly affect energy systems profoundly. Thus, talking about energy security without talking simultaneously about sustainability is, at best, penny wise and pound foolish.

2.2. Threats to Energy Security

Any source of danger to the continuity of the provision of energy and energy services is conceived as a threat to energy security. For this reason ensuring energy security requires a good understanding of the causes of danger, the nature of the threats, the level of dependency between the threat sources and what impact the damage has on the provision and access to energy services (Barrett et al. 2010).

Some of the threats are less predictable than others e.g. depletion of fossil fuel reserves, while others are not, e.g. fluctuations in energy prices or occurrence of natural disasters (Ibid; 15). Egenhofer, Gialoglou and Luciani consequently distinguish between short-term and long-term threats. The former are generally associated with supply shortages due to accidents, terrorist attacks, extreme weather conditions or technical failure of the grid. The latter are associated with the long-term adequacy of supply, the infrastructure for delivering this supply to markets, and a framework for creating strategic security against major threats (non- delivery for political, economic, force majeure or other reasons).

Threats can be divided into four categories: Threats posed by humans and human activities; threats posed by technology failure; threats posed by factors related to the nature of energy resources; and threats posed by environmental factors Barrett et al. 2010).

According to Elkind (2009; 122) the respective elements of energy security (availability, reliability, affordability and sustainability) are linked with potential threats:

Availability (Exhaustion of reserves that can be extracted cost effectively, Limits on development opportunities (such as resource-nationalist policies and state-to-state contracts), Problems in siting infrastructure – for example, the “not in my back yard” (NIMBY) syndrome, Financial, legal, regulatory, or policy environments that are not conducive to sustained investment).

Reliability (Failure of energy systems due to severe weather, earthquake, and so forth, Failure due to poor maintenance or underinvestment, Attack (or threat of attack) by military forces or terrorist organizations, Political interventions (such as embargoes and sanctions).

Affordability (Exhaustion of reserves that can be extracted cost-effectively, Excessive demand resulting from high energy intensity and/or failure to institute sound pricing and other desirable policies, Failure to incorporate an environmental dimension into concepts of energy security, resulting in need for an even more urgent response to climate change or other threats to sustainability).

Sustainability (Policy responses to narrow definition of energy security (for example, support for increased use of coal before carbon capture and storage technologies are commercialized, Impacts of a changing climate (such as sea-level rise, storm surges, and severe weather events).

2.3. U.S. Oil Dependence

The oil (in)dependence represents a national problem the United States has been facing since the first oil price shock in 1973.

In the final months of 2013, domestic crude oil production in the United States surpassed imports. As a result, the outlook for the U. S. oil supply has shifted from one of scarcity and insecurity to one of abundance. Regardless of the economic benefits as well as potential impacts on national security interests domestic oil abundance has not ended the involvement in the above mentioned regions, largely due to the enduring importance of the U.S. economy and transportation sector in particular (Commission on Energy and Geopolitics; 2014; 2).

Indeed, not only is the word “dependence” but also its antonym, hence the word “independence” frequently inflected in public policy discussions. Galles (2015) ascribes this phenomenon to American political ideology having been defined by the Declaration of Independence. As a consequence, Americans naturally think of independence as good and dependence as bad. That is why arguments to implement government policies to reduce US dependence on foreign oil often find a receptive audience.

According to Greene and Ahmad (2005; 3) even today no consensus exists on the definition of oil dependence and how to measure its costs, because the problem of oil is not one dimensional. Consequently, the oil dependence should be seen as a syndrome, a combination of the importance of oil to the economy, reliance on imports, lack of economical substitutes, and the use of market power by oil producing states.

According to Greene at al. (2007) oil dependence is fundamentally an economic problem. It is primarily the fear of the economic consequences of oil market disruptions or manipulations that creates oil dependence, submission of the United States to control or influence by others.

Given the essence of the oil dependence problem is the actual and potential economic costs it generates (Greene et al.; Ibid), Brown and Kennelly (2013; 2) quantify the costs of U.S. dependence on foreign oil using relatively broad matric that is based in a long-standing economics literature and a relatively narrow metric that is confined to oil-security externalities[31] (exemplified below).

[31] Since externalities are market failures, and oil dependence reflects a market failure, then oil dependence should be treated as if it were an externality (Greene and Ahmad (2005; 4).

They argue the U.S. dependence on imported oil yields a variety of costs in excess of the market price paid for the oil. In addition to the environmental and foreign policy implications and (marginal) social costs associated with the consumption of domestic or imported oil, other (economic) costs resulting from U.S. dependence on imported oil may include the macroeconomic risks associated with greater exposure to world oil supply disruptions, the foregone opportunities for the United States to exercise market power in the world oil market, and the costs to the United States of maintaining a strong military presence in the Middle East.

For the above mentioned costs to be reduced, the unique opportunity represented the year 2014 that saw the restricted US oil imports (currently averaging for 6.75 million barrels per day) and the immense domestic oil production (currently averaging 9.33 million barrels per day). This fact as well as OPEC (and non-OPEC) decision (as of 27 November 2014) to maintain constant oil production resulted in the collapse in global crude oil prices. Given OPEC (though being able to exercise its monopoly power[32] by restricting its production) did not cease to maintain constant oil production, the ability of the United States (exercising its monopsony power) to restrict imports not only reduced global crude oil price but also offset the price gains the OPEC cartel generally achieves by reducing oil production (in order to manipulate oil prices). Brown and Kennelly consider the monopsony premium as a causation of marginal social cost of U.S. dependence on imported oil. According to Galles (2015) arguments, such as “reducing our dependence” on foreign oil are generally misleading excuses.

Greene et al. (Ibid; 2) argue once the problem of oil dependence is correctly characterized, a meaningful definition of oil independence can be formulated as achieving a state in which a nation´s decisions are not subject to restraining or directing influence by others as a consequence of the nation´s need for oil. Galles (2015) posits economic independence means the power to choose among offers, hence an alternative is available. Economic independence means freedom to choose the lower-cost option. Economic independence is perfectly consistent with voluntary dependence on trading partners who benefit us the most. Given energy independence is the mantra politicians of all ideologies repeat (Geri and McNabb (2011; 95), Sullivan (2014; 2) calls it a fallacy that needs to be put to rest (Sullivan; 2014; 2).

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[32] The cartel´s market power arises from its market share and the inelasticity of world oil demand and oil supply by non-OPEC producers (Greene et al.; Ibid; 3).

Table 2: World Proved Crude Oil Reserves (Billion Barrels) 2014

	Reserves	Share		Reserves	Share
North America	219.8	13.3%	**Africa**	126.7	7.7%
Canada	*173.2*	10.5%	*Algeria*	*12.2*	0.7%
Mexico	*10.1*	0.6%	*Angola*	*9.1*	0.5%
United States	36.5	2.2%	*Libya*	*48.5*	2.9%
Central & South America	328.3	19.8%	*Nigeria*	*37.1*	2.2%
Brazil	*15.0*	0.9%	**Eurasia**	118.9	7.2%
Ecuador	*8.2*	0.5%	*Kazakhstan*	*30.0*	1.8%
Venezuela	*297.7*	18.0%	*Russia*	*80.0*	4.8%
Middle East	803.6	48.5%	**Asia & Oceania**	46.0	2.8%
Iran	*157.3*	9.5%	*China*	*24.4*	1.5%
Iraq	*140.3*	8.5%	**Europe**	12.3	0.7%
Kuwait	*104.0*	6.3%	*Norway*	*5.8*	0.4%
Qatar	*25.2*	1.5%	*United Kingdom*	*3.0*	0.2%
Saudi Arabia	*268.4*	16.2%			0.0%
United Arab Emirates	*97.8*	5.9%			0.0%
World	1,655.6	100.0%	**World**	1,655.6	100.0%

Source: EIA (2015, online tables)

A strategy based on “enough, at low cost” has serious limitations because the United States abounds with about 2.2 percent of world oil reserves only (see Table 1). It presupposes importing vast quantities of oil (currently accounting for approximately 42 percent of US consumption) to run US transportation system (Gerri and McNabb; 2011; 95) accounting for about two-thirds of all petroleum used in the United States. As a result, calls for energy independence are not realistic (Bahgat; 2011; 22) because the worldwide market for oil makes it almost impossible for a large country like the United States to gain independence, or separation, from that market. The United States cannot shut itself off from the world market without causing a shortage in US supplies of oil and a resulting large and rapid increase in the price of oil and its products. As long as the United States imports, even in small quantities, the price of oil, whether imported or produced domestically, will be set in the world market (CBO; 2012; 9). While politicians have extolled the benefits of energy, most scholars (cited in Bordoff and Houser (2015; 48) prefer focusing on energy security. As Sage (2014; 9) puts it „Global energy security and relative geopolitical stability is more important to price than energy independence“.

The United States not being able to disconnect itself from the global markets, its energy independence is not a viable option. The beneficial participation of the United States in global oil markets allows it to mitigate the impact of supply disruptions, whether domestic crude oil production losses or disruptions in long-term import supply. Even if the United States achieves crude oil self-sufficiency, American businesses and consumers will still be vulnerable to global oil supply disruptions (Bordoff and Houser; 2015; 48). As a result, Bahgat (2011; 3) suggests calls for self-sufficiency or energy independence are more for domestic constituencies.

Consequently, Yergin argues for setting aside the pipe dream of energy independence concept and embracing the one of interdependence (cited in Mallaby; 2006)**.** Bordoff and Houser (2015; 48) too, favor the interdependence of the United States and global oil market stressing better integrating US crude oil into global oil markets can improve both US and global energy security. According to Baghat (2011) interdependence is the underlying characteristic of today´s energy markets. According to CBO (2012; 22) the interconnectedness of the world oil market means that US households and businesses will always be exposed to fluctuations in the price of oil, regardless of how much oil the United States imports or produces domestically. Mallaby (2006) too, argues for the concept of interdependence as it can actually be good for energy security. Because oil is traded globally a supply disruption anywhere affects oil prices in the United States. In other words, the level of energy security of the respective global oil market participants (be them producers or consumers) is part of US energy security. In this sense the energy security of producers is not supposed to be in competition with that of consumers because they are interdependent.

2.4. Economic Losses Associated with Supply Disruptions

According to Brown and Yücel (2002) and Hamilton (2003) international oil supply shocks have led to sharp price increases and U.S. economic losses (in Brown and Kennelly; 2013; 10). Brown and Huntington (2013) (Ibid; 10-11) explain these losses include transfers from the United States to foreign oil producers and reduced GDP.

When oil went from about $30 barrel at the beginning of 2004 to almost $150 barrel by 2008 Rubin (2010) posits over $1 trillion of income was transferred from the industrialized oil-consuming world to the OPEC cartel. Greene and Ahmad (2005) posit when oil suppliers use market power to raise prices above competitive market levels, wealth is transferred from oil consumers to oil producers. The transfer of wealth is not a loss to the global economy. The wealth still exists, only its ownership has changed. Oil consuming states become poorer, oil producing states become richer. Consequently, the transfer of wealth is a real economic loss to the United States too.[33] Brown and Huntington (2013) (Ibid; 10-11 argue to the extent that the economic losses associated with oil supply disruptions are not taken into account in private actions in making commitments to use oil, they are externalities that raise concerns for economic policy. If consumers can correctly anticipate the size, risks and societal impacts of oil disruption and take them into account in their oil purchases, Brown and Huntington see little reason for government intervention. Consumers are expected to internalize all of the social costs of oil consumption, including the risk of disruption, by holding inventories, diversifying their energy consumption and reducing their dependence on oil use. However, national security concerns are believed to restrict the available information about geopolitical conditions and oil market risks. If restricted information causes oil consumers to underestimate the risks, they are likely to underinvest in oil security protection. If oil consumers have accurate information about oil market risks, government intervention may be justified for a more fundamental reason. Brown and Huntington further argue that if oil consumers have accurate information about oil market risks, government intervention may be justified for a more fundamental reason. Oil consumers will internalize any costs of oil use that they expect to bear, but they will typically ignore any costs that their decisions impose on other consumers. The purchase of an additional barrel of oil has the potential to affect the economic security for all other consumers—not just the purchaser.

2.4.1. Expected (Potential) Transfers and Imported Oil

The period of 1986 through 2007 saw the increased US oil imports accounting for 10 million barrels per day (EIA; 2015; online tables). According to Brown and Kennelly (Ibid; 11-12) during a supply shock an increase in US oil imports accordingly increases the expected transfers to foreign oil producers. The respective increase happens in two ways. Oil production in unstable countries expands with oil production outside the United States, which translates into bigger price shocks and larger transfers on all U.S. oil imports. In addition, increased consumption of imported oil increases the amount of oil subject to a foreign transfer during a disruption. Although both elements are traditionally considered

[33] In order to compute the transfer of wealth it would equal the quantity of net imports times the difference between the actual market price and the hypothetical price that would prevail in a competitive market. In reality, the hypothetical competitive market price cannot be observed but must be estimated (Greene and Ahmad; 2005).

part of the cost of U.S. dependence on foreign oil, Brown and Huntington take the perspective that only one portion of these transfers ought to be considered a security externality. Brown and Huntington argue that individuals buying oil products (or oil-using goods) should recognize that possible oil supply shocks and higher prices could harm them personally. So the expected transfer on the marginal purchase for this individual should not be regarded as a security externality.

On the other hand, individuals are unlikely to take into account how their purchases may affect others in the United States by increasing the size of the price shock that occurs when there is a supply disruption. So the latter portion is a security externality. When summed across more than three hundred million people in the United States, this small external effect is significant in the aggregate. Brown and Kennelly embrace both approaches and include estimates of both transfers in their broad measures of the cost of U.S. dependence on imported oil.

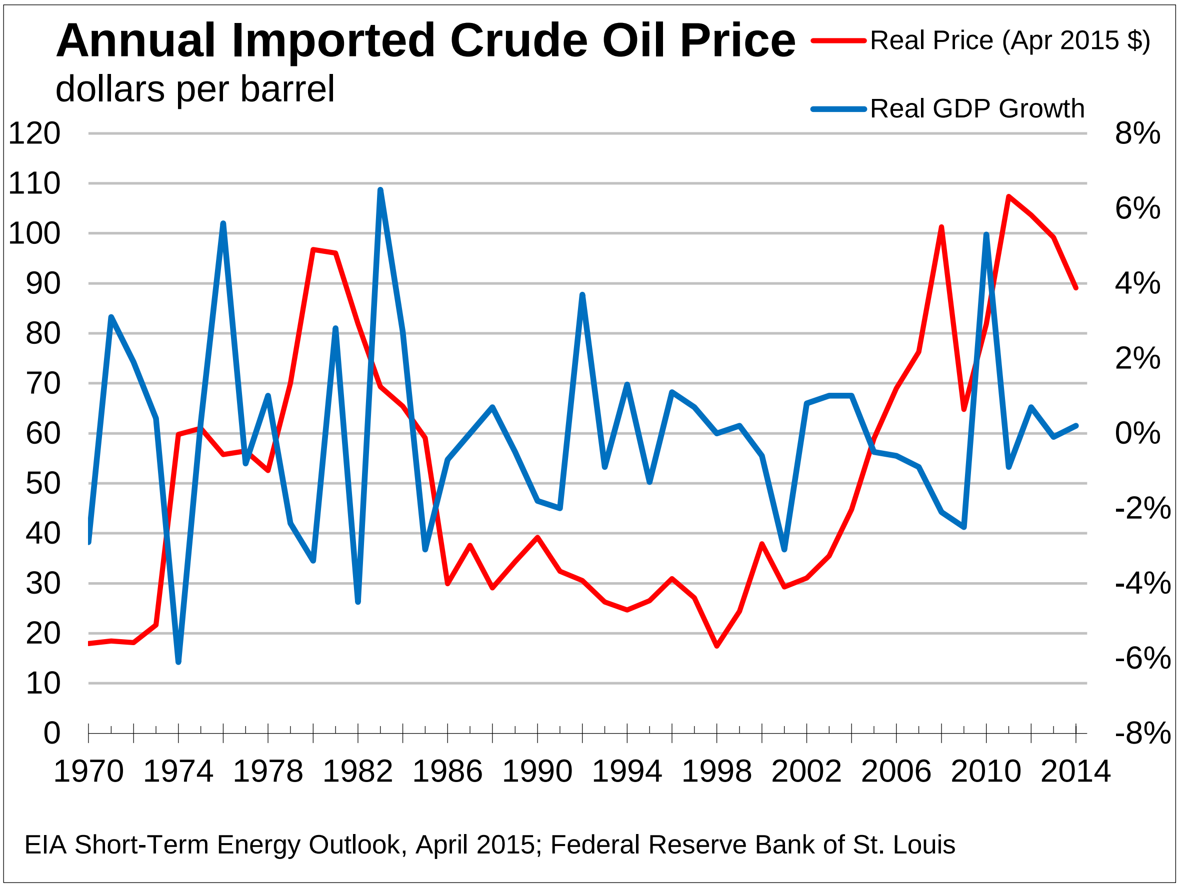
2.4.2. Expected (Potential) Transfers and Domestically Produced Oil

The period of June through December 2014 saw the increased production of US shale oil averaging 4.5 million barrels per day as of December 2014 (EIA, 2015d). According to Brown and Kennelly (Ibid; 12) an increase in U.S. domestic production of oil and its adequate consumption increases the secure elements of world oil supply. The increased security of supply weakens the price shocks arising from any given supply disruption and yields smaller transfers on all U.S. oil imports. Consequently, the increased consumption of domestically produced oil reduces the expected transfers resulting from world oil supply disruptions. Because the benefits of lower price volatility are conferred throughout the economy, consumers are unlikely to take the benefit into account when buying oil (or oil-using goods). Following either the broader or narrower approaches, the difference in transfers between the consumption of imported and domestically produced oil represents a cost difference between the two sources of oil.

2.4.3. Expected (Potential) GDP Losses

Greene and Ahmad (2005) posit when the price of oil is raised above the competitive market level, the higher price signals the world economies that oil is scarcer. Economic scarcity (as opposed to physical scarcity) is communicated to economies by higher prices. From the economic perspective, it is unimportant whether scarcity is due to the exercise of market power or the lack of physical resources. In a world where oil is scarcer, the ability of economies to produce output is decreased. This loss of ability to produce is termed a loss of potential GDP.[34]

Figure 7: Real Annual Imported Crude Oil Price, real GDP growth



Sources: EIA (2015e, online tables), Federal Reserve Bank of St. Louis

According to Council (2012; 7) every U.S. recession since 1973 has been preceded by—or occurred concurrently with—an oil price spike. As illustrated in Figure 7, changes in world crude oil prices tend to be inversely correlated with the direction of U.S. GDP development.

According to Brown and Kennelly (Ibid; 12-14) the GDP losses associated with oil supply shocks can be considerable. Economic researchers have offered a variety of explanations for the outsized effects that could yield such losses. John (1995) points to market power and search costs. Rotemberg and Woodford (1996) similarly blame imperfect competition. In practice, consumers may not understand the likelihood of future

[34] The loss of potential GDP could be measured by summing the losses (and gains) throughout the economy of producers´ and consumers´ surplus caused by higher oil prices (Greene and Ahmad; 2005).

oil supply disruptions and the consequent price effects, which could mean that the possibility of future transfers is not considered in the decision process. Bohi (1989, 1991), Bernanke et al. (1997), and Barsky and Kilian (2002, 2004) attribute these effects to possible monetary policy failures. Mork (1989) and Davis and Haltiwanger (2001) point to the reallocation of resources necessitated by an oil price shock. Hamilton (1996, 2003), Ferderer (1996), and Balke et al. (2002) blame the uncertain environment created for investment, and Huntington (2003) points to coordination failures.

Whatever generates the strong impact of oil supply shocks on U.S. economic activity, the economic losses from such shocks extend throughout the economy and are much greater than any individual might expect to bear as part of an oil purchase. Consequently, those purchasing oil are unlikely to understand or consider how their own oil consumption increases the economy-wide effects of oil supply shocks. Therefore, the expected GDP losses resulting from oil price shocks are likely to be security externalities.[35]

Recent research, such as that by Kilian (2009) and Balke et al. (2008), shows that it is important to differentiate among the various causes of oil price shocks when analyzing or estimating the effects on GDP. Oil supply disruptions result in higher oil prices and reduced economic activity. Oil demand shocks originating from domestic productivity gains result in increased economic activity, which increases oil demand and leads to higher oil prices. Other oil market shocks—such as foreign productivity gains—can boost oil prices and have neutral effects on U.S. output. In such cases, oil price increases do not yield economic losses.

These recent findings do not provide a reason to conclude that the GDP losses resulting from oil supply disruptions are not externalities. Neither are they a reason to think it impossible to quantify the GDP effects of oil supply disruptions. One simply needs to be careful that any analysis of GDP losses depends on probable oil supply disruptions—not

[35] O´Keffe, O´Brien and Pearsall (2010; 34) define externalities (negative and positive) as the unintentional side effects of an activity affecting people other than those directly involved with a given activity. Arthur Pigou (a British economist) argues the existence of externalities justifies government intervention through legislation or regulation. Other economists suggest the most efficient solution to externalities is to include them within the cost for those engaged in the activity, that is, to internalize any given externality. This means that externalities are not necessarily seen as market failures, which can, in turn, weaken the case for government intervention.
According to Clô (2000; 40) the term externalities is used to indicate costs and benefits that are not reflected in prices and therefore not transmitted into market decisions. He too, suggests the presence of externalities justifies public intervention to improve the allocation of resources, even though it does not, in itself, ensure that the benefits obtained will necessarily outweigh the avoided costs. Pertaining to security of supply public and company policies prefer the aim of a greater diversification in sources of oil supplies to their relative costs or physical availability.

just oil price shocks—and that any parameters used in estimation are from research that has distinguished between oil supply disruptions and other factors that might serve to boost oil prices. Although the increased consumption of either imported or domestically produced oil increases the economy's exposure to the effects of oil supply shocks, policymakers have a reason to differentiate between these two sources of oil when it comes to GDP losses.

Brown and Kennelly conclude that increasing U.S. oil imports boosts the insecure elements of world oil supply, which strengthens the oil price shocks resulting from any given oil supply disruption and exacerbates the GDP loss. In contrast, increasing domestic oil production boosts the secure elements of world oil supply, which weakens the price shocks from any given oil supply disruption and dampens the GDP loss. Consequently, the expected GDP loss is smaller for an increase in oil consumption from domestic production than from imports. Following either the broader or the narrower approaches, these GDP losses are considered part of the costs of U.S. oil consumption. The difference between the GDP losses associated with increased consumption of imported oil and domestically produced oil is a cost of using foreign rather than domestically produced oil.

2.5. U.S. Oil Premium Components

According to Brown and Huntington (2013; 118; 125-126) world oil supply disruptions lead to U.S. economic losses. Increased oil consumption increases the vulnerability of the economy to oil supply disruptions, but it matters where the additional oil is produced. Increased production from stable producers can dampen future oil price shocks, whereas increased production from unstable producers can exacerbate future oil price shocks. Given oil is fungible, the term domestic and imported oil rather than that of stable and unstable is being preferred. The economic losses associated with oil supply disruptions—GDP losses and some transfers abroad—are externalities that can be quantified as oil security premiums. These are a way to measure these externalities. Estimated in dollars per barrel of oil, these security premiums reflect the externality components of expected changes in aggregate output and transfers that result from the increased consumption of domestic or imported oil. Brown and Huntington provide a methodology for computing oil-security premiums that can be updated as world oil market conditions change. These premiums are estimated by taking into account projected world oil market conditions, probable oil supply disruptions, the market response to oil supply disruptions, and the resulting U.S. economic losses.

Because there is an integrated world oil market in which all oil prices are determined, the economy's exposure to the price effects of oil supply disruptions increases with all U.S. oil consumption. Nonetheless, the security premium for the consumption of imported oil is greater than that on the consumption of domestically produced oil. Increased domestic oil production boosts the share of stable supplies in the world oil market, and increased U.S. oil imports boost the share of unstable supplies. These premiums can be used to evaluate any U.S. policy that improves the security of world oil supplies. For instance, the premium on imported oil could be implemented as a tax on U.S. consumption of refined products with the addition of a subsidy for the production of domestic oil and other liquids that are close substitutes for refined products. The premiums also can be used in the cost–benefit analysis of specific government policies such as developing the strategic petroleum reserve, or using the military to secure Middle Eastern production, or market interventions that would alter U.S. oil consumption, imports, or domestic production. Quantitatively, the premiums show only that moderate policy is recommended to respond to the security issues associated with U.S. oil consumption. The midpoint estimates of the oil security premium for the consumption of domestically produced oil rise from less than $3 per barrel in 2010 to less than $6 per barrel in 2035. The midpoint estimate of the oil security for the consumption of imported oil premium rises from less than $5 per barrel in 2010 to just over $8 per barrel in 2035. By way of contrast, the oil price projections used in their analysis rise from about $80 per barrel in 2010 to almost $145 per barrel in 2035 (in 2010 dollars). The difference between the premiums for increased consumption of domestic and imported oil also means that there is a security premium for displacing domestic oil production with imported oil without any change in U.S. consumption. Such premiums are useful for evaluating any tax, fuel efficiency or research and development policies that would displace imports with domestic production or for policies to change the size of the strategic petroleum reserve. Brown and Huntington argue future efforts are needed to update oil disruption risks, identify more precisely the source of additional oil when consumption increases, and develop global rather than country-specific measures of security.

3. Foreign Supply

Worldwide, the amount of petroleum that could ultimately be produced is very large, but most of this resource is located outside of the United States. In 2014 the United States imported about 26 percent of the oil it consumed representing a drop from the peak of 60 percent in 2006. This drop can be mainly attributed to the growth in production from the deep water Gulf of Mexico (GoM) and production of oil from US unconventional resources (primarily oil shales).

3.1. Global Oil Market

According to CBO (2012; 6) a defining characteristic of the oil market is its global nature: The network of shipping, pipeline, and transport options that moves oil around the world means that oil from anywhere in the world is generally bought and sold at a single price (the price may vary depending on the quality of the oil and the costs of transporting it to the market). Consequently, disruptions in the supply of oil anywhere in the world rapidly result in higher oil prices worldwide. As a result, disruptions in one oil-producing country that were not offset by increased production elsewhere would increase the price of every barrel of oil consumed in the United States, including the oil produced domestically. Even if the United States increased production to become a net exporter of crude oil, US consumers would still be exposed to gasoline prices that rose and fell in response to disruptions around the world.

The market for crude oil has the following key characteristics:

- A substantial amount of oil is produced in countries that are vulnerable to geopolitical, military, or civil disruptions;

- Oil is supplied in a global market that rapidly transmits the effect of disruptions to the prices paid in all oil-consuming nations, regardless of the amount of oil those nations produce domestically;

- Most oil-producing countries have a limited spare capacity to increase production over the short term in response to such disruptions;

- The United States has very little ability to affect the world price of oil by increasing the supply of oil to the market.

Attempts to isolate the United States from global market for oil would almost certainly fail, because demand for oil in the United States exceeds domestic supply and because isolation would require a fundamentally different energy market, with restrictions on prices and exports that would probably not be feasible. Unless all imports and exports of oil were banned, any imports of oil from abroad, such as from Canada and Mexico, would still allow the world price to be transmitted through such countries to the United States (Ibid; 7).

According to Buchan (2010; 209) the only real energy independence would be zero oil imports from anywhere.

CBO (Ibid; 6) posits the global nature of the oil market comes with benefits and costs for US consumers. The global market benefits US consumers by giving them access to less expensive oil; a market limited to North America or just the United States would have far higher oil prices because the demand for oil in the United States exceeds the supply from US or North American producers. The United States currently imports 42 percent of the crude oil it consumes. More than 59 percent of the imported oil comes from Canada, Mexico, and other non-OPEC members. That is why a change in the price of any country´s oil that is not caused by changes in its quality will be accompanied by a similar change in the price of every other country´s oil.

As a result, CBO (Ibid; 9) notes the worldwide market for oil makes it almost impossible for a large country like the United States to gain independence, or separation, from that market.

The amount of oil to be imported is not decided on by the Government but the private firms that extract, refine and sell products made from oil to households and businesses. That is why US independence from the worldwide oil market would require a degree of isolation that is almost certainly not feasible or desirable in such a global economy. As long as the United States imports oil, even in small quantities, the price of oil, whether imported or produced domestically, will be set in the world market. What is more, even if the United States produced all of its oil, it could only cut itself off from the world market and its price fluctuations by prohibiting private firms from trading internationally (which would violate rules of the World Trade Organization (WTO)).

Elkind (2010; 125-126) argues demand or supply dynamics in one corner of the world (where contemporary energy markets are truly global) trigger reactions, price volatility, fuel switching, capital investment choices, far away. Even if the United States had zero dependence on foreign oil, it would face energy security challenges as a result of its considerable energy intensity. Domestically produced oil or economic substitutes for oil would be just as subject to price fluctuations in an integrated global oil market as current imports are. In times of high global prices, US producers of petroleum or ethanol would be tempted to export production, which in extremis could squeeze supply for domestic consumers.

According to US General Accounting Office (GAO) experts (cited in Rutledge (2005; 154-155) the integration of the US oil market into the world oil market meant that the United States could not isolate itself from the effects of oil-supply disruptions: As long as prices are set in the marketplace, oil price changes in one part of the world affect oil prices everywhere, including the United States. Unless the United States were to shift fundamentally away from a market-based economy and ban all oil imports and exports, reducing oil imports could not substantially reduce the effects of oil supply disruptions on the US economy. In the oil shocks of 1973 and 1979, the Americans realized precisely how dependent they were on an uninterrupted flow of motor gasoline. The pattern was at first one of rapidly rising prices. In December 1973, with 5 million barrels per day of Arab oil withdrawn from the world market, gasoline prices soared by 40 per cent. The next stage was real, physical shortage culminating in the gas lines – angry Americans actually reduced to queuing for gasoline. The public mood was described as one of mistrust, confusion and fear. Consequently, the oil crises of 1973 and 1978-1979 burned deep into the American psyche and it is the collective memory of these events which underlines the continuing intense anxiety among Americans about vulnerability to oil shocks.

According to Irwin Stelzer (a GAO expert on 1 November 2001 cited in Rutledge (2005; 157) the United States must take whatever measures are necessary to ensure that such disruptions do not occur in the first place, or if they do occur, they are immediately suppressed by the most vigorous military action. The United States is not only dependent on those countries from which it buys oil directly, because oil is a fungible product, a shutdown of production in any country, even one from which it buys little oil, will affect the price the United States pays for its own supplies.

3.2. Main Suppliers

More than 100 countries produce oil, but a much smaller group produces a large share of the world´s oil. In 2013, the 12 countries that constitute the Organization of Petroleum Exporting Countries (OPEC) supplied 43 percent of the world´s oil; Russia, the United States and China accounted for 29 percent (BP, 2014).

Luft and Korin (2009; 148-150) posit contrary to common belief the United States is not heavily dependent on Middle East oil. As Table 2 demonstrates, about a 60 percent of total U.S. imports come from Canada, Mexico, and Venezuela, whereas the Middle East (primarily Saudi Arabia) accounts for a little more than 25 percent of total imports. U.S. relations with its neighbors are therefore critical to its future energy security.

Table 2: U.S. Crude Oil Imports

U.S. Crude Oil Imports (in thousands of barrels per day)								
	2000		2005		2010		2014	
	Imports	Share	Imports	Share	Imports	Share	Imports	Share
Saudi Arabia	1,523	17%	1,445	14%	1,082	12%	1,159	16%
Iraq	620	7%	527	5%	415	5%	364	5%
Kuwait	263	3%	227	2%	195	2%	309	4%
Other Persian Gulf	*3*	0%	*8*	0%	*2*	0%	*14*	0%
Persian Gulf Countries	2,409	27%	2,207	22%	1,694	18%	1,846	25%
Venezuela	1,223	13%	1,241	12%	912	10%	733	10%
Ecuador*	125	1%	276	3%	210	2%	210	3%
Angola*	295	3%	456	5%	383	4%	136	2%
Nigeria	875	10%	1,077	11%	983	11%	59	1%
Algeria	1	0%	228	2%	328	4%	6	0%
Libya	0	0%	44	0%	43	0%	5	0%
OPEC* Countries	4,544	50%	4,816	48%	4,553	49%	2,995	41%
Canada	1,348	15%	1,633	16%	1,970	21%	2,885	39%
Mexico	1,313	14%	1,556	15%	1,152	13%	781	11%
NAFTA	2,661	29%	3,189	31%	3,122	34%	3,666	50%
Colombia	318	4%	156	2%	338	4%	294	4%
Brazil	5	0%	94	1%	255	3%	145	2%
Russia	7	0%	199	2%	269	3%	18	0%
Gabon	143	2%	127	1%	47	1%	16	0%
United Kingdom	291	3%	224	2%	120	1%	10	0%
Norway	302	3%	119	1%	25	0%	9	0%
*Other Non-OPEC**	*379*	4%	*470*	5%	*485*	5%	*184*	3%
Non-OPEC* Countries	4,526	50%	5,310	52%	4,661	51%	4,342	59%
Total U.S. Imports	9,071	100%	10,126	100%	9,213	100%	7,337	100%
*Countries listed under OPEC and non-OPEC are based on current affiliations. OPEC and non-OPEC totals are based on affiliations for the stated period of time which may differ from current affiliations.								
The Persian Gulf includes Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and United Arab Emirates.								

Source: EIA (2015, online tables)

Of the three Western hemispheric neighbors, Canada**,** America's top trading partner overall and also its number one source of foreign oil, offers the most promise. U.S.-Canada relations are stable and the Canadian resource base holds great potential for America's future. Apart from large reserves of conventional oil and natural gas, Canada's oil sands in Alberta, 174 billion barrels in total, are second only to Saudi Arabia in terms of proven oil resources, albeit significantly more difficult and costly to extract. Output of marketable oil sands production increased to over 1 MMbpd in 2007. With anticipated growth, this level of production could reach 3 MMbpd by 2020 and possibly even 5 MMbpd by 2030. But due to Canada's growing demand and the rise of China, only a fraction of this oil will be directed to the U.S. market. Because buying oil from countries unfriendly to the United States poses a threat to national security, there is little doubt the United States happily consumes Canadian imports (Naugle and Copeland; 2011; 3).

According to Luft and Korin (Ibid) the situation in Mexico is different. Though it is the fifth largest producer of oil in the world, the country's production and proven reserves are in acute decline. Mexico produced an average of 3.74 MMbpd during 2006, a 1.2 percent decline from 2005 and a 2.5 percent decline from 2004. Its reserves/production ratio fell from 20 years in 2002 to 10 years in 2006. Mexico's largest producing field, the Cantarell offshore field in the Gulf of Mexico, is facing a steep annual decline of roughly 14 percent from the current 2 MMbpd to anywhere between 1.5 MMbpd and 0.5 MMbpd. Apart from natural geological depletion the Mexican oil sector suffers from excessive government control, insufficient investment, corruption and mismanagement. Be it due to geology or mismanagement Mexico's oil decline could cost the United States more than 1 MMbpd.

An even more complicated challenge for U.S. energy security is Venezuela. The United States and Venezuela are interdependent. Venezuela supplies about 11 per cent of U.S. oil imports and the United States purchases roughly 60 percent of Venezuela's oil output. Yet, relations between the two countries are acrimonious. In recent years, Venezuela's populist leader Hugo Chavez has tightened his grip over the country's state owned oil company, Petroleos de Venezuela (Pdvsa) and his heavy-handed policies have caused a rapid decline in Venezuela's production. His tense relations with the Bush administration brought him in September 2008 to expel the U.S. ambassador from Venezuela and recall his envoy to Washington. He also threatened more than once that "oil is a geopolitical weapon" and that he would not hesitate to use it should the bilateral relations continue to deteriorate.

Chavez has also stated his intent to drive oil to $200 a barrel and to divert an increasing portion of Venezuela's oil exports from the United States to China. In the near term, these threats are hollow, as the United States is the only country with significant infrastructure to refine Venezuela's specific type of crude, but as China and Venezuela develop such refining capacity more and more oil will be diverted into the Asian market at the expense of the U.S. market. The decline of Western hemispheric producers will force the United States increasingly to turn to alternative suppliers.

The National Energy Policy (NEP) report released by the White House in May 2001 (also known as the Cheney report) put strong emphasis on obtaining access to petroleum sources abroad by removing political, economic, legal, and logistical obstacles in Caspian and African nations "to provide a strong, transparent, and stable business climate for energy and related infrastructure projects." At first glance, diversification of sources may seem to be a sound approach. But this solution is no more than a Band-Aid, and, in the long run, it could breed stronger reliance on the club of countries on which the United States would like to be less dependent. There are three downsides to this approach.

First, oil is a globally traded, fungible commodity, so stifling U.S. purchases from the Persian Gulf and buying from other regions like Africa would just mean that somebody else would buy more from the Persian Gulf with no impact on price and availability.

Table 3: U.S. Reserves to Production and Consumption (Million Barrels)

2014	Supply	Years of supply
Proved reserves	36,520	
Crude oil Consumption	5,720	6.4
Crude Oil Production	3,168	11.5
Crude Oil Imports	2,678	
Crude Oil Exports	126	

Sources: EIA (2015, online tables), author's interpretation

Second, reserves outside of the Middle East are being depleted almost twice as fast as those in the Middle East. The overall reserves-to-production ratio—an indicator of how long proven reserves would last at current production rates—in non-OPEC countries is about 15 years comparing to roughly 80 years in OPEC. At the average daily rate of production recorded in 2014, U.S. proved reserves would last 11.5 years (see Table 3).With current growth in global demand, many of today's large non-Middle East producers such as Russia, Mexico, Norway and China are running a marathon at the pace of a sprint, and, if production continues at today’s rate, many of today’s largest producers will cease to be relevant players in the oil market in less than two decades. At that point, the Middle East will be the remaining major reservoir of abundant, cheap crude oil and the world’s dependence on it will grow rather than diminish. This could allow Middle Eastern producers even more leeway than they have today to manipulate prices and increase their political leverage on U.S. foreign policy.

Third, deepening alliances with various African and Central Asian energy exporters may be beneficial to energy security, but by relying on additional nondemocratic countries the United States runs the risk of undermining its own foreign policy priorities such as human rights and democracy promotion. Supplying nondemocratic oil producers with advice and state-of-the-art weapons enables these regimes to stay in power and oppress their people. Such relations have proven in the past to be extremely problematic and in conflict with America’s prime foreign policy goal of spreading freedom and democracy in countries where they are lacking. In the 1970s, energy security considerations dictated forgiving treatment of the Shah of Iran despite his corruption and abysmal human rights record. When the Shah fell, the Iranian people responded with an outpouring of anti-Americanism that reverberates to this date. America’s support for the House of Saud and reluctance to criticize Saudi Arabia’s dreadful human rights record openly, its mistreatment of women and its lack of religious freedom and contempt for Shiites, Sufis and other non-Wahhabi Muslims is already producing similar sentiment.

Like the Middle East, both West Africa and Central Asia suffer from territorial disputes, authoritarian regimes, bad governance, corruption, ethnic and religious strife and terrible human rights records.

Nigeria, expected to supply a quarter of U.S. oil imports by 2030, is one of the most corrupt countries in the world and despite its oil riches most of its people live on less than $2 per day. The situation in Angola and Equatorial Guinea is not much better.

Central Asia’s most important producers, Azerbaijan and Kazakhstan, both have human rights records that would normally deny them U.S. support. Yet, by becoming increasingly dependent on new energy producing regions the United States is forced to turn a blind eye to these social illnesses and in doing so it undermines the prospects for the kind of reforms that are the keystone of its own diplomatic efforts.

It is therefore not clear whether the rush to the new oil domains will improve America’s energy security or replay in other arenas the problems the United States currently faces in the Middle East.

3.3. Roles of OPEC and OECD

The two most important international energy organizations being involved in the global oil market are the Organization of Petroleum Exporting Countries (OPEC) and the International Energy Agency (IEA). These organizations have acquired the importance that should not be undervalued (Clô (2000; 47).

To date, the successful history of OPEC, as the main oil-producing countries´ organization, remains as one of the most important multinational energy institutions outside the Western industrial world (Luft and Korin; 2009; 78).

OPEC was founded in Baghdad (Iraq), on 14 September 1960 by five countries, namely the Islamic Republic of Iran, Iraq, Kuwait, Saudi Arabia and Venezuela. They were to become the Founder Members of the Organization.[36] Currently, the Organization has a total of twelve Member Countries. The OPEC Statute distinguishes between the Founder Members and Full Members - those countries whose applications for membership have been accepted by the Conference.

The Statute stipulates that "any country with a substantial net export of crude petroleum, which has fundamentally similar interests to those of Member Countries, may become a Full Member of the Organization, if accepted by a majority of three-fourths of Full Members, including the concurring votes of all Founder Members."[37]

Luft and Korin (Ibid; 9) assert of all the crude oil producers, OPEC is the most influential. It holds 78 percent of the world proven oil reserves and produces about 40 percent of the global crude oil supply. This allows the cartel38 a dominant position on the supply side and the ability to dictate the price of oil through its regularly organized conferences in Vienna (Austria) where members decide on their production quotas. 39

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[36] Qatar (1961), Indonesia (1962), Libya (1962), the United Arab Emirates (1967), Algeria (1969), Nigeria (1971), Ecuador (1973), Gabon (1975) and Angola (2007). From December 1992 until October 2007, Ecuador suspended its membership. Gabon terminated its membership in 1995. Indonesia suspended its membership effective January 2009. (OPEC, 2015)

[37] For more information see www.opec.org

[38] Even though OPEC is sometimes used as a textbook example of a cartel, there is no clear-cut consensus whether OPEC is indeed acting as a cartel, or rather competitively or as a non-cooperative oligopoly. Given the objective of a standard cartel is a maximizing joint profit OPEC does not have mechanisms for internal compensation and effective enforcement to align the incentives of its members (Huppmann and Holz; 2015; 2).

[39] According to Dibooglu and AlGudhea (2007) a quota system determines a quantity each OPEC member is assigned to produce over the following months. This creates incentives for each OPEC member to overstate its reserves to gain a larger share of the quota. In addition, oil production is difficult to keep track of, so cheating and over-producing the assigned quota is common and usually tolerated by the group (cited in (Huppmann and Holz; 2015; 2).

According to Buchan (2010; 28) there has been a tradition for almost the entire 150 year history of oil industry, of maintaining price by regulating production. Consequently, cutting production to raise prices is a regular and open part of the OPEC´s policy and practice (Ibid; 14). On the other hand (Luft and Korin; Ibid), increasing OPEC´s output is not a matter of capacity, but of will. OPEC members have the geological capability to provide oil for many decades.40 The cartel's production is similar to its 1973 level, while over the same period global demand for oil has nearly doubled. OPEC has repeatedly claimed it holds the spare production capacity of more than 3 MMbpd, which follows it can inject a significant amount of oil into the market almost immediately, hence dropping prices significantly. But this is not what the cartel is after. Since its inception in 1960, OPEC has successfully restricted its member states' petroleum production, artificially distorting the world's oil supply to fill its members' pockets. Buchan (Ibid; 32-33) observes big population states (Iran, Nigeria and Venezuela) traditionally find it harder to accept quota cuts than less populous states of the Arabian Peninsula. The lack of the organization discipline results in internal disagreement and tension between large and small population states over the size of quotas which do not reflect reserves. As a consequence, OPEC members often cheat and pump more than their allotted quotas incorporate.

In addition to their regular producing more oil than their quotas stipulate, Yetiv (2015; 21) observes they cheat even if doing so leaves them all worse off when oil prices fall and are not offset by greater overall revenue. Although it is not exactly clear what situations are most conducive to cheating, the IEA tends to see higher prices as causing more cheating.

Buchan (Ibid) argues OPEC´s ability to influence the oil price thus depends essentially on its willingness to hold production capacity in reserve when prices and demand are weak, as well as to use it when prices and demand pick up. Keeping capacity idle is not a normal thing for anyone to do.

Even when demand for oil slumps non-OPEC oil producers do not reduce output. This makes it doubly hard for OPEC. When OPEC reduces output to maintain prices, it has

[40] The reserve to production (R/P) ratio of Saudi Arabia´s oil sector accounts for 63 years (BP; 2014) meaning it could continue to produce at current levels for 63 years without additional discoveries or significant improvements in technology. R/P ratios of Algeria and Angola account for twenty years only (Huppmann and Holz; 2015; 3).

to watch non-OPEC producers take its market share and, free-riding on the cartel´s self-restraint, reap the benefit of higher prices.

Yetiv (2015; 22) rightly posits that OPEC interaction with non-OPEC states (such as Russia and Brazil) is subject to consideration. If non-OPEC states join OPEC in future production cuts, the effect on oil prices would be far larger than if OPEC acts alone. But non-cooperation by states outside OPEC will make it harder for OPEC to agree on its own cuts for fear that others will take market share, including American oil producers. In Yetiv´s view these dynamics should not be seen as a one-time game because if prices stay low enough to knock out a portion of American production, it will push the oil price higher, but as the price rises, American production would be likely to return. Such dynamics will lessen as American production peaks. At present, this does not account for a specified time span yet.

Notwithstanding OPEC´s declared effort for keeping oil prices like Goldilocks´ porridge (not too hot and not too cold) OPEC likes its oil price pretty high in effect (Buchan ; Ibid).

On 27 November 2014 the 166th OPEC´s Ministerial Conference was convened in Vienna (Austria). The very same day saw a drastic decline of the West Texas Intermediate (WTI) benchmark for light, sweet crude oil (on the New York Mercantile Exchange (NYMEX)) delivered in Cushing, Oklahoma (USA) to less than $66/bbl as a result of the crude oil prices plunge in the second half of 2014. Despite the fact that OPEC in general, and Saudi Arabia in particular, has the capability of checking prices that not only rise too high but also fall too low (Yetiv; 2015; 17), OPEC oil ministers decided not to decrease their output quota. The suprising decision by OPEC not to curtail production and thereby stabilize crude oil markets brought renewed attention to this supplier group (Huppmann and Holz; 2015; 1). Yetiv (2015; 18) speculates about the the reasons for the unusual switch in the strategy of Saudi Arabia. Instead of cutting oil production in order to fend against lower oil prices Saudi Arabia decided not to play this role. Given this unusual strategy OPEC failed to decrease oil production. This led some to speculate about actual OPEC´s power and capability. Indeed, OPEC can respond to American oil surge but the extent depends on a number of factors.

Huppmann and Holz (2015; 4) argue it is in the interest of suppliers with substantial reserves to guarantee price stability. For the OPEC strategy to be thoroughly interpreted it is worth looking at individual OPEC members first. Given Saudi Arabia constitutes a pivotal supplier, acting as swing producer (able to withhold production capacity in order to maintain the ability to compensate short-term disruptions and shocks) within OPEC there is every reason to assert the American oil boom affects in part Saudi oil policy within and outside OPEC.

There is no doubt OPEC forms a very heterogeneous group consisting of different economic development countries, presenting a commensurate behavior. Yetiv (2015; 31; 27) observes OPEC is divided into the “doves” and the “hawks”. The former spectrum is represented by Saudi Arabia. For economic, political, and strategic reasons, doves usually attempt to prevent oil prices from rising too high, while hawks (in a given case Iran and Venezuela) prefer higher oil prices than do the doves. In August 2013 Iran suggested that it would be willing to start an oil-price war by boosting its oil production by 70 percent in order to regain its place as OPEC´s second-largest producer due to global economic sanctions having been imposed on Iran in the past. At the time of writing, Iran is in the process of talks with the United States regarding its nuclear program which could result in sanctions on Iran being lifted. According to the EIA’s April 2015 Short Term Energy Outlook (EIA; 2015e; 1), EIA believes Iran has the technical capability to ramp up crude oil production by at least 700,000 barrels per day (bbl/d) by the end of 2016. This could result in supply overhang pushing the prices down even further in the short to medium term. If and when sanctions are lifted, EIA (Ibid) believes, crude oil prices in 2016 could be reduced $5-$15/barrel (bbl) from its current expectations.

This behavior demonstrates the competitive nature of OPEC politics is still topical.

Consequently, (Yetiv; 2015; 19-43) the 2014 switch in Saudi strategy can largely be attributed to its relations with fellow-members. Saudi strategy is said to have been aimed at weakening Iran. Iran seeks to undermine the House of Saud and competes with their brand of Islam in the region, and Riyadh sees Iran´s nuclear aspirations as a top national security concern. Saudi Arabia wants to see Iran isolated rather than re-integrated into the global economy. In November 2014 Iran urged Saudi Arabia to cut oil production in order to boost oil prices.

Despite the fact Iran has ample crude oil reserves, its government is highly dependent on oil revenues to finance the national budget. As a result, political interference in government-owned oil companies triggers a bias towards short-term revenue maximization to please political constituencies. In addition, these countries may see crude oil as a weapon against perceived threats from Western countries (Huppmann and Holz; Ibid; 3).

Venezuela, (Yetiv; Ibid) like most OPEC members also needs high oil prices to meet its budget targets. Therefore, it urged Saudi Arabia to cut oil production too.

With Saddam Hussein gone, and with the Iraqi military threat removed for the forseeable future, there is little or no ground threat from Iraqi military because it is ineffective and Iraq´s leadership is not more threatening its former war enemy.

By refusing to support cuts, Saudi Arabia signaled other OPEC members (and states outside OPEC, like Russia) that they would have to join in serious cuts in the future or face the pain of lower oil prices.

The oil price drop exacerbated non-OPEC Russia´s economic woes. Saudi Arabia has sought to pressure Moscow to cut its own production. Indeed, Saudi Arabia can tolerate lower prices because it (like Russia) has much cash on hand, but the time period length is questionable. Given 90 percent of Saudi budget is still reliant on oil revenues, both of the countries will find it hard to sit by idly for long if America´s production surge contributes to a sustained drop in oil prices.

With oil demand booming in China**,** Saudi Arabia also has options it did not have in the past. Despite the fact that the world oil market is global, the Chinese are more than willing to pay a higher price than the market-based price for oil, as well as to invest in oil projects in places like Iran and Sudan.

Starting in the mid-1970s, Saudi Arabia generally tried to work to keep oil prices from rising too high. Riyad feared that high oil prices could hurt global growth and reduce demand for Saudi oil. Moreover, Saudis did not want to anger their long-term US protector. As a result, they tended to act as an oil price dove. Washington not only protects Saudi Arabia, but also provides it with arms, spare parts, and technical training and support. Despite the fact Saudi-US relations have been strained lately (over Iran´s nuclear program, fighting the current regime in Syria) the Saudis still need the United States.

This fact, among others, contributed to the popular opinion that Washington and Riyadh were in collusion to push oil prices downward in order to hurt Russia, Iran and Venezuela (the United States has not maintained friendly relationships with).

The Economist (2014) argues (cited in Huppmann and Holz; Ibid; 5) the decision by OPEC in November 2014 not to reduce their quota was driven by the desire to drive shale oil producers out of the market. It follows that OPEC acted strategically, seeking to deter further investment in North American unconventional oil and defending its market share. Any reduction in the OPEC quota in the fall/winter of 2014 would have been easily compensated by shale oil, in light of weak global demand and abundant global supply. A quota reduction may not have stabilized prices, but would just have led to a loss of OPEC market share. The very refusal of OPEC to reduce production may have been a tacit admission that its ability to stabilize prices and dominate the market is limited. The historical record suggests that OPEC will eventually and repeatedly decrease crude oil production with the intention of boosting prices, be it in 2015, 2017, 2020, and/or later.

Given shale oil has the potential to change the dynamics of the crude oil markets there is every reason to assert that the Saudi strategy switch of 2014 (Yetiv; 2015; 23) as the pivotal supplier within OPEC, did make some sense: lower oil prices caused by Saudi policy, the American oil boom, and various other factors could make a large segment of US oil production less profitable or even non-economical. It is estimated that US shale oil may require around $75 per barrel or more to be economically viable, while the Saudis could produce a barrel for less than $5, hence being able to flood the oil market and undermine US drilling and production.

If OPEC´s November 2014 decision and that of Saudi Arabia have triggered an outright oil price war, the (collateral) pain will be felt by both the OPEC producers and US shale oil firms accordingly. It is estimated that US shale oil production will eventually slow down around 2020 after which production will decline. Unless this happens, the outlook for crude oil in today´s economy and the role of OPEC will be as uncertain as it has lately been.

The International Energy Agency (IEA), as the main oil-consuming countries´ organization, is an autonomous body which was established in November 1974 within the framework of the Organisation for Economic Co-operation and Development (OECD) to provide energy policy guidance and cooperation for its sixteen founding-member countries as a response to future disruptions and to serve as a counterweight to OPEC.

IEA carries out a comprehensive program of energy co-operation among the current twenty-nine of the OECD thirty four member countries. These member countries [41] represent less than half of global energy consumption. Yet no other organization covers the full energy mix and represents consumers' interests with the expertise and the experience of the IEA. To be a member country of the IEA, a country must be a member country of the OECD. However, membership in the OECD does not automatically result in

[41] Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Republic of Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States, Poland, Estonia. (IEA website, 2015)

membership in the IEA. In order to become a member country of the IEA the prospective candidate is to demonstrate that as a net oil importer it has reserves of crude oil and/or product equivalent to 90 days of the prior year's average net oil imports to which the government (even if it does not own those stocks directly) has immediate access should the Co-ordinated Emergency Response Measures (CERM) – which provide a rapid and flexible system of response to actual or imminent oil supply disruptions – be activated.42

Irrespective of the fact IEA presents itself as a relentless proponent of oil-consuming countries Florini (in Pascual and Elkind; 2010; 150) argues it has no regulatory powers and is ill-equipped to play an oversight role in the extremely volatile and poorly regulated global energy markets.

3.4. Impact of U.S. Oil Dependence on its Foreign Policy

A quality (national) energy policy reflects the extent of meeting domestic demand (Baumann; 2008; 6). In an-ever dynamic global energy, landscape US domestic oil production surpassed imports in the final months of 2013 because of the US tight oil revolution. Consequently, the United States overtook Russia (non-OPEC country) as the world´s second largest oil producer. Beyond all doubt, the US supply shock caused shifts in its demand and supply curves thus reflecting prospective economic benefits to this recent largest oil importer (before September 2013) and consumer. Irrespective of this fact from a national security perspective the real prospect of US oil independence (affecting the global energy landscape) begs the question whether or not to reformulate its existing political and security interests given the center of gravity for demand is moving and those of supply, North America and the Persian Gulf, are remaining unchanged.

According to Stokes (2014; 9-10) the new sources of oil in North America, growing demand in Asia and the Middle East, and large and sustained supply disruptions primarily from Middle Eastern suppliers are instrumental in transformation process of the world energy map. Despite the shale revolution, the Middle East is supposed to remain the heart of global oil industry for some time to come. Demand from Asian nations (China, India and Southeast Asia) entails a reorientation of energy trade from the Atlantic basin to the Asia-Pacific region. Demand for energy from the very Middle East is supposed to reduce the region´s ability to serve as a major exporter, because it faces the prospect of emerging

[42] For more information see www.iea.org

as a major energy consuming region.[43] Middle East notable oil suppliers, mainly Libya, Iraq and Iran, remain suffering from sustained global oil supply disruptions.[44] [45]These are likely to persist given the political instability in the region.

Indeed, the regional energy map (unlike the security one) is supposed to change dramatically. Given global markets determine the price of energy, the United States is supposed to henceforth play a major role in regional security despite the fact the North American energy boom has dramatically lowered the United States' reliance on the Middle East. The will or capabilities of Asian nations to secure the region or the free flow of oil from the Persian Gulf to Asia is doubtful. Because the only strategic certainty about the Middle East for the foreseeable future is uncertainty the United States is supposed to go along with pursuing the interests in this vitally important region.

However, depending on the continuous flow of oil to fuel its economy for transportation and everyday life, the United States cannot ignore the rising imminent threats on their supply (Baumann; 2008; 9). According to Richardson (2007; 195) the administration´s lack of realism led the United States to a dangerous place and needed to take a different path. To pursue US national interests, Richardson accentuated working with US friends, enemies, and everyone in between. "The United States will need strong diplomacy, backed up by a strong military and alliances. This is the path of American leadership".

Diversification away from OPEC and towards Western hemisphere sources has been a key element of US foreign oil policy since the oil embargo in 1973. Consequently, in American energy policy discourse the necessity to achieve energy independence has been staple (Herbstreuth; 2014; 24-26) because after the oil embargo Middle Eastern oil was considered to be the most insecure and the Middle East itself undependable.

As a result, the United States intended to maximize supply from Canada, Mexico and Venezuela, hence reducing dependence on the Persian Gulf. In the context of the ongoing American energy boom, the political appeal of self-sufficiency has gained purchase again despite the fact that some US oil import relationships have always been seen as unproblematic and even beneficial. It follows that dependency is seen as a benign

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[43] Becoming the second-largest gas consuming region by 2020 and third-largest oil consuming region by 2030 (Ibid).

[44] Libyan supply have been disrupted by the protests at seaports and militias closing pipelines. Iraqi supply has declined due to attacks on the pipeline from Kirkuk to Ceyhan (Turkey) and maintenance at the port of Basra. Iran´s supply to the global market have been attenuated because of the economic sanctions (Ibid).

[45] Currently, the talks are underway to lift some Iran sanctions under nuclear deal.

form of international division of labor that reaps gains from trade for each party. The best example of this view is the US-Canadian energy trade. In 2001 President George W. Bush said: “Canada is going to be the largest exporter of crude oil to the United States”...That is good for our national security; it is good for our economy”.[46]

Despite the fact, dependency is generally negatively denoted hence representing a threat to national security, in this case it is a form of economic cooperation. Therefore, some sources of foreign supply are more secure than others. The distinction between secure and insecure foreign oil has thus fundamentally shaped US foreign energy policy. Herbstreuth (Ibid) observes the security or insecurity of foreign oil is not determined by objective assessment of risk but is socially constructed. Evaluations of the costs and benefits of oil imports take place within larger discourses of Self and Other. From the American standpoint, Canadian oil is not foreign in the same sense as Middle Eastern oil. For this reason, the culturally constructed foreignness of imported oil determines whether dependency is represented as a mutually beneficial economic relationship or as a fundamental threat to national security. Given the United States features the Middle East as America´s principal cultural Other, the imported oil from the Middle East represents a threat to US national security. This ambiguous dependence definition conforms closely to realist and liberal readings of interdependence (mutual dependence). Liberals tend to argue that entering into a relationship of interdependence entails mainly efficiency gains. Realists, by contrast, charge liberals with ignoring questions of power and security. Therefore, Canadian oil has been described as secure, hence originating from a producing friend. By contrast, Middle Eastern oil has routinely been described as insecure (unreliable, prone to disruption and political manipulation), hence originating from a hostile producer.

According to Verbruggen and Graaf (2013; 80, 84) different groups of oil suppliers operate within the current geopolitical setting. On the one hand, there are friendly countries (USA, UK, Netherlands, Arab states of the Gulf Cooperation Council (GCC), namely Saudi Arabia, Oman, United Arab Emirates, Qatar, Bahrain and Kuwait) that accept and protect foreign investments, hence delivering “friendly oil”. On the other hand, there are hostile countries (Iran, Venezuela, Sudan and Ecuador) that contest the dominance of the first group and that deliver “hostile oil”. In between the opponent camps there are transient

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[46] George W. Bush, „The President’s News Conference with Summit of the Americas Leaders in Quebec City“, 22 April 2001, Public Papers of the Presidents, The American Presidency Project, Accessed April 5, 2015, http://www.presidency.ucsb.edu/ws/?pid=45638.

countries. Canada and Norway adhere to the friendly oil camp. Brazil, Indonesia, Mexico and Nigeria stay at further distance. By violent political change Algeria, Angola, Iraq and Libya were "freed" from the hostile oil camp. Most actors in transient position accept the ruling of the dominant group. Russia attempts to build its own oil empire after losing control on the sources in the Caucasus and Central Asia. The camps OPEC versus non-OPEC, oil exporters versus oil consumers, are thus superseded by the antagonism "friendly" versus "hostile" oil. The main goal is not to conquer oil sources for exploitation, but to gain control over oil production and delivery possibilities, by precluding and containing hostile sources.

Herbstreuth (Ibid; 30) observes that states act towards other states based on the meanings dependency has for them. In this view, assessments of costs and benefits are socially constructed given endless reiteration of encounters between Self and Other thus shaping each party´s identities and interests. Given assessments of dependency are effects of interpretation, interdependence is what states make of it, as it were. Geopolitical foreign policy discourses about dependency are thus a discursive practice. Therefore, categories like secure/insecure, reliable/unreliable, friendly/unfriendly are culturally constructed within the framework of these geographical discourses. It follows that the identity of Self is defined in relation to Other. The difference is converted into otherness, which is the claim that the outside is not only different but also strange, dangerous, menacing, inferior or evil. Given the US foreign policy has been shaped by a positive construction of America´s national greatness American dependence on Middle Eastern oil is inseparable from the pre-established cultural construction of the Middle East appearing as foreign, inferior, dangerous, irrational, incompetent, backward, untrustworthy, treacherous – in short undependable and Arab oil sheiks as lazy people whose wealth is the undeserved result of accidents of geology. Therefore, the meaning of US foreign oil dependence is not coherent and uniform. Given the United States and Canada have already recognized their energy interdependence, the American encounter with the Middle East is portrayed as a realist relationship going back to the days following the WWI (when US oil men first sought to acquire access to the region´s petroleum reserves), WWII (when the effort to integrate the vast oil reserves of Saudi Arabia and other Gulf producers into a US-led liberal oil regime became a central tenet of American Cold War strategy), 1945 (forming the forged political alliance with the House of Saud in Saudi Arabia), 1953 (forming the forged political alliance with the Shah of Iran) to protect Western access to this oil.

The realist behavior can also be identified in the year 2000 that Bill Richardson (US Energy Secretary) exerted pressure to convince OPEC officials that oil production cuts would hurt the United States and global economies. Richardson described such “quiet diplomacy” as effective pressure on OPEC to boost production. OPEC production subsequently increased by 1.8 million barrels per day (Yetiv; 2015; 44).

As Clausewitz once asserted, “No one starts a war, or rather, no one in his senses ought to do so, without first being clear in his mind what he intends to achieve by that war and how he intends to conduct it” (Clausewitz, 1989, 579). Given the above mentioned argument the hard political realism can be identified in the year 2003 that hyper motorization had ultimately driven America to the invasion and occupation of Iraq (Rutledge; 2005; 11; 198; 201). What was required was the establishment of a new American Imperium in the Middle East: one in which American-selected local rulers would invite American oil companies to make super-profits for American investors under the protective shield of the American military, while at the same time satisfying the voracious demands of the motorized American oil consumer. Rutledge too, posits states do not go to war for one reason alone. The desire to coerce the Palestinians into the peace with Izrael and the war on terror engagement in the region were behind the invasion as well.

In the year 2011 the United States enforced the National Defense Authorization Act (NDAA) to persuade other oil-consuming countries to significantly reduce their purchases of Iranian crude oil or face sanctions to be imposed by the United States. Iran´s oil buyers were forced to diversify their sources (Bordoff and Houser; 2015; 54). Given the hegemonic status of the United States the respective countries were coerced into behavior they otherwise would not be on.

According to the Commission on Energy and Geopolitics (Commission on Energy and Geopolitics) (2014) oil dependence of the United States has contributed to its involvement in often unstable and sometimes hostile world regions to U.S. interests. Given the above mentioned, there is every reason to assert that it is just the extent of hard realist behavior of the United States that mirrors the value of oil it has been dependent on for so many years. Despite the fact that changing energy trends drive geopolitical dynamics, it is unlikely the United States will cease to apply this form of behavior especially when engaging in the Middle East that is supposed to remain a vitally important region henceforward.

4. Domestic Supply

According to Bordoff and Houser (2015; 19) the application of hydraulic fracturing, horizontal drilling, and seismic imaging to tight oil formations has catalyzed a renaissance in US oil production. After peaking at 11.3 million barrels per day in 1970, US production began a multi-decade decline, falling to 6.8 million barrels per day in 2006. Since 2008 US crude oil production has recovered to bring the total US supply to 9.32 million barrels per day as of December 2014.[47] The commercial import of crude oil accounted for 6.77 million barrels per day as of December 2014. [48]

4.1. Conventional Sources

While total U.S. output has grown by significant margins in recent years, the surge in LTO production in the lower-48 United States has masked notable declines in crude oil production from two critical regions—Alaska and the federal Gulf of Mexico. Alaskan crude oil production is estimated to have averaged 490,000 bbl/d in 2014, a decline of 76 percent from its peak of 2.0 MMbpd in 1988—a year in which Alaskan crude output accounted for 25 percent of the U.S. total. The decline in oil production from Alaska—the result of depleting existing reserves and a lack of access to new resources on federal lands—has been steady and relentless (Council; 2012; 57). The Lower 48 Onshore production rates have been stagnating for years, with production rate averaging 2.16 MMbpd in 2014. The trends is expected to continue in the foreseeable future.

According to Bahgat (2011; 24) the offshore oil industry of the United States is an important source of domestic oil.

Accordingly, the respective oil industry is a significant contributor to domestic energy production, employment, national economy and government revenues. Current offshore oil production in the United States is essentially limited to the Central, Western and a small amount of the eastern Gulf of Mexico (GoM) with limited additional legacy production off Alaska and California (Offshore; 2013; 4). As of December 2014 the U.S. offshore oil production in the GoM averaged 1.46 million barrels per day (EIA; 2015e; online tables).

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[47] EIA (2015; online tables)
[48] Ibid.

Bahgat (Ibid) posits the first offshore well on the GoM shelf was drilled in 1947 off Louisiana. The year 2000 saw a major milestone when more oil was produced from the deep-water GoM than from the shallow-water GoM. The Minerals Management Service (MMS) considers projects in less than 1000 feet (305 meters) water depth to be shallow water wells and those above are deep-water ones.

The enacting of the Deep Water Royalty relief Act in 1995 paved the way for the very significant development. Currently, more than 25% of domestic production of oil comes from the offshore areas of six states: Alabama, Alaska, California, Louisiana, Mississippi, and Texas. Despite the fact, approximately 85% of acreage in federal offshore waters is still inaccessible to offshore oil development, the GoM is one of the largest single sources of oil supply to the US market.

According to Quest Offshore (Ibid) since the 1980s, the Atlantic Outer Continental Shelf (OCS) has been subject to restriction after only 51 exploratory wells were drilled in the 1970s and 1980s.

Menaquale (2015; 2-9) posits in its current effort to expand offshore drilling to the Atlantic Ocean the oil industry claims that opening the Atlantic to drilling will lead the United States towards energy independence. Menaquale (Ibid) also argues the very oil resources would not be extracted until 2026 but the industry and some offshore drilling proponents argue that states will benefit from funding that would come from a revenue-sharing system that currently does not exist and the revenue figures promised not guaranteed. In addition, moving forward with the expansion of offshore drilling may detrimentally affect the coastal environment and economies even if it could be conducted safely. Given current drilling takes place in the Gulf of Mexico and offshore California, if the Atlantic Ocean were opened for oil, three-quarters of the oil production in the Atlantic would come from deep-water projects that take place in harsher and more challenging conditions than shallow water drilling. These developments for domestic supply place the United States at a critical juncture in offshore energy development. The Atlantic OCS (including the Northern Atlantic OCS) contains less than 4 percent of the nation´s total oil reserves. The GoM offshore region alone has more than 10 times the amount of oil. Because of various economic factors (current oil prices) only about half of the technically recoverable resources in the Atlantic are likely to be profitably recoverable”. Using unsuitable multiplier (derived from areas rich in offshore fossil fuel resources) for estimating oil resources more than doubles the oil estimate, which consequently artificially inflates the amount of oil reserves. Given states along the Atlantic coast are not provided revenue sharing under current law, there is every reason to think the oil from the Atlantic OCS cannot be relied on for the time being.

4.2. Unconventional Sources

With regards to energy policy the shale oil revolution of the early twenty-first century has placed the United States at one of its most pivotal points in recent history (Coney et al.; 2014; 1). Fogleman and Gardner (2014; 3) posit in the course of the current „energy renaissance" US domestic crude oil production has reversed years of decline to reach levels not seen in decades.

Such a growth has transformed the United States from the world´s largest importer to a growing exporter of petroleum products. Consequently, this large-scale production of crude oil from shale rock represents a true revolution in the US energy industry, and like all revolutions has a revealing history behind it (Coney et al.; Ibid; 1).

The (North) American energy revolution began in 2005 when natural gas producers applied hydraulic fracturing ("fracking") to shale formations across the country. Though the technique had been around since the 1940s, it had not been widely applied until the middle of the last decade as natural gas prices were rising up to above $10/thousand cubic feet (mcf) following the supply disruption from Hurricanes Katrina and Rita in August and September 2005 (Fogleman and Gardner (Ibid; 5). In just a few years, massive increases in gas supply lowered prices, which urged many companies to shift focus and target petroleum liquids, whose prices remained high. Such a shift, responsible for the current shale oil boom, was possible primarily because of the advanced state of fracking technology (Coney et al.; Ibid; 5).

The contemporary shale oil phenomenon is a direct result of the government backed technological development that has allowed for a significantly larger volume of trapped oil to be extracted - as opposed to what was historically feasible. Shale oil is undoubtedly producing its own boom (Coney et al.; Ibid; 16).

U.S. crude oil production peaked in 1970 at 9.6 MMbpd and subsequently bottomed in late 2008 at roughly 5 MMbpd. As drillers have applied fracking techniques to crude oil, domestic crude production has soared to reverse the decades-long decline in the course of several years (Fogleman and Gardner; Ibid; 7). Consequently, the United States is by far the leader in the development and utilization of fracking technology. Since 2008, US annual crude oil production has risen by 3 million barrels per day (Coney et al.; Ibid).

The three dominant shale oil plays that have largely contributed to the recent surge in crude oil production are represented by the Bakken Play in North Dakota, the Eagle Ford Play in South Texas, and the Permian Basin in West Texas (Fogleman and Gardner; Ibid; 3)

4.2.1. The Bakken Play

The Bakken Play (Bakken) has been the primary driver behind North Dakota displacing Alaska as the second largest oil producing state in the United States. Like nearly all other shale oil plays, the Bakken is dominated by independents. The Bakken play began producing oil in 1951, yet its shale development began in the 1970s, reaching 100,000 barrels per day (bbl/d) and remaining at that level until around 2008 (Coney et al.; Ibid; 48-50).

To date, the dramatic increase in production (1.2 million barrels per day as of February 2015 (EIA 2015d; figure data) has brought an economic windfall to the area but has created some difficult logistical issues (e.g. rapid growth in production of oil has overwhelmed the ability of the regional refineries to process it (Fogleman and Gardner; Ibid; 9-10).

4.2.2. The Eagle Ford Play

The Eagle Ford play is younger than the Bakken and emerged in 2008 when Petrohawk drilled the first horizontally fractured well in the area. Due to higher carbonate content, the Eagle Ford play is more brittle and easier to frack than the Bakken play. Its oil rich resources are at depths ranging from roughly 4,000 to 12,000 feet (Coney et al.; Ibid; 51).

Originally thought to be a wet natural gas[49] play, the Eagle Ford produced less than 1,000 bpd of crude oil as recently as 2009. By the end of 2013, crude production had topped 1.2 million bpd with ultimate production expected to reach 1.7-2.0 MMbpd by the end of the decade. The Eagle Ford play recently surpassed the Bakken in terms of crude oil

[49] Wet Natural Gas contains less than 85% methane and has a higher percentage of liquid natural gasses (LNG’s) such as ethane and butane. The combination of LNG’s and liquefied hydrocarbons give it the “wetness.” LNG’s are separated from the methane and sold as individual compounds. The five highest-yielding wet gas states include Pennsylvania, Texas, Louisiana, Oklahoma and Colorado. Energy, U.S.. "Natural Gas : Dry vs . Wet." *U.S. Energy Development Corporation*. September 5, 2013. Accessed April 13, 2015. http://www.usenergydevcorp.com/media_downloads/Natural Gas Dry Vs Wet_050913.pdf.

production. The dramatic increase in production (Coney et al.; Ibid; 53) (1.58 million barrels per day as of February 2015 (EIA; 2015d; figure data) has brought an economic windfall to the area but has created some difficult logistical issues as well (e.g. having the pipelines in place to deliver product may not prove to be an adequate solution because the product being delivered is not what the end user needs) (Coney et al.; Ibid; 53).

Given The Eagle Ford produces light sweet crude oil, this is not the preferred feedstock for the U.S. Gulf Coast refiners. Believing that the world was running out of light sweet crude, many U.S. refiners spent the last decade recalibrating their facilities to handle heavier sour barrels (i.e. higher sulfur content), like those produced in Canada, Mexico, Venezuela, and throughout the Middle East. The Gulf Coast refiners are no exception. Despite the fact a new approach in production – down spacing (the process of drilling wells closer together, in order to improve total recovery) is being applied, economically recoverable oil may change if the global oil price changes. The fact that this shale oil play is quite new and its long-term productivity has not been confirmed the amount of its technically recoverable oil is estimated accordingly (Ibid)

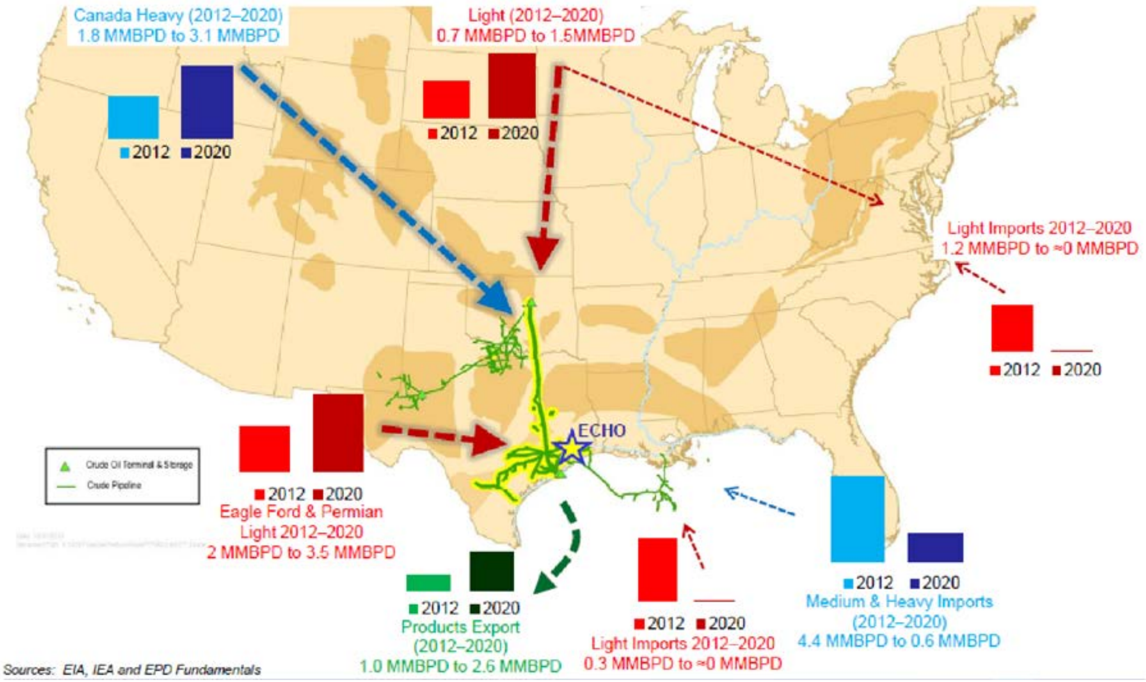
4.2.3. The Permian Basin

The Permian Basin, stretching 250 miles wide and 300 miles long from southeastern New Mexico into west Texas, involves many formations and plays that have a substantial history of oil production dating back to the 1920s. It experienced a peak in the 1970s and faced a steady decline until the middle of the first decade of the twenty-first century. The two most essential shale oil plays are the Cline and the Wolfcamp (M) within the Midland Basin. The majority of the production increase is credited to horizontal drilling and fracking, which began between the years 2010 and 2011(Coney et al.; Ibid; 54).

The current Permian Basin production of oil accounts for 1.2 million barrels per day (EIA; 2015d; figure data). For decades, the supply/demand balance has been largely kept in the Permian Basin, with local refineries consuming roughly 300 Mbpd and three crude oil pipelines providing takeaway capacity of 975 Mbpd. Two-thirds of that takeaway capacity went to Cushing, Oklahoma, which is the New York Mercantile Exchange (NYMEX) pricing hub for West Texas Intermediate (WTI). It is important to understand that Cushing is simply a staging area for crude oil – it is not designed to be the final destination (Fogleman and Gardner; Ibid; 9-10).

The increase in crude oil production is (was) believed to be a step towards positioning the country squarely on a path to “energy independence.”

Figure 8: Changing Structure of Imports



Source: Salient (2014; 15)

The respective (Figure 8) map delineates the total U.S. imports (excluding Canada) are expected to decline from 5.9 MMbpd in 2012 to just 600 Mbpd by 2020. On the East Coast, light imports are expected to be completely backed out (from 1.2 MMbpd in 2012). These imports will largely be displaced by Bakken production, the majority of which is expected to be transported by rail to the East Coast refining markets. Along the Gulf Coast, which is home to approximately 45% of the nation’s refining capacity, light imports are expected to be completely backed out (from 300 Mbpd in 2012) and replaced with supply from the Permian and Eagle Ford basins and possibly some Bakken crude as well. Medium and heavy imports are also expected to fall precipitously along the Gulf Coast (from 4.4 mm to 0.6 MMbpd) and be replaced by Canadian oil. Another interesting fact is that the U.S. is becoming a net exporter of products – both refined products and NGLs (particularly propane). Exports are expected to continue to ramp throughout the rest of the decade – from 1.0 MMbpd in 2012 to 2.6 MMbpd in 2020.

In general, non-North American crude oil imports are anticipated to decline by 90% within seven year period. In addition, the United States will likely never be able to produce its current daily crude oil consumption totaling 16 million bpd but given the Mexican Government allowed foreign investment in developing its energy reserves the United States is believed to be able to get pretty close when adding to the oil import from Canada (Fogleman and Gardner; Ibid; 9-10).

According to many scholars there is every reason to believe energy renaissance is real and able to make the dream of the US energy independence a reality despite the fact that in response to the collapse in global crude oil prices, that have dropped by about 50 percent since June 2014 as a result of OPEC´s November 2014 decision to maintain constant oil production, some of the very top US shale oil producers started to cut their capital expenditures and their rig count in 2015 (Driver; 2015).

Their activity can be ascribed to the competitive dynamics of the oil markets (the producers, too, are part and parcel of) which can be seen as self-correcting in some measure (Yetiv; 2015; 23). Yetiv observes that they are affected by the cycle of investment. When oil prices drop to low levels for some time, current investment in future oil production tends to drop because producers see investment as less profitable. When oil prices are high for some time, investment in future production goes up. This creates a lagged effect on oil prices. If the drop in oil prices in late 2014 lasts for some time-which is still topical-it will decrease investment in oil production, diminish supply, and generate higher oil prices down the road. Another self-correcting aspect of the market is that the cheaper the price of oil, the more demand there will be for it. People will drive more if gasoline prices are lower, even if gasoline is less elastic or responsive to price changes than are other goods. In turn, this increased demand will eventually push oil prices higher, all other things being equal. Similarly, lower oil prices contribute to higher economic growth, all other things being equal. That growth will then increase demand for oil and push prices higher. The above mentioned theory can be explained by way of a practical example below.

McCracken (2015) argues companies will not invest in new projects today if they believe the cost of doing so will be cheaper tomorrow. US rotary rig count saw a peak of 1609 oil-directed rigs in the week ending 19 September 2014, but it has dropped to 1317 by 23 January 2015. Shale oil production is reacting quicker to price than conventional drilling. Shale wells are quick to drill and have a different decline profile to conventional wells. While conventional wells typically display a hyperbolic decline curve, the decline rate from shale well is much steeper from the start. As shale drillers can drill and complete wells more quickly than a conventional development, and will receive the bulk of a well´s output almost immediately, they have a different price horizon, one much more focused on current price levels and the short-term outlook. Conventional drillers are interested in the oil price ten years hence. A conventional driller will complete a well to recoup development coasts even in a low price environment. Shale drillers weigh the drill cost of the well against the completion costs, given the high proportion of initial output from the well (65 percent in the first year and further 35 percent in the second. A long tail of output, accounting for very low levels and extending for over two decades, follows). McCracken stresses that not just growth in the output but the maintenance of existing levels of production is dependent on continuous drilling.

Given OPEC´s (November 2014) decision, Krane and Agerton (2015; 3; 20-21) posit the clearest evidence of decline in new US shale production has emerged from the Permian Basin of Texas and New Mexico. There were steep drop-offs in the number of rigs in operation and in the drilling of vertical wells. As a result, projected new oil flow has decreased. On the other hand, the rising numbers of wells drilled and increasing volumes of oil produced have been registered in the Eagle Ford shale in Texas. Krane and Agerton (Ibid) do not fail to stress that the slowdown in growth does not mean that overall US oil production has decreased. It means that production growth is occurring at a decreasing rate.

Although the actual changes in output are modest, the implications are not, given some producers may still be profitable and stay in business despite lower oil prices. In any case the US production of shale oil will be an early responder to the large drop in oil prices that occurred in late 2014.

The shale oil production being on the increase has given rise to the abundant crude oil supply, which is highly beneficial to the US economy. On the other hand, there are growing concerns about the ability of the US refining system to absorb future growth in domestic crude oil production. Bordoff and Houser (2015; 4) assert the growing mismatch between domestic crude oil supply and domestic refining capacity is prompting a re-evaluation of the export restrictions first put in place in the 1970s when the United States adopted domestic price controls to combat inflation, and crude oil export restrictions were necessary to make those price controls effective. While price controls have long since fallen away, crude oil export restrictions remain (Ibid; 61). However, crude oil exports are not entirely prohibited under current US law. Interestingly enough, since the 1970s the US Presidents have taken steps to relax these restrictions for targeted reasons (from addressing excess production of heavy California crude oil to fostering free trade in energy with Canada to opening markets for Alaskan crude oil (Ibid; 8)). As a result, US crude oil exports currently (March 2015) account for 478 thousand barrels per day (EIA; 2015; online tables).

According to Bordoff and Houser (Ibid; 17) the United States is presently the largest refined petroleum exporter in the world. This can be ascribed to the fact that refined product exports are allowed and are not subject to requiring a license. That is why, the distinction between crude oil[50] and a refined product is crucial to current export policy.

There are both proponents and opponents of increasing the amount of crude oil that can be exported from the United States. Bordoff and Houser (Ibid; 4) posit producers worry that without access to foreign markets they will have to discount their oil to incentivize refiners to process it at existing facilities or cover the investment required to build new ones. Lower market prices for US oil producers could reduce upstream investment and future domestic production growth. Refiners worry that allowing crude oil exports will raise domestic oil prices, harm their competitiveness and reduce the incentive for new refining investments. Consumers worry that exporting oil could increase gasoline and diesel prices and leave them more vulnerable to future international supply disruptions. Environmental groups worry that allowing exports will result in more shale development domestically and more greenhouse gas emissions globally.

With reference to the US export restrictions Banzhaf (2014) points out to France´s ban on agricultural exports in the 18th century as a result of likewise lobbying from industrial and consumer interests, which wanted to hold urban wages low by keeping subsistence cheap. That law kept the domestic supply of agriculture commodities high, forcing the price of grain lower in France than the rest of Europe. Distorting the market to keep the price of agricultural commodities cheap only impoverished the rural economy. France´s farmland was thus undervalued and underperforming. Freeing up the market for grain exports would unleash that wealth and encourage productive investments in land, which would enrich the whole country in the long run. The respective US export

[50] Under The Bureau of Industry and Security (BIS) regulations crude oil is defined as a mixture of hydrocarbons that existed in liquid phase in underground reservoirs; remains liquid at atmospheric pressure after passing through surface separating facilities; and which has not been processed through a crude oil distillation tower. From the perspective of BIS regulations even condensate (coming straight off a wellhead) or rather lease condensate, is considered crude oil and thus not exportable without a license. There remains some uncertainty about how much processing of the condensate is required to classify it as a refined product rather than crude oil despite the fact there exists the oil industry standard (API gravity inverted scale for denoting 'lightness' or 'heaviness' of crude oils and other liquid hydrocarbons) to determine and classify the density of oil (Bordoff and Houser; Ibid;17).

restrictions ban is distorting the domestic energy market to lower prices. Indeed, this may help refineries and consumers in the short run.

Because the United States was hardly in the oil export business for many years, the impact of the respective ban was relevant accordingly. Rather than maximizing the value of oil resource, the United States has been preventing it from flowing to the areas which value it most, hence limiting US wealth rather than enriching it.

Bordoff and Houser (Ibid; 61), too, suggest the original rationale for crude oil export restrictions no longer applies. If they remain unchanged while the production growth rates continue, the ability of refineries to process additional US light crude oil within the next few years will be exhausted. Accordingly, the respective restrictions will distort market outcomes, reducing US crude oil output, increasing the price of gasoline and other refined product prices and last but not least, harming the US economy. Lifting crude oil export restrictions would not harm US energy security. It would make the United States more resilient to supply disruptions elsewhere in the world. Increased US production can weaken the economic power, fiscal strength and geopolitical influence of other large oil producers, as the recent oil price drop has demonstrated.

Weiss and Peterson (2014; 1-8) suggest American crude oil should be kept at home despite the fact the United States has experienced an amazing energy transformation accounting for the increase in domestic oil supply, the decline in demand and the decrease in foreign oil imports. This resulted in gasoline/diesel price stabilization and higher energy security.

Given the crude oil export ban was established to protect consumers and energy security, Weiss and Peterson posit ending the crude oil export ban could raise gasoline prices. They point out to unfavorable experience from the removal of a ban on Alaska oil exports in 1996. Before the ban was lifted, much of this oil was shipped to the West Coast. After Congress eliminated the ban, gasoline prices rose in that area. When Alaskan oil exports ceased, the gasoline price differential between the West Coast and the national average did decline.

Weiss and Peterson argue lifting the crude oil export ban could threaten energy security. The less oil the United States imports, the more secure its oil supply. Lifting the ban on the crude oil exports would lower the domestic supply available to meet US demand. This would necessitate imports of foreign oil to replace the domestic oil shipped overseas. It would also reduce US energy security by increasing its dependence on foreign oil, which is still vulnerable to frequent supply disruptions. Moreover, a more serious supply disruption of foreign oil from volatile parts of the world (for example OPEC nations in the Middle East) would have dire consequences for the US economy.

Weiss and Peterson suggest lifting the export ban to help those lobbying the most to sell their oil on a global market, namely the five Big Oil companies, would be worth consideration if they were in dire economic straits. But the five largest oil companies – BP, Chevron, ConocoPhillips, Exxon Mobil, and Shell – earned a combined profit of more than $1 trillion in the past decade. The companies are pushing to lift the ban on crude oil export to take advantage of the barrel price difference ($5.20[51] as of April 13) between domestic West Texas Intermediate (WTI) crude oil and the Brent crude oil sold on the world market. The growing supply of lighter, sweeter, low sulfur tight oil has further lowered the domestic price compared to the world Brent price. Given the companies are already effectively exporting refined petroleum products, which are unaffected by the ban on crude oil exports, and are spending huge profits on stock buybacks rather than investing in alternative energy or other projects there is every reason to stress they are only keen on prosperity. The current US oil import being on the decline, the current surge in domestic oil production stabilizes gasoline/diesel prices and enhances security. Commission on Energy and Geopolitics (2013) argues no matter how close the United States comes to oil self-sufficiency, volatility in the global oil market (the United States is part and parcel of) will remain a serious concern. There is no concrete independent analysis that lifting the ban on crude oil exports would leave gasoline prices or energy security unaffected. EIA predicts the current surge in domestic oil production is temporary. Consequently, crude oil export policy should not be based on the assumption of endlessly growing domestic oil supply (cited in Weiss and Peterson; 2014; 5).

4.3. Impact on Global Oil Market

The US shale oil revolution has altered the geopolitical map and the global oil market to such an extent that OPEC´s ability to play its historical role as a market balancer has been substantially weakened. As recently as 2007, the United States was the world's number one oil importer. By 2012, these circumstances no longer held true. The US imports from mainly OPEC countries fell rapidly and instead, the United States became a top exporter of petroleum products (Coney et al.; 2014; 32).

[51] "Brent WTI Spread:." *Ycharts.com*, Accessed April 16, 2015, http://ycharts.com/indicators/brent_wti_spread.

In the midst of a massive global transformation US shale oil revolution has accordingly affected the global oil market the United States is part and parcel of. As a result, the policies and regulations implemented by the United States have a significant effect on how shale oil production impacts US economic, environmental and geopolitical interests around the world (Coney et al.; Ibid; 2).

The most visible effect of shale oil production has been the decline in the WTI price relative to Brent. Consequently, some observers have posited that shale oil may have become victim of its own success, attributing the overall decline in the global price of oil in recent months to increases in shale oil production. The persistent divergence between these prices since 2011 increasingly calls into question the use of the WTI price as a benchmark in pricing crude oil. The price of LLS, which during 2011-2013 was considered a plausible alternative benchmark, since 2014 has closely tracked the WTI price, indicating that the US market for light sweet crude oil is no longer fully integrated with the world market. A possible solution consists in returning to regional markets. However, such a development would be striking given the prevailing trend toward globalization in recent decades. Another potential solution resides in removing US export ban on crude oil, which in the long run would be expected to reestablish arbitrage between alternative prices for light sweet crude oil (Killian; 2014; 27)

4.4. Impact on Domestic Economy

According to Coney et al. (2014; 67) US shale oil production qualifies as a true "boom" in the traditional sense, meaning that it has happened suddenly, on a massive scale, and brings both positive and negative elements, creating opportunities and success even as it brings new risks and challenges. It is a real turnaround in the historic pattern of long-term oil production decline since the late 1980s. In November 2013, US oil production topped eight million barrels per day for the first time since January 1989.

Booms do not last but they are temporary phenomena. Given this is the historical pattern, reflecting the total potential involved, there is every reason to stress that the United States stands at the threshold of a new era of true oil abundance because of continued innovations in fracking technology having the long-term potential to open up a large number of new formations for commercial production. The extreme rate of production growth in the Eagle Ford and Bakken is indicative of how suddenly shale oil has appeared on the US energy scene.

This suddenness itself brings major challenges. Infrastructure, namely the pipelines, roads, and housing, as well as proper environmental impact assessment, and even institutional adjustments at the county, state, and federal level have been seriously overwhelmed by the respective boom. As a result, the rising shale oil production impacts are being dealt with by proponents and opponents (Coney et al.; Ibid; 67).

According to Kilian (2014; 22-28) the increased shale oil production affects the economy at the local and state level where shale oil plays are located. Given population growth has spiked near major oil plays, local communities and cities have been impacted accordingly. Increased shale oil production positively affected employment but employment gains sometimes are not as large as public debate would suggest. States containing shale oil plays also benefit from increases in tax revenues. Regardless of the notion that shale oil is a game changer for the US economy, for the average American the shale oil revolution has changed little. Gasoline prices at the pump have remained largely unaffected by increased shale oil production. One way of profiting from shale[52] would be to own stocks of the refining companies that are able to buy crude oil at discounted prices, yet sell gasoline at undiscounted prices. Another way would be through private ownership of mineral rights. As a result, the main beneficiary from the US shale oil revolution has been not gasoline consumer or oil producer but the US refining industry, which enjoys a competitive advantage compared to diesel or gasoline producers abroad because of its access to low-cost crude oil. Therefore, refiners have every incentive to preserve the status quo and to prevent a lifting of the US ban on exports of domestically produced crude oil. As a result, there is an obvious conflict between the interests of US refiners and US crude oil producers. An additional beneficiary of the shale oil revolution has been the transportation sector, notably the railroad industry, and the industries directly serving the oil sector. One of the hopes has been that shale oil would revive manufacturing sector, but much of this sector has moved to emerging economies. An industrial revival is based on the premise that manufacturing relies on energy and that shale oil provides a source of inexpensive energy being able to compete with emerging economies. Proponents of this view hope for a return of blue-collar jobs to the United States, as firms reevaluate the costs and benefits of outsourcing. Given it is based on the premise of lower fuel costs there is no reason for the US prices of gasoline or diesel to mirror the decline in the price of domestic crude oil. Although there has been a widely noted decline in US domestic oil prices

[52] For someone living outside Texas, Oklahoma, new Mexico, Colorado, North Dakota or Montana (Ibid.)

relative to international benchmarks such as Brent, this price decline is not being passed on to the consumer. The discrepancy between domestic and global oil prices has resulted from a breakdown of arbitrage reflecting the current US ban on exporting crude oil and an inadequate transportation infrastructure that prevented the oil from being shipped to refineries able to process it. The mismatch between the supplies of crude oil and the available refining and transportation capacity arose because the shale oil boom caught the refining industry by surprise.

The US shale oil boom was preceded by a growing shortage of light sweet crude oil in world markets. US refiners responded to this trend by expanding their capacity to handle heavy crude oil that remained in abundant supply, becoming the world leader in this field. Much of the refining structure was ill equipped to process this oil and parts of the pipeline infrastructure developed over the preceding forty years became obsolete. As a result, the US oil market fragmented into regional markets and became distinct from the global market for crude oil. Reconfiguring the US refining and transportation infrastructure is a costly and slow process. Long-term investments in infrastructure are likely to be held back by uncertainty about the future of US shale oil production, especially in light of recent declines in the price of crude oil. For the time being, therefore, the evolution of the US price of oil is inextricably tied to the development of the US refining, pipeline and rail infrastructure.

Additional negative impacts such as increased traffic, housing units, and environmental effects such as gas flares, oil spills, and leaks (Coney et al.; Ibid; 66) should not be overlooked, as well.

5. Future Outlook

According to White House CEA (2014; 3) the resilience of the economy to international supply shocks, is enhanced by reducing spending on net petroleum imports and by reducing oil dependence. The aim of the following chapter is to determine the core components of reducing exposure to energy security threats associated with oil consumption and examine possible future scenarios with a particular emphasis on identifying the effects of key variables.

The first part of the chapter will focus on the means of achieving reduced dependence on foreign oil imports. The second part of the chapter will explore potential future scenarios through a number of select projections modeled by the EIA and other organizations, with a particular emphasis on U.S. domestic oil production. Through these scenarios, we will identify the effects of two critical factors that act as constraints on oil production, specifically the resource base, which is primarily determined by geology and technology, and the price, which affects the economics of the recovery.

5.1. Reducing Dependence

The means of achieving reduced dependence on foreign oil have three dimensions: increasing domestic production of conventional energy sources, particularly oil and natural gas; reducing consumption by increased energy efficiency; and developing new sources of energy, particularly renewable energy and renewable fuels that can replace oil and other fossil fuels (Yacobucci; 2015; 1).

5.1.1. Increasing Production

Recent years have seen a jump in domestic production of crude oil, mostly light crude oil from unconventional supplies in the Bakken formation in North Dakota and the Eagle Ford formation in Texas. Increased production has reduced U.S. crude oil imports, and has led to other meaningful benefits such as an improved current account deficit, and increased economic competitiveness (Council; 2012; 13 and Yacobucci; 2015; 2).

However, significant oil and natural gas resources on federal lands, both onshore and offshore, remain unavailable for development due to statutory restrictions and bureaucratic inertia (Council; 2012; 13).

Much of the urgency regarding access to federally restricted areas both offshore and onshore has receded as the industry has turned its attention to developing unconventional resources on state and private lands. While touting the benefits of developing these new resources, policymakers have simultaneously questioned the need to make additional tracts of land available to an industry in the midst of a nearly unprecedented growth phase (Council; 2012; 59).

With regard to increased production, investment in infrastructure development is essential for handling the surge of oil and gas production, both in regards to pipelines and processing facilities. However, domestic production of oil and gas is currently outpacing the approval rate of new pipelines and the capacity of existing infrastructure (Cimino and Hufbauer; 2014; 8).

Given the gravity of the nation's energy security challenges, U.S. policy should prioritize growth in domestic oil and natural gas production by increasing access to areas with high potential and letting industry invest in developing the most promising resources (Council; 2012; 60). Furthermore, steps should be taken toward simplifying regulatory processes so as to address the harmful effects of regulatory uncertainty in the energy industry (Council; 2012; 25).

Producing more crude oil, natural gas liquids, and alternative liquid fuels domestically would directly offset the need for imports of foreign oil, driving meaningful reductions in the trade deficit. Greater investment in domestic fuel production would also create direct and indirect jobs and increase federal revenues through greater collection of income taxes as well as production royalties when such activities occur on federal lands and waters (Council; 2012; 10-11).

5.1.2. Reducing Consumption

Given energy security is primarily a function of oil consumption, not production (Council; 2012; 30), the United States continues to face considerable risks even during this time of monumental increase in domestic supply.

To address this issue, oil consumption can be reduced by a) conservation and by increased efficiency of energy use and b) switching to other fuels that are abundant domestically and are less price-volatile.

Reduced demand would have an effect similar to increased production in terms of the trade deficit, reducing capital outflows and increasing domestic investment. However, more importantly, greater adoption of advanced transportation technologies, particularly those powered by electricity and natural gas, would sharply reduce the oil intensity of the economy, making the United States far more resilient to high and volatile oil prices. This increased resiliency would have beneficial long-term effects on consumer spending, business investment, and overall economic growth. The single most important benefit of reduced oil dependence is that the economy will be much better prepared to withstand the damaging effects of oil price spikes (Council; 2012; 10-11).

5.1.2.1. Fuel Efficiency

Achieving significant reductions in the oil intensity of the U.S. economy has been a long-standing goal of public policy as it relates to energy security. Most prominent has been setting fuel economy standards for automobiles and trucks (Yacobucci; 2015; 2). With recently-finalized vehicle fuel economy standards targeting a light-duty vehicle fleet average of 54.5 miles per gallon by 2025, the transportation sector is on a trajectory that will reduce total oil consumption by approximately 3.1 million barrels per day (MMbpd) by 2030.This level of oil savings will have positive implications for U.S. energy security (Council; 2012; 30).

If the energy savings from improvements in passenger vehicles are to be large, Americans' penchant for increasing vehicle size and performance will have to give way to the goal of reducing fuel consumption—that is, improvements in fuel efficiency must have priority over increases in vehicle size and performance (Lave et al.; 2010; 10-11).

In the near term, fuel-consumption reductions will come predominantly from improved gasoline and diesel engines, improved transmissions, and reduced vehicle weight and drag. Through at least 2020, evolutionary improvements in vehicles with gasoline internal-combustion engines are likely to prove the most cost-effective approach to reducing petroleum consumption (Lave et al.; 2010; 13). Advanced internal combustion engine technologies, low-cost hybrid systems such as stop-start, and other sources of efficiency can meaningfully reduce U.S. oil demand without requiring major changes to infrastructure or consumer behavior (Council; 2012; 25).

5.1.2.2. Alternative Energy Sources

Oil dependence can be effectively addressed by developing a transportation system that is no longer predominantly beholden to the high and volatile prices characteristic of the global oil market. While continued improvements in fuel efficiency remain a critical part of the solution for vehicles of all sizes, so too is the development and adoption of alternative fuel vehicles that use electricity, natural gas, or other domestic and less price-volatile fuels (Council; 2012; 12).

As noted, reducing the need for imported oil has been a major feature of energy policy, and congressional mandates have led to increased consumption of ethanol and other biofuels. However, essentially all fuel ethanol currently is produced from corn, potentially putting pressure on food production and food prices (Yacobucci; 2015), 5)

The cost of producing ethanol varies significantly from year-to-year based on two critical determining factors: energy costs and crop costs. In the United States, this has meant that the viability of the ethanol industry is determined in large part by the prices of corn and natural gas, in addition to the price of the dominant liquid fuel in the marketplace, gasoline. As the fuels, which essentially define the market, gasoline and diesel are critical price benchmarks for all biofuels, and their prices usually track each other closely. While low natural gas prices and high oil prices have created favorable economic drivers for ethanol in recent years, high corn prices have created an increasingly challenging outlook. Food-for-fuel debates aside, the dependence of the U.S. ethanol industry to corn as a feedstock exposes the production chain to uncontrollable events, such as 2012's Midwestern drought (Council; 2012; 81).

The technology for producing ethanol from non-food sources (including cellulosic biomass) faces serious technological barriers. Another transportation alternative, long considered but only slowly adopted, has been natural gas-powered vehicles. Recent increases in natural gas production, noted above, have made this option appear more attractive, although developing a supply infrastructure and overcoming technological and cost difficulties continue to present barriers to widespread adoption (Yacobucci; 2015), 5)

Alternative fuel vehicles (AFVs), those vehicles that use fuels derived from something other than petroleum, such as electricity and natural gas, are an attractive solution because they are powered by domestic fuels whose prices are less volatile than oil (Council; 2012; 31). Plug-in electric vehicles (PEVs) draw energy from the electric grid, which generates electricity from a diverse range of largely domestic fuels (Council; 2012; 31).

However, natural gas vehicles (NGVs) and PEVs each face considerable barriers to broader commercialization. While they both rely on existing technologies, they also impose on consumers a larger upfront investment, and suffer from some degree of uncertainty regarding refueling infrastructure (Council; 2012; 31).

Technological readiness—whether or not a given technology will, in fact, be commercially available at suitable performance levels within the study horizon—is a threshold constraint for any decarbonization scenario. Technologies, such as electric, plug-in hybrid and fuel cell vehicles are commercially available at demonstration or early commercial stages but require substantial maturation and face significant technical and cost hurdles to scale up (Loftus; 2015; 106).

The capital assets and infrastructure that comprise and support the U.S. on-road fleet represent decades of investment by energy providers, automakers, and government agencies at all levels in a system designed to function on petroleum. Transitioning this system away from its current heavy reliance on petroleum toward a more diverse mix of fuels that does not expose the broader economy to the volatility of global oil markets will take time, technological advancements, and targeted public policy (Council; 2012; 30-31).

Because changing the manufacturing, servicing, and fuel infrastructure to serve electric or fuel cell vehicles would be expensive and time-consuming, the new technology would have to offer major advantages. For the medium term, plug-in hybridelectric vehicles (PHEVs) and the associated electricity fueling infrastructure could be deployed more rapidly and more cheaply than hydrogen fuel-cell vehicles and the associated hydrogen fuel production and distribution infrastructure. Thus, if high-energy-storage battery technology progresses sufficiently, PHEVs would be a promising mid- to long-term option. In contrast, it would take decades—perhaps until 2050—for hydrogen fuel-cell vehicles (HFCVs) to have a major impact on U.S. oil use (Lave et al.; 2010; 10-11).

Belzowski and McManus cited in Loftus (Loftus; 2015; 105) estimate that 20–40 years would be required for alternative LDV powertrain technologies to increase their on-road penetration by 50 percentage points in the USA. The growth of diesel LDVs also provides a historical analogue. A significant fuel price differential, together with the inherent fuel efficiency advantage of diesel over gasoline engines led diesel LDV sales to reach 50–70% of new sales in many EU countries by 2005. Despite these economic and technical advantages and the maturity of the technology platform, the total LDV fleet diesel penetration only increased from 15 to 30% over a 10-year period (1995–2005).31 The barriers to electric or hydrogen vehicle penetration are significantly larger than those facing diesel (Loftus; 2015; 105-106).

5.2. Future Scenarios

Energy market projections are subject to much uncertainty. While energy markets are complex, energy models are simplified representations of energy production and consumption, regulations, and producer and consumer, projections are highly dependent on the data, methodologies, model structures, and assumptions used in their development. Many of the events that shape energy markets are random and cannot be anticipated. In addition, future developments in technologies, demographics, and resources cannot be foreseen with certainty (EIA; 2015f; iii).

We will use EIA's Annual Energy Outlook 2015 as the basis for possible future scenarios as it is specifically focused on the United States. A comparison with projections made by other organizations will follow.

5.2.1. Annual Energy Outlook

The *Annual Energy Outlook 2015* (EIA; 2015f;), prepared by the U.S. Energy Information Administration (EIA), presents long-term annual projections of energy supply, demand, and prices focused on the United States through 2040, based on results from EIA's National Energy Modeling System (NEMS)[53] (EIA; 2015f; ii).

Projections by EIA are not statements of what will happen but of what might happen, given the assumptions and methodologies used for any particular scenario. The analysis in AEO2015 focuses on six cases, four of which will be presented in this section: Reference case, Low and High Oil Price cases, and High Oil and Gas Resource case. The AEO2015 Reference case projection is a business-as-usual trend estimate, given known technology and technological and demographic trends. The impacts of alternative assumptions [54]are explored in other scenarios with different macroeconomic growth rates, world oil prices, and rates of technology progress (EIA; 2014a; iii).

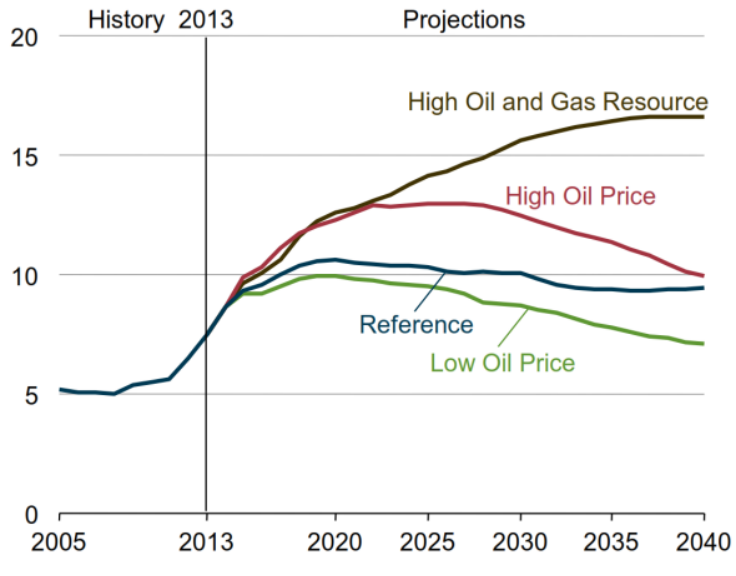
[53]NEMS enables EIA to make projections under alternative, internally-consistent sets of assumptions, the results of which are presented as cases. (Ibid)

[54] For the description of scenarios, see Annex A.

5.2.1.1. Reference Case

The Reference case reflects global oil market events through the end of 2014. Over the past two years, growth in U.S. crude oil production, along with the late-2014 drop in global crude oil prices, has altered the economics of the oil market. These new market conditions are assumed to continue in the Reference case, with the average Brent [55]price dropping from $109/barrel (bbl) in 2013 to $56/bbl in 2015. Prices rise steadily after 2015 in response to growth in demand from countries outside the OECD; however, downward price pressure from continued increases in U.S. crude oil production keeps the Brent price below $80/bbl through 2020. (EIA; 2015f; ES-2) U.S. crude oil production starts to decline after 2020, but increased production from non-OECD countries and from countries in the Organization of the Petroleum Exporting Countries (OPEC) contributes to the Brent price remaining below $100/bbl through 2028. (EIA; 2015f; ES-2) At the same time, growth in demand from non-OECD countries—countries outside the Organization for Economic Cooperation and Development (OECD)—pushes the Brent price to $141/bbl in 2040 (in 2013 dollars). The increase in oil prices supports growth in domestic crude oil production (EIA; 2015f; 4).

Figure 9: U.S. total crude oil production in four cases



Source: EIA (2015f)

[55] In the Reference, High Oil Price, and Low Oil Price cases, the North Sea Brent (Brent) crude oil price reflects the market price for light sweet crude oil free on board (FOB) at the Sullen Voe oil terminal in Scotland (EIA; 2015f; 4).

U.S. crude oil production in the AEO2015 Reference case increases from 7.4 million bbl/d in 2013 to 9.4 million bbl/d in 2040. Production in AEO2015 reaches 10.6 million bbl/d in 2020. Higher production volumes result mainly from increased onshore oil production, predominantly from tight (very low permeability) formations. Lower 48 onshore tight oil production reaches 5.6 million bbl/d in 2020 in the AEO2015 Reference case before declining to 4.3 million bbl/d in 2040 as high-productivity areas, or sweet spots[56], are depleted (EIA; 2015f; E-10).

Lower 48 offshore crude oil supply grows from 1.4 million bbl/d in 2013 to 2.2 million bbl/d in 2019, before fluctuating in accordance with the development of projects in the deepwater and ultra-deepwater portions of the Gulf of Mexico. In 2040, Lower 48 offshore production totals 2.2 million bbl/d (EIA; 2015f; E-10).

5.2.1.2. Price

Recent declines in West Texas Intermediate oil prices (falling by 59% from June 2014 to January 2015) have triggered interest in the effect of lower prices on U.S. oil production (EIA; 2015f; 18).

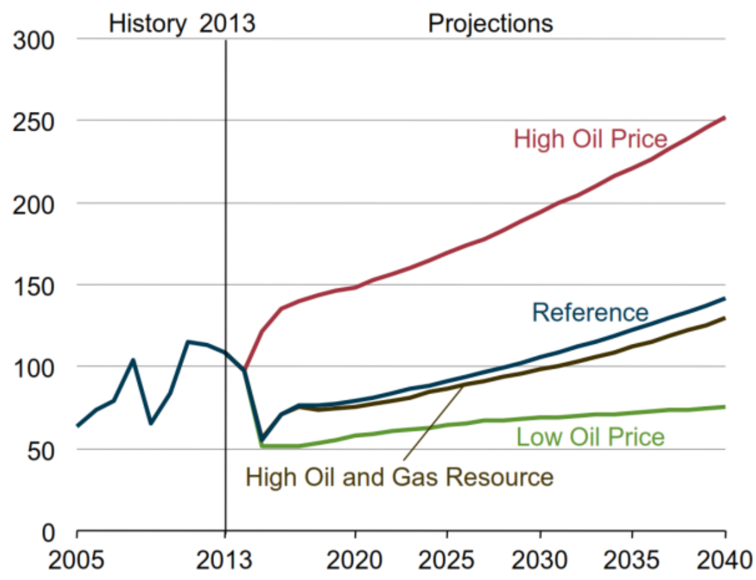
The Low and High Oil Price cases assume the same level of resource availability as the Reference case but different world oil prices (EIA; 2015f; 6).

In the Low Oil Price case, the Brent price drops to $52/bbl in 2015, 7% lower than in the Reference case, and reaches $76/bbl in 2040, 47% lower than in the Reference case, largely as a result of lower non-OECD demand and higher upstream investment by OPEC (EIA; 2015f; ES-2). Domestic crude oil production is 9.8 million bbl/d in 2022, 0.7 million bbl/d lower than the 10.4 million bbl/d in the Reference case. In 2040, U.S. crude oil production totals 7.1 million bbl/d, 2.3 million bbl/d lower than the 9.4 million bbl/d in the Reference case. Most of the difference in total crude oil production levels between the Reference and Low Oil Price cases reflects changes in production from tight oil formations. However, all sources of U.S. oil production are adversely affected by low oil prices (EIA; 2015f; 17). As increased OPEC production depresses world oil prices in the Low Oil Price case, development of some non-OPEC resources that are viable in the Reference case

[56] After accounting for infrastructure constraints and general development patterns, oil and natural gas resources in sweet spots are developed earlier than lower quality resources, based on net present value. (EIA; 2014a;, vi) Sweet spot is an industry term for those selected and limited areas within a play where the well EURs are significantly higher than those for the rest of the play—sometimes as much as 10 times higher than those for the lower production areas within the play (EIA; 2014a; IF-14).

become uneconomical (EIA; 2015f; 5). As crude oil prices fall and remain at or below $76/ barrel (Brent) in the Low Oil Price case after 2014, poor investment returns lead to fewer wells being drilled in noncore areas of formations, which have smaller estimated ultimate recoveries (EURs) than wells drilled in core areas. As a result, they have a more limited impact on total production growth in the near term (EIA; 2015f; 17-18).

Figure 10: North Sea Brent crude oil prices in four cases



Source: EIA (2015f)

In the High Oil Price case, the Brent price increases to $122/bbl in 2015 and to $252/bbl in 2040 (EIA; 2015f; ES-2). The case assumes higher world demand for petroleum products, less upstream investment by the Organization of the Petroleum Exporting Countries (OPEC), and higher non-OPEC exploration and development costs. These factors all contribute to a rise in the average spot market price for Brent crude oil to $252/bbl in 2040, 78% above the Reference case (EIA; 2015f; 4.)

In the High Oil Price case, higher prices for crude oil support higher levels of Lower 48 onshore crude oil production than in the Reference case. Higher oil prices improve the economics of production from new wells in tight formations as well as from other domestic production sources, leading to a more rapid increase in production volumes than in the Reference case. Tight oil production increases through 2022, when it totals 7.4 million bbl/d. After 2022, tight oil production declines, as drilling moves into less productive areas. Total U.S. crude oil production reaches 13.0 million bbl/d by 2025 in the High Oil Price case before declining to 9.9 million bbl/d in 2040 (EIA; 2015f; 18).

In the High Oil Price case, producers take greater advantage of CO2-enhanced oil recovery (CO2-EOR) technologies. CO2-EOR production increases at a steady pace over the projection period in the Reference case and increases more dramatically in the High Oil Price case, where higher prices make additional CO2-EOR projects economically viable. In the High Oil and Gas Resource and Low Oil Price cases, with lower crude oil prices, fewer CO2-EOR projects are economical than in the Reference case (EIA; 2015f; 19).

5.2.1.3. Resource Base

In the High Oil and Gas Resource case, tight oil production grows in response to assumed higher estimated ultimate recovery (EUR) and technology improvements, closer well spacing, and development of new tight oil formations or additional layers within known tight oil formations (EIA; 2015f; 18). Higher well productivity reduces development and production costs per unit, which results in more and earlier development of tight oil resources than in the Reference case (EIA; 2014a; IF-13).

Crude oil production in the High Oil and Gas Resource case increases to 16.6 million barrels per day (bbl/d) in 2040, compared with a peak of 10.6 million bbl/d in 2020 in the Reference case (EIA; 2015f; ES-4).

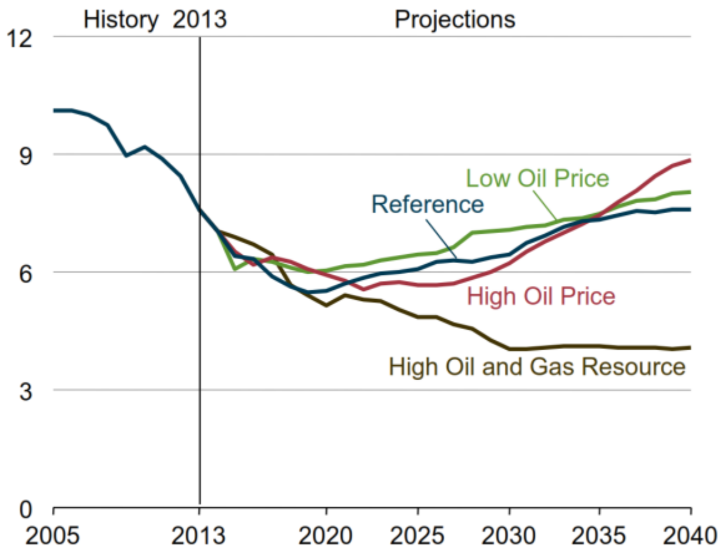
The share of total U.S. energy production from crude oil and lease condensate rises from 19% in 2013 to 25% in 2040 in the High Oil and Gas Resource case, as compared with no change in the Reference case (EIA; 2015f; ES-3).

In the High Oil and Gas Resource case, assumptions about overseas demand and supply decisions do not vary from those in the Reference case, but U.S. crude oil production growth is significantly greater, resulting in lower U.S. net imports of crude oil, and causing the Brent spot price to average $129/bbl in 2040, which is 8% lower than in the Reference case (EIA; 2015f; ES-2).

Net crude oil imports in the High Oil and Gas Resource case decline by 46%, from 7.6 million bbl/d in 2013 to 4.1 million bbl/d in 2040 as a result of cheaper light crude oil production from inland basins and increased production of heavier GOM crude oil. Net imports in the Reference case remain unchanged at 7.6 million bbl/d in 2040. A 6% increase (to 8.05 million bbl/d in 2040), occurs in the Low Oil Price case. In the High Oil Price case, net crude imports first fall to 5.55 million bbl/d by 2022 before rising to 8.86

million bbl/d in 2040, representing an overall increase of 17% (EIA; 2015f; 20 and online tables).

Figure 11: U.S. net crude oil imports in four cases



Source: EIA (2015f)

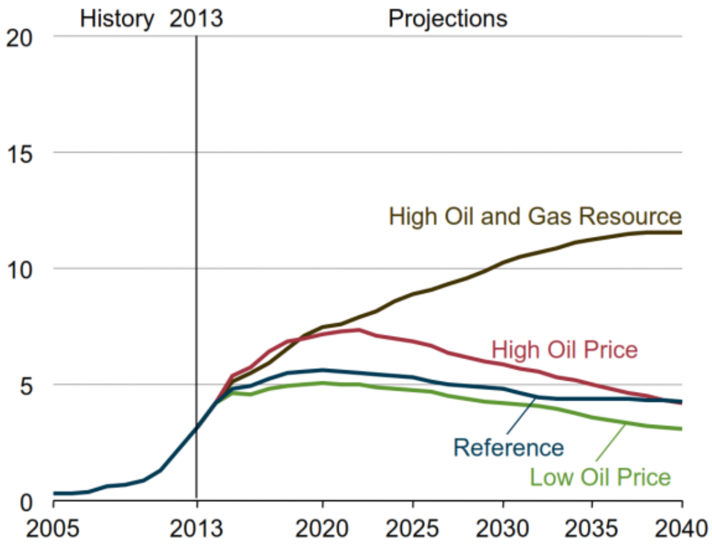
5.2.1.4. Tight Oil

Production from tight formations leads the growth in U.S. crude oil production across all AEO2015 cases. The path of projected crude oil production varies significantly across the cases, with total U.S. crude oil production reaching high points of 10.6 million barrels per day (bbl/d) in the Reference case (in 2020), 13.0 million bbl/d in the High Oil Price case (in 2026), 16.6 million bbl/d in the High Oil and Gas Resource case (in 2039), and 10.0 million bbl/d in the Low Oil Price case (in 2020) (EIA; 2015f; 18).

In all cases with the exception of the High Oil and Gas Resource case, lower 48 onshore tight oil production reaches its peak between 2020 and 2022. The peak occurs in 2020 at the production level of 5.6 million bbl/d in the Reference case. Afterwards, the production declines to 4.3 million bbl/d in 2040.

In the High Oil Price case, the peak occurs in 2022 reaching the production level of 7.4 million bbl/d, followed by a drop to 4.2 million bbl/d by 2040. In the Low Oil Price case, lower 48 onshore tight oil production peaks at 5.1 million bbl/d in 2020 before declining to 3.1 million bbl/d in 2040. In the High Oil and Gas Resource case, lower 48 onshore tight oil production continues growing throughout the projection period, reaching 11.97 million bbl/d in 2040. (EIA; 2015f; online tables).

Figure 12: U.S. net crude oil imports in four cases



Source: EIA (2015f)

In most of the cases, Lower 48 onshore crude oil production shows the strongest growth in the Dakotas/Rocky Mountains region (which includes the Bakken formation), followed by the Southwest region (which includes the Permian Basin) (EIA; 2015f; ES-5).

In both the High Oil and Gas Resource and High Oil Price cases, growing production of 27°–35° American Petroleum Institute (API) medium sour crude oil from the offshore Gulf of Mexico (GOM) helps balance the crude slate when combined with the increasing production of light, sweet crude from tight oil formations. In all cases, GOM crude oil production increases through 2019, as offshore deep-water projects have relatively long development cycles that have already begun. GOM production declines through at least 2025 in all cases and fluctuates thereafter as a result of the timing of large, discrete discoveries that are brought into production. Overall GOM production through 2040 is highest in the High Oil and Gas Resource case, followed closely by the High Oil Price case and finally by the Reference case and Low Oil Price case (EIA; 2015f; 19).

5.2.1.5. Liquids

Production of petroleum products at U.S. refineries depends largely on the cost of crude oil, domestic demand, and the absorption of petroleum product exports in foreign markets (EIA; 2015f; 19). The prices charged for petroleum products and other liquid products in the United States reflect the price that refiners pay for crude oil inputs, as well as operation, transportation, and distribution costs, and the margins that refiners receive.

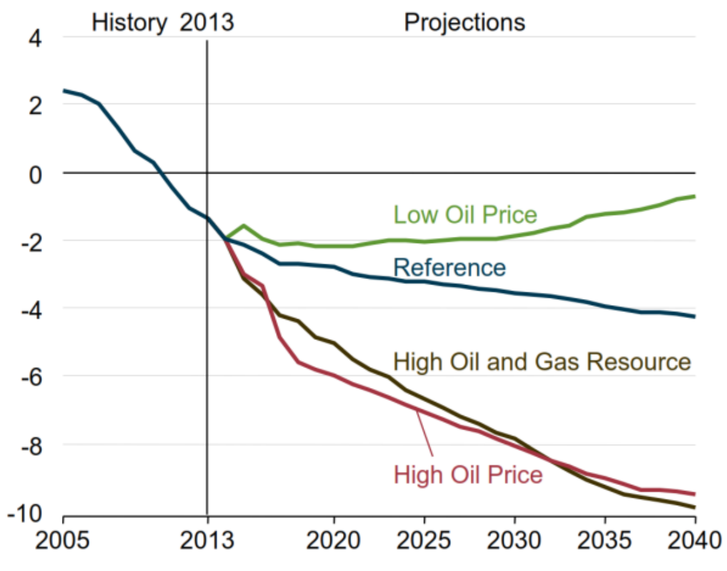
Changes in gasoline and distillate fuel oil prices generally move in the same direction as changes in the world crude oil price, but the changes in price are also influenced by demand factors (EIA; 2015f; 5).

In the High Oil Price case, higher demand for crude oil in non-OECD countries and lower supply of OPEC crude oil push world crude oil prices up. As a result, the weighted average price for U.S. petroleum products increases by 84%, from $3.16/gallon in 2013 to $5.81/gallon in 2040. In the Low Oil Price case, with lower non-OECD demand and higher OPEC supply pushing world oil prices down, the weighted average price for U.S. petroleum products drops by 26%, from $3.16/gallon in 2013 to $2.32/gallon in 2040 (EIA; 2015f; 5-6).

Through 2020, strong growth in domestic crude oil production from tight formations leads to a decline in net petroleum imports and growth in net petroleum product exports in all AEO2015 cases (EIA; 2015f; ES-1).

Net petroleum product exports increase as U.S. refineries become more competitive in all cases except for the Low Oil Price case. Net petroleum product exports increase most in the High Oil Price and High Oil and Gas Resource cases (from 1.4 million bbl/d in 2013 to 9.5 million bbl/d and 9.9 million bbl/d, respectively, in 2040). In the Reference case, net petroleum product exports increase to 4.3 million bbl/d in 2040, and in the Low Oil Price case they increase to 2.2 million bbl/d in 2020 and then decline to 0.7 million bbl/d in 2040 (EIA; 2015f; 20).

Figure 13: U.S. net petroleum product imports in four cases



Source: EIA (2015f)

In the Reference case, the existing U.S. competitive advantage in oil refining compared to the rest of the world continues over the projection period. This advantage results in growing gasoline and diesel exports through 2040 in the Reference case. Consequently, the net import share of domestic liquid fuels consumption declines from an estimated 33% in 2013 to 14% in 2020 as a result of faster growth of domestic liquid fuels supply compared with growth in consumption. Domestic liquid fuels supply begins to decline after 2023 in the AEO2015 Reference case, and as a result, the net import share of domestic liquid fuels consumption rises from 14% in 2022 to 17% in 2040 (EIA; 2015f; E-10, 18).

In the Low Oil Price case, with lower non-OECD demand and higher OPEC supply pushing world oil prices down, the weighted average price for U.S. petroleum products drops by 26%, from $3.16/gallon in 2013 to $2.32/gallon in 2040. With lower levels of domestic production and higher domestic consumption in the Low Oil Price case, the net import share of domestic liquid fuels consumption increases from an estimated 33% in 2013 to 36% in 2040 (ES-4).

In the High Oil Price case, higher world crude oil prices make overseas refineries less competitive compared to U.S. refineries. As a result, the United States becomes a net exporter of liquid fuels in 2020, as higher oil prices reduce U.S. consumption of petroleum products and spur additional U.S. crude oil production. Net liquid fuels exports share of total domestic product supplied will reach 10% in 2029, before declining to 3% in 2040 as domestic production flattens and begins to decline (EIA; 2015f; 19).

In the High Oil and Gas Resource case, refiners and oil producers gain a competitive advantage from abundant domestic supply of light crude oil and higher GOM production of lower API crude oil streams, along with lower refinery fuel costs as a result of abundant domestic natural gas supply. The United States becomes a net exporter of liquid fuels by 2021, with net liquid fuels exports equal to 29% of total domestic product supplied in 2040 (EIA; 2015f; 19-20).

5.2.1.6. Transportation

The energy consumption in transportation depends largely on macroeconomic indicators and fuel prices. Additionally, U.S. laws and regulations shape demand and, consequently, the price of petroleum products in the United States in all the AEO2015 cases. The Corporate Average Fuel Economy (CAFE) standards for new light-duty vehicles (LDVs), which typically use gasoline, rise from 30 miles per gallon (mpg) in 2013 to 54 mpg in 2040 under the fleet composition assumptions used in the final rule issued by the U.S. Environmental Protection Agency (EPA) and National Highway Transportation Safety Administration. The rise in vehicle miles traveled (VMT) for LDVs does not fully offset the increase in fuel efficiency, and motor gasoline consumption declines through 2040 in all the AEO2015 cases (EIA; 2015f; 6).

Light-duty vehicle (LDV) energy consumption declines in the AEO2015 Reference case from 15.7 quadrillion Btu in 2013 to 12.6 quadrillion Btu in 2040. The increase in fuel economy raises the LDV vehicle stock average miles per gallon by 2.0%/year, from 21.9 in 2013 to 37.0 in 2040. The increase in LDV fuel economy more than offsets modest growth in vehicle-miles traveled (VMT), which averages 1.1%/year from 2013 to 2040 as a result of changes in driving behavior related to demographics (EIA; 2015f; E-8).

Gasoline consumption in the transportation sector in 2040 is 21% lower than in 2013. In contrast, diesel fuel consumption, largely for freight transportation and trucking, grows at an average rate of 0.8%/year from 2013 to 2040, as economic growth results in more shipments of goods. LDVs powered exclusively by motor gasoline remain the predominant vehicle type in the AEO2015 Reference case, retaining a 78% share of new vehicle sales in 2040, down only somewhat from 83% in 2013. Because the United States consumes more gasoline than diesel fuel, the pattern of gasoline consumption strongly influences the overall trend of energy consumption in the transportation sector (EIA; 2015f; E-8, ES-6).

The 32% decrease in motor gasoline consumption in the High Oil Price case is larger than the decrease in the Reference case because higher gasoline prices reduce VMT, reducing consumption.

In the Low Oil Price case, the decrease in gasoline consumption (11%) is smaller than in the Reference case because lower gasoline prices stimulate enough increased VMT to offset a part of the impact of fuel efficiency improvements resulting from regulation.

5.2.2. Comparison with Other Projections

The following section compares the AEO2015 Reference case with projections made by four other organizations, namely the IEA World Energy Outlook 2014 (WEO2014), the ICF International study on the impacts of crude oil exports, the OPEC's World Oil Outlook (WOO2014) and the U.S. edition of ExxonMobil's 2015 Outlook for Energy.

5.2.2.1. Price

Of the studies surveyed, only the AEO2015 and the ICF International study examine the effects of different price scenarios[57]. ICF International report examines differential impacts between the export-restricted [58] and non-restricted cases. ICF International created two market scenarios. Its Low WTI-Brent Price Differential Market Scenario (Low-Differential scenario) assumes relatively rapid accommodation of light crudes and condensate, leading to a narrowing in WTI-Brent differentials. The High WTI-Brent Price Differential Market Scenario (High-Differential scenario) assumes that refiners are slower to reconfigure refineries and change crude supplies to accommodate growing light oil supplies, thus prolonging the U.S. crude pricing discounting to global prices (ICF International 2014; 26-27).

Price projections in all of the studies aside from the AEO2015 are within a narrow range[59] and in real 2013[60] dollars. ExxonMobil's outlook does not list price projections.

Average oil spot prices in the AEO2015 are based on the North Sea Brent benchmark. Prices in the WEO2014[61], are based on the international average of crude oil import prices within the member countries of the Organization for Economic Cooperation and Development (OECD). ICF International study includes projections for both the North Sea Brent and the WTI. The OPEC's WOO2014 outlook uses the ORB [62]Reference Case price.

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[57] ICF International study examines the impact of the Brent-WTI spread
[58] Only the export-restricted cases will be used in our comparison.
[59] \$95/bbl-\$104/bbl on the low-end and \$106/bbl-\$132/bbl on the high end
[60] with the exception of ICF International study, which is in real 2011 dollars. Prices were converted to 2013 dollars using the CPI deflator available at http://www.bls.gov/data/inflation_calculator.htm
[61] World Energy Outlook 2014
[62] The OPEC Reference Basket

AEO2015 expects the average Brent price to drop to$56/bbl in 2015, followed by an increase to $91/bbl by 2025 and $141/bbl by 2040. The IEA projections for 2025 assume the price for IRAC to be around $118/bbl in its New Policies[63] scenario. IEA expects IRAC prices to continue increasing throughout the projection period reaching $132/bbl by 2040.

ICF International (2014; 71-72), in both its Low and High Differential (with export restrictions) scenarios, projects the Brent price to grow throughout the projection period, breaking $100/bbl by 2020 before reaching $125/bbl in 2035. WTI price is expected to remain largely the same between 2015-2020, at levels below $93/bbl, followed by an increase to $96/bbl by 2025 and $116/bbl by 2035 in the Low Differential scenario. In the High Differential scenario, WTI is expected to rise from $86/bbl in 2015 to $90/bbl by 2020, then to $96/bbl by 2025, reaching $116/bbl by 2035 as the WTI-Brent price spread narrows.

OPEC assumes a constant nominal price of $110/bbl for the period of 2015-2020. The price in real terms is expected to decline to $95/bbl by 2020. A gradual growth is anticipated for the rest of the projection period, with ORB price in real terms reaching $102/bbl by 2040 (OPEC 2014; 32).

5.2.2.2. Total Crude Oil Production

AEO2015 assumes the domestic crude oil production to increase from 9.3 MMbpd in 2015 to a peak of 10.3 by 2025. A subsequent decline will bring the production down to 9.4 by 2040.

Under the ICF International’s Low Differential scenario, domestic crude oil production is estimated at 8.5 MMbpd in 2015 rising to 10.6 MMbpd by 2020. The production level is expected to peak at 11.1 MMbpd in 2025, and subsequently decline to 10.9 MMbpd in 2035. In the High Differential scenario, domestic crude production will increase more slowly throughout the production period with production levels reaching

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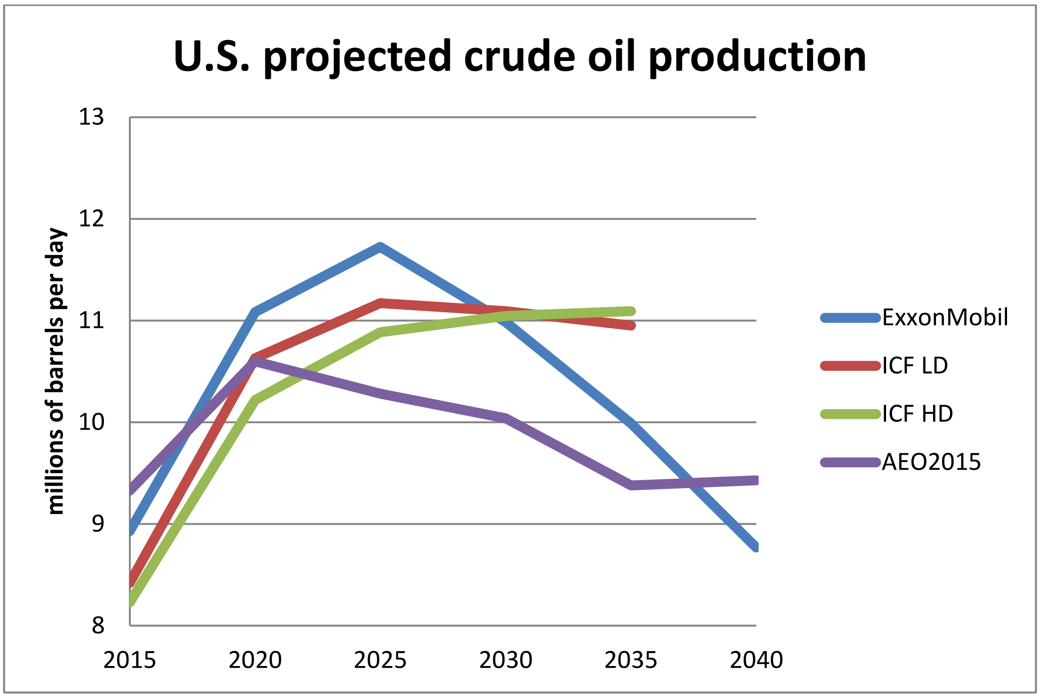
[63] A scenario in the *World Energy Outlook*, that broadly serves as the IEA baseline scenario. It takes account of broad policy commitments and plans that have been announced by countries, including national pledges to reduce greenhouse-gas emissions and plans to phase out fossil-energy subsidies, even if the measures to implement these commitments have yet to be identified or announced.
IEA. "Scenarios and Projections." Scenarios and Projections, Accessed April 12, 2015, http://www.iea.org/publications/scenariosandprojections.
For a complete list of assumptions in the scenario, refer to Annex B in the WEO2014.

11.1 by 2035. The difference reflects the impact of a higher WTI discount to Brent. As the gap between WTI and Brent narrows, production picks up (ICF International 2014; 55).

Figure 14: U.S. Crude Oil production, comparison of projections



Sources: EIA, ExxonMobil, ICF International

OPEC projects the domestic crude oil production to peak at 9.7 MMbpd around 2020, before gradually declining to around 8 MMbpd by 2040 in their Reference case scenario(OPEC; 2014; 305).

ExxonMobil projects the domestic oil[64] production to peak before 2025 at 11.7 MMbpd[65] before declining to 8.8 MMbpd by 2040 (ExxonMobil; 2015; 17).

To allow comparison with the IEA projections, the AEO2015 Reference case projections for crude oil and NGPL productions were combined as the IEA projection for oil production includes NGPL. In the AEO2015 Reference case, U.S. domestic oil production is expected to peak at 14.6 MMbpd in 2020 followed by a decline to 13.5 by 2040. In the WEO2014 New Policies case, domestic oil[66] production increases from 10.1

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[64] includes crude and condensate and tight oil
[65] data extracted using WebPlotDigitizer
[66] includes NGL

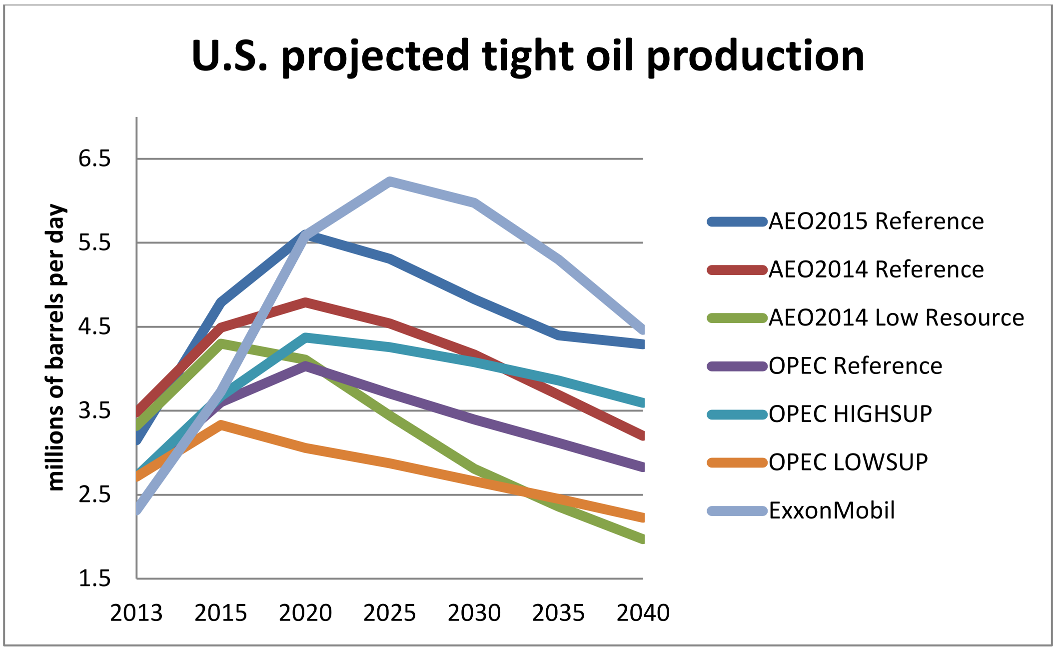
MMbpd in 2013 to a peak of 12.3 MMbpd by 2020, before declining to 10.0 MMbpd by 2040 (IEA 2014; 2014; 124).

OPEC's projection for U.S. oil production with NGPL included expects the level of production to reach 13 MMbpd by 2020 followed by a decline to 11.3 MMbpd by 2040.

5.2.2.3. Tight oil

A continued growth in tight oil production is reflected in all of the outlooks. However, growth potential and sustainability of domestic crude oil production hinge around uncertainties in key assumptions, such as well production decline, lifespan, drainage areas, geologic extent, and technological improvement—both in areas currently being drilled and in those yet to be drilled (EIA; 2014a; IF-10). The resource base variable is analyzed only in the AEO 2015 and the OPEC's WOO2014, however only the latter explores the possibility of a low resource base. EIA's previous Annual Energy Outlook (EIA; 2014a;) did include a Low Oil and Gas Resource case.

Figure 15: U.S. Crude Oil production, comparison of projections



Sources: EIA, ExxonMobil, ICF International

The Reference case in the AEO2015 expects the U.S. tight oil production to reach 5.6 MMbpd by 2020 followed by a decline to 4.3 MMbpd by 2040. The Low Oil and Gas Resource case in AEO2014 assumed lower estimated ultimate recovery per tight oil well than in the AEO2014 Reference case, increasing the per-unit cost of developing the resource. The U.S. tight oil production was expected to peak at 4.3 MMbpd in 2016 subsequently declining through 2040 (EIA; 2014a; IF-13). In the AEO2014 reference case, U.S. tight oil production was assumed to peak at 4.8 MMbpd in 2021 before declining to 3.2 MMbpd by 2040. The year-over-year change in projections is caused by updated the estimated ultimate recovery of tight and shale formations at the county level. (EIA; 2015f; E-4). The pace of oil-directed drilling in the near term is faster in AEO2015 than in AEO2014, as producers continue to locate and target the sweet spots of plays currently under development (EIA; 2015f; E-10)

Under the WEO2014 New Policies scenario, U.S. domestic tight oil production increases from 2.5 MMbpd in 2013 to a peak of 4.5 MMbpd in 2025 before falling to 3.0 MMbpd by 2040.

OPEC projects the U.S. domestic tight oil production to grow from 2.7 MMbpd in 2013 to a peak of 4.0 MMbpd in 2020, before dipping to 3.4 MMbpd by 2030 and declining further to 2.9 MMbpd by 2040 in the Reference case. In its Upside Supply scenario[67], OPEC projects the U.S. domestic tight oil production to increase from 2.7 in 2013 to a peak of 4.4 in 2021 followed by a drop to 3.6 MMbpd by 2040. In the Downside Supply scenario[68], a peak of 3.1 MMbpd is expected in 2016 followed by a fall to 2.2 MMbpd by 2040.

ExxonMobil expects the U.S. tight production to increase from 2.4 MMbpd in 2013 to a peak of 6.2 MMbpd in 2025 before dipping to 6.0 by 2030, followed by a continued decline to 4.5 MMbpd by 2040 (ExxonMobil; 2015; 17).

ICF International study does not include a separate projection for U.S. domestic tight oil production.

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[67] Upside Supply scenario constitutes an optimistic view regarding non-OPEC supply. It assumes higher future drilling activity, as well as a more optimistic view of the resources of the different plays and a higher well density, particularly in sweet spots (OPEC 2014; 177).

[68] Downside Supply scenario represents a pessimistic view regarding non-OPEC supply. It assumes an overall lower drilling pace after 2017 in all of the plays (OPEC 2014; 184).

5.2.2.4. Crude Oil Import

In the AEO2015 Reference case, net crude oil imports are expected to first drop to 5.5 MMbpd by 2019 before rebounding to 7.6 MMbpd (the 2013 level) by 2040. The net crude oil imports are expected to average 7.35 MMbpd in 2035.

Under the ICF International Low Differential scenario, net imports of crude are projected to decrease from 6.4 MMBPD in 2015 to 4.6 MMBPD in 2020. The levels should remain largely stable, between around 4.6 MMBPD, in the 2020-2035 period (ICF International 2014; 67). In the High Differential scenario, the decrease from 6.6 MMbpd in 2015 to 5.0 MMbpd in 2020 is expected, followed by a further decline to 4.5 MMbpd in 2035. This is due to lower domestic production levels arising from a larger Brent- WTI spread. As the differential narrows, towards the end of the projection, so do the net imports coinciding with an increase in domestic production.

OPEC's projections do not include figures for the U.S. separately[69].

To allow comparison with the IEA projections, the AEO2015 Reference case projections for crude oil and NGPL productions were combined as the IEA projection for oil production includes NGPL. In the AEO2015 Reference case, U.S. net oil imports are expected to peak fall from 6.0 MMbpd in 2012 to 3.5 by 2040. IEA expects the net imports of oil [70]to decline from 47% (7.0 MMbpd[71]) of primary demand in 2012 to 24% (2.7 MMbpd[72]) of primary demand by 2040 under its New Policies scenario.

ExxonMobil does not list projections for U.S. net crude oil imports.

5.2.2.5. Liquids

Net imports of products are largely the same in both scenarios in the ICF International study. The United States is a net exporter of products throughout the projection period, with net product exports rising from 1.2 MMbpd in 2015 to 3.3 MMbpd by 2035. Total net imports of liquids thus drop from 5.2 MMbpd in 2015 to 1.3 MMbpd by 2035 in the Low Differential scenario. In its High Differential scenario, ICF International expects the net liquids imports to decline from 5.4 MMbpd in 2015 to 2.4 MMbpd by 2025, followed by a continued decline to 1.2 MMbpd by 2035.The difference between the two

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[69] figures list crude imports for U.S. and Canada combined
[70] Includes NGPL
[71] converted from Mtoe to barrels at 7.15 Mbbl/MTOE
[72] converted from Mtoe to barrels at 7.15 Mbbl/MTOE

scenarios is caused by net crude imports initially declining more slowly due to a larger Brent-BTI price spread in the High Differential scenario.

ExxonMobil projects the U.S. domestic liquids [73,74]demand to decrease from 19.5 MMbpd in 2015 to 16.8 MMbpd in 2040 representing a 14% reduction over the projection period (ExxonMobil; 2015; 13).

IEA expects the oil demand to first increase from 17.5 MMbpd in 2013 to 17.8 MMbpd by 2020, before dropping to 13.4 MMbpd by 2040.(IEA 2014; 2014; 98).

ICF International and OPEC do not explicitly list U.S. liquids consumption projections.

5.2.3. Discussion

The surveyed studies all point to the fact that the status of the United States as the net crude oil importer is not likely to change. Despite a projected decline in overall demand for crude oil, U.S. domestic production levels will not be able to exceed or even match the U.S. crude oil consumption. The lowest imports averaging 4.1 MMbpd between 2030-2040 are envisioned in the AEO2015 High Oil and Gas Resource case. However, it is important to bear in mind that the scenario is subject to a higher degree of uncertainty than the Reference case (EIA; 2014a; IF-12).

Overall, a positive development in decades to come is envisioned in most of the above mentioned cases, specifically as sustained production driven by extensive shale and offshore development leads to production levels exceeding those experienced in 2013 and a concurrent moderate decline in domestic consumption resulting from recently implemented fuel efficiency standards are expected to bring about a reduced physical dependence on foreign oil compared with the previous decade.

Based on the above model scenarios we have identified the effects of the two key variables, the price and resource availability. These scenarios have provided a framework for potential developments that might occur as a result of continued or changing trends in said variables.

[73] excluding biofuels
[74] ExxonMobil liquids demand data converted from quadrillion Btu to barrels at 187.84572 million barrels per quadrillion Btu. (EIA; AEO2014; CP-15).

Given crude oil prices influence the rate of production and investments in technology, low world crude oil prices**,** which are expected to potentially result from low non-OECD consumption growth and high OPEC production growth, reduce the economic viability of domestic resources. However, the impact on production growth in the near term is limited as high productivity areas are currently being drilled. In the long term, as the sweet spots are exhausted, the impact of low prices will become more pronounced as many lower productivity areas will be uneconomical. At the same time lower fuel prices attributable to lower world oil prices would increase domestic consumption resulting in higher share of net liquid fuels imports.

High(er) oil prices, which might result from higher non-OECD demand and lower OPEC growth would lead to a more rapid increase in domestic oil production and higher production peak level volumes that would also occur a few years later than under normal price conditions. High oil prices would also make enhanced oil recovery projects more economically viable. Resulting higher fuel prices attributable to higher world oil prices would curtail domestic consumption leading to the U.S. potentially becoming a net exporter of liquid fuels as a result of domestic liquid fuels production exceeding the consumption.

The economics of upstream producers are shaped by both the capital and operating costs incurred during production and the prices at which they are able to sell the production. These prices depend primarily on world oil prices. Nevertheless, the spread between the prices upstream producers are ultimately able to secure and the world benchmark prices depends on the downstream demand and the infrastructure. Under the assumption of a sustained growth in LTO production, midstream and downstream oil industry will require significant investments to accommodate the anticipated increased volume of LTO.

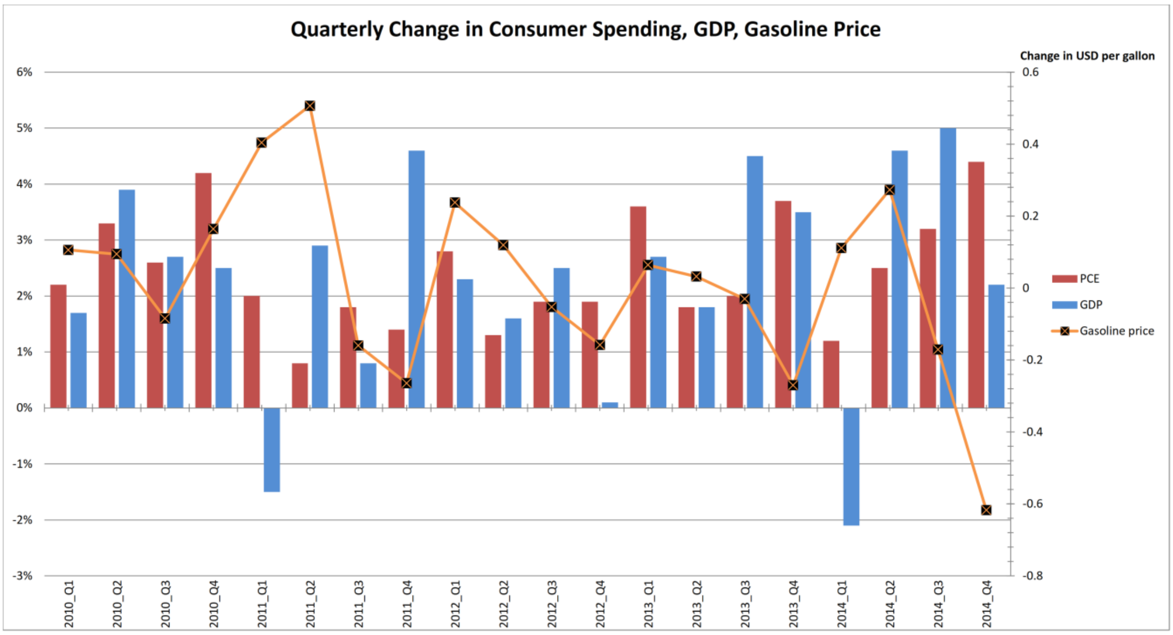
With regard to resource base, higher resource abundance and higher well productivity would reduce the per unit costs of production and result in earlier development of resources as well as higher and more production levels due to higher resource availability. Higher resource availability under unchanged price assumptions would also lead to a slight decline in world oil prices as a result of lower U.S. net imports of crude oil resulting from higher domestic production. The U.S. would potentially become a net exporter of liquid fuels.

Petroleum consumption, in which transportation plays the primary role, is shaped by a number of factors. The size of consumption is a function of vehicle miles traveled which depend on such factors as economic growth and demographic trends, and vehicle efficiency (vehicle rate of fuel consumption), which is largely affected by the technology and regulations mandated by the government.

Petroleum prices are one of the most significant variables that affect consumption; low petroleum prices tend to stimulate consumption, whereas high petroleum prices will curtail the consumption. However different segments of the transportation sector respond differently to changes in petroleum prices. According to EIA (2014d), gasoline is a relatively inelastic product, meaning changes in prices have little influence on demand. Automobile travel in the United States is much less elastic, and its price elasticity has fallen in recent decades. The price elasticity of motor gasoline is currently estimated to be in the range of -0.02 to -0.04 in the short term. Air travel, on the other hand, especially for vacation, tends to be highly elastic: a 10% increase in the price of air travel leads to an even greater (more than 10%) decrease in the amount of air travel. Price changes have greater effects if the changes persist over time, as opposed to being temporary shocks (EIA, 2014d).

Due to low its low elasticity, the price of gasoline has a limited impact on physical volumes of gasoline consumption. This fact has important implications for the economy. As the physical consumption of gasoline remains largely unaffected by price changes, such changes will result in different structure of consumer spending. A decrease in gasoline prices will translate into increased levels of non-petroleum and overall consumer spending, as well as, GDP growth.

Figure 16: Quarterly Change in Consumer Spending, GDP, Gasoline Price



Sources: EIA, Federal Reserve Bank of St. Louis

This tendency is demonstrated in Figure 16. .

Given this framework it is important to stress that these factors cannot be isolated, because causes and effects occur continuously in time, and as a consequence, the future development will depend on which of these trends prevails and to what degree.

Conclusion

At the threshold of the 21st century globalization and modernity bring about the challenges the sovereign states incorporated into bilateral and/or multilateral interaction processes are faced with. Within the profound economic and social transformation on a global scale, the position of any state is largely affected by the amount of the energy resources it abounds with. Right at the beginning, we established that oil is the world´s most valuable energy resource within the energy mix without which no highly industrialized society can survive and whose availability must be guaranteed, if necessary, by military force.

In order to confirm or refute the strategic character of oil in the world economy in general and more importantly the US economy in particular we formed the hypothesis pertaining to the strategic role of oil. In the process of exploring its role we also were focusing on the premises that oil is worth going to war over; it is worth perceiving to be especially rare and valuable for national competitiveness; and it is worth thinking of its supplies in a zero-sum context (meaning your control of a new source of supply is my loss). The principal guide to the analysis was the assumption that the above mentioned premises bear signs of strategic significance. Through the prism of the statement "Oil is the lifeblood of America´s economy" the very statement was subsequently explored.

Drawing on the observations and arguments which arose from the analysis there is a good reason to argue that the current US strategy based on the premise "enough" and "at low cost" has serious limitations affecting the United States both as an oil importer and an oil producer. Because oil is so useful a substance, those who can achieve control over it will be very rich. We first learned this lesson from Rockefeller in the 1870s, and then from the Seven Sisters – that carved up the world oil market between them and maintained their control over oil from 1920s to 1960s (Rutledge; 2005; 3). Following the OPEC revolution, the US Administration lost big influence having been exerted over the Middle East region by proxy. The 1970s saw many changes affecting both producers and consumers. Diversification away from OPEC and towards Western hemisphere sources has been a key element of US foreign oil policy since the oil embargo in 1973. Consequently, in the American energy policy discourse the necessity to achieve energy independence has been staple (Herbstreuth; 2014; 24-26) because after the oil embargo, Middle Eastern oil was considered to be the most insecure and the Middle East itself undependable. Accordingly, the current US behavior towards other oil producers draws on the cultural identity of Self and Other. As a result, evaluations of the costs and benefits of oil imports take place within larger discourses of Self and Other. For this reason, the culturally constructed foreignness of imported oil determines whether dependency is represented as a mutually beneficial economic relationship or as a fundamental threat to national security. Given the United States features the Middle East as America´s principal cultural Other, the imported oil from the Middle East represents a threat to US national security. This ambiguous dependence definition conforms closely to realist and liberal readings of interdependence (mutual dependence). In the work we observed Canadian oil has been described as secure, hence originating from a producing friend. By contrast, Middle Eastern oil (though being fungible) has routinely been described as insecure (unreliable, prone to disruption and political manipulation), hence originating from a hostile producer. Given the above mentioned there is every reason to assert the realist thinking has served as the prism through which the United States has been treating this region for decades. The hard realist behavior of the United States mirrors the value of oil it has been dependent on for so many years.

Energy security can only be achieved through a common sense of insecurity (Luft and Korin; 2009; 157-158). However paradoxical this statement may be, the signs of veracity can be interpreted given all the US presidents since 1973 have underlined the exigency of energy security. However, it was as late as in final months of 2013 that American crude oil production surpassed imports. The outlook for US oil supply has shifted from one of scarcity and insecurity to one of domestic abundance because of the shale oil production boom. The US supply shock caused shifts in its demand and supply curves thus reflecting prospective economic benefits to this recent largest oil importer and consumer. The shale oil production being on the increase has become highly beneficial to the US economy.

The US consumers are happy because gasoline and diesel prices are favorable. As we established in chapter five, gasoline prices depend primarily on world crude oil prices due to a global nature of oil trade. Gasoline prices are correlated with domestic consumer spending which is a crucial indicator of the strength of the economy.

At the same time, it is important to consider that although the growth in US petroleum production has been significant, the status of the US as the net oil importer is not likely to change as demonstrated through a number of scenarios in chapter five.

Furthermore, even if the United States were to completely cease imports from regions it considers unfriendly, for example only import from Canada and Mexico, it would nevertheless have to maintain its military presence around the chokepoints as any supply disruption although not physically impacting the U.S. would adversely affect the U.S. economy through increased petroleum prices. As stated in chapter five "energy security is primarily a function of oil consumption, not production. That is, U.S. energy security is determined by the role of oil in the economy." As long as U.S. economy uses oil, the U.S. will not be able to eliminate its exposure to associated energy security threats, given the global nature of oil trade. Future will hinge on continued shale development as well as offshore areas. It will depend on the available technology and the economics of drilling which is a function of global crude oil prices. Another important component will be investment in the midstream and downstream infrastructure so as to be able to absorb the projected LTO inflow, which has different properties than refineries are currently configured to. This will affect the development of prices of domestic crude oil production in relation to global benchmarks. Significant differences would impact on the upstream economics.

Rutledge (2005) posits by the beginning of the twenty-first century, the United States had become the motorized society par excellence and its working, shopping, recreational and family life reflected personal mobility Americans enjoy. Unfortunately, this completely motorized American Way made the United States uniquely vulnerable to the forces of radical Islamism which, nurtured by the very regimes upon which America had come to depend for its energy security now threatened the lifeblood of modern US capitalism. For the US leaders the establishment of a new American Imperium in the Middle East was required: one in which American-selected local rulers would invite American oil companies to make super profits for American investors under the protective shield of the American military, while at the same time satisfying the demands of the motorized American oil consumer. Only fifty years ago, it was Americans who controlled the oil flowing from the Middle East. The automobile, this supposedly wonderful, freedom-giving, autonomy providing symbol of US prosperity had turned into an economic and political juggernaut whose owners would increasingly have to subordinate and control the rest of the oil-producing world in order to ensure the continuing enjoyment of their „non-negotiable“ way of life the US President George H. Bush defended at the Rio „Earth Summit“, declaring „the American Way of life is not negotiable“.

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List of charts and tables

Annex

Annex A: EIA Annual Energy Outlook 2015 Assumptions (EIA; 2015f)

Reference Case

Real gross domestic product (GDP) grows at an average annual rate of 2.4% from 2013 to 2040, under the assumption that current laws and regulations remain generally unchanged throughout the projection period. North Sea Brent crude oil prices rise to $141/barrel (bbl) (2013 dollars) in 2040. Complete projection tables are provided in Appendix A

Low Oil Price Case

Low oil prices result from a combination of low demand for petroleum and other liquids in nations outside the Organization for Economic Cooperation and Development (non-OECD nations) and higher global supply. On the supply side, the Organization of Petroleum Exporting Countries (OPEC) increases its liquids market share from 40% in 2013 to 51% in 2040, and the costs of other liquids production technologies are lower than in the Reference case. Light, sweet (Brent) crude oil prices remain around $52/bbl (2013 dollars) through 2017, and then rise slowly to $76/bbl in 2040. Other energy market assumptions are the same as in the Reference case. Partial projection tables are provided in Appendix C.

High Oil Price

High oil prices result from a combination of higher demand for liquid fuels in non-OECD nations and lower global crude oil supply. OPEC's liquids market share averages 32% throughout the projection. Non-OPEC crude oil production expands more slowly in short- to mid-term relative to the Reference case. Brent crude oil prices rise to $252/bbl (2013 dollars) in 2040. Other energy market assumptions are the same as in the Reference case. Partial projection tables are provided in Appendix C.

High Oil and Gas Resource

Estimated ultimate recovery (EUR) per shale gas, tight gas, and tight oil well is 50% higher and well spacing is 50% closer (i.e., the number of wells drilled is 100% higher) than in the Reference case. In addition, tight oil resources are added to reflect new plays or the expansion of known tight oil plays, and the EUR for tight and shale wells increases by 1%/year more than the annual increase in the Reference case to reflect additional technology improvements. This case also includes kerogen development; undiscovered resources in the offshore Lower 48 states and Alaska; and coalbed methane and shale gas resources in Canada that are 50% higher than in the Reference case. Other energy market assumptions are the same as in the Reference case.

Estimated Ultimate Recovery

Estimated Ultimate Recovery (EUR) is the sum of actual past production from the well, as reported in the data, and an estimate of future production based on the fitted production decline curve over a 30-year well lifetime. The actual production curve and the resulting actual ultimate recovery are highly uncertain and cannot be known until the well is plugged and abandoned, which may occur sooner or later than 30 years. Estimates of future production based on the first few months of initial production can differ significantly from later estimates for the same well (EIA; 2014a; IF-11).

Annex B: Key Terms Regarding Reserves and Resources

Technically recoverable resource estimates encompass oil and gas reserves, the producible oil and natural gas that are inferred to exist in current oil and gas fields, as well as undiscovered, unproved oil and natural gas that can be produced using current technology without consideration of economics (EIA; 2013; 13). Recoverable resources include cumulative production, proved reserves, undiscovered reserves, and reserves growth in discovered fields (Hakes; 2000; 10).

Economically recoverable resources represent that part of technically recoverable resources that are expected to be economic, given a set of assumptions about current or future production technologies, prices, and market conditions (ICF International 2014; ix).

Proved reserves are estimated volumes of hydrocarbon resources that analysis of geologic and engineering data demonstrates with reasonable certainty are recoverable under existing economic and operating conditions. Reserves estimates change from year to year as new discoveries are made, existing fields are more thoroughly appraised, existing reserves are produced, and prices and technologies change (EIA; 2014b; 5).