CHARLES UNIVERSITY

FACULTY OF SOCIAL SCIENCES

Institute of Political Studies

Examining United States' Presidential Perception of the Energy Security in Period 2001–2017: A Content Analysis

Master's thesis

Author: Bc. Jan Mazač

Study programme: International Relations

Supervisor: Dr. rer. Pol. Michal Parízek, M.Sc., Ph.D.

Year of the defence: 2019

Declaration

1. I hereby declare that I have compiled this thesis using the listed literature and resources only.
2. I hereby declare that my thesis has not been used to gain any other academic title.
3. I fully agree to my work being used for study and scientific purposes.

Prague May 8, 2019 Jan Mazač

References

MAZAČ, Jan. *Examining United States' Presidential Perception of the Energy Security in period 2001–2017: A Content Analysis.* Praha, 2019. 70 pages. Master's thesis (Mgr.). Charles University, Faculty of Social Sciences, Institute of Political Studies. Supervisor Dr. rer. Pol. Michal Parízek, M.Sc., Ph.D.

Length of the thesis: 118 153 characters

Abstract

Unprecedented expansion in U.S. shale oil and gas production since the mid-2000s, alias known as “shale revolution“, has triggered a transformation of global energy markets and has altered many decades lasting geopolitical paradigms. However, whether and how such phenomenon affected U.S. governmental perception of energy security has not been addressed yet. With focus on the executive branch, this master's thesis attempts to do so and presents comprehensive and systematic descriptive account of perception of energy security and its evolution in 17-year period. Conceptualizing the perception of energy security in four measurable indicators, two quantitative methods, a humanly conducted and dictionary-based computer aided text analysis are exploited herein. Both analysis suggests that the U.S. presidential perception of energy security has been positively affected by this phenomenon and four decades long paradigm regarding the security of supply as a threat to national security has become obsolete. Furthermore, the number of statements, portraying the energy security negatively dropped by one fifth, and vice versa, the positive perception of the energy security augmented by factor four. The author anticipates that used methodological framework, especially the computer aided text analysis, serving as a useful analytical technique to operationalize large bodies of textual data, should be the subject of future research.

Keywords

United States, Energy Security, Shale Revolution, Perception, Content Analysis, CATA

Title

Examining United States’ Presidential Perception of the Energy Security in Period 2001–2017: A Content Analysis

Abstrakt

Bezprecedentní nárůst v těžbě ropy a plynu z břidlic, který odstartoval v polovině minulé dekády v USA (známý též jako "břidličná revoluce"), zahájil transformaci světového obchodu s energiemi, a také změnil po dekády platná geopolitická paradigmata. Nicméně zda a jak tento fenomén ovlivnil percepci energetické bezpečnosti americkými prezidenty nebylo doposud prozkoumáno. Tato diplomová práce se o to pokouší a nabízí její komplexní a systémovou analýzu v období 2001-2017. Deskripce percepce energetické bezpečnosti je rozdělena do čtyř měřitelných kategorií a provedena metodou kvantitativní obsahové analýzy. V prvním případě je sémantika určována člověkem (autorem), v druhém případě počítačem na základě vytvořených slovníků. Výsledky obou metod jsou jednoznačné. Břidličná revoluce pozitivně ovlivnila to, jak je energetická bezpečnost vnímána a bylo překonáno po více než 40 let platné paradigma, které spojovalo otázky energetických dodávek s národní bezpečností. Počet negativních výroků o energetické bezpečnosti se během zkoumaného období snížil o pětinásobek a naopak, počet pozitivních výroků vzrostl čtyřnásobně. Autor práce předpokládá, že použitý metodologický rámec, především počítačová obsahová analýza, která slouží jako velmi užitečný nástroj pro zpracování velkého množství textových dat, má velký potenciál v budoucím výzkumu.

Klíčová slova

USA, energetická bezpečnost, břidličná revoluce, percepce, obsahová analýza, CATA

Název práce

Percepce energetické bezpečnosti USA jejími prezidenty v letech 2001–2017: obsahová analýza

Acknowledgement

I would like to express my sincere gratitude to my supervisor Dr. rer. Pol. Michal Parízek, M.Sc., Ph.D. for his expert advice, encouragement, great communication and continuous support. This thesis would not have been possible without his professional guidance.

Content

List of Figures

List of Tables

List of Abbreviations

Bcm	Billion m^3
BP	British Petrol
CATA	Computer Aided Text Analysis
CI	Composite Index
CoI	Coefficient of Imbalance
EIA	Energy Information Agency
ESII	Energy Security Indicator Index
ESIS	Energy Security Indicator Salience
IEA	International Energy Agency
IR	International Relations
IS	Image Salience
MMBtu	Million British thermal units
NES	National Energy Strategy
NGPL	Natural gas plant liquids[1]
OLS (regression)	Ordinary Least-Squares (regression)
OPEC	Permanent intergovernmental organization of 14 oil-exporting developing nations
Tcm	Trillion m^3
U.S.	United States of America

[1] Hydrocarbons in natural gas that are separated as liquids at natural gas processiong, fractionating, and cycling plants (EIA, 2019m).

Introduction

One decade ago, global oil supply appeared to be peaking and conventional production of natural gas in the U.S. had been declining. It seemed obvious that the country would become dependent on costly natural gas imports. But few years later, those predictions have proved wrong. Worldwide energy production has begun to move away from traditional suppliers in Eurasia, the Middle East and Latin America, as producers tab unconventional gas and oil resources around the world, from coastal waters of Australia, Brazil, Africa, and the Mediterranean to the oil sands of Alberta, Cold Lake or Peace River in Canada, and Permian, or Eagle Ford shale plays in Texas (Blackwill and O'Sullivan, 2014, p. 102). Unconventional gas and crude oil has gained center stage in the global energy market, which is mainly driven by rapid development in the shale production (Hongxun and Jianglong, 2018, p. 1). However, the greatest revolution has taken place in the United States (U.S.), since American entrepreneurship has taken advantage of cutting-edge technological development and has become a pioneer in its application, unlocking resources once regarded commercially infeasible (Blackwill and O'Sullivan 2014, p. 102).

During the mid-2000s, the application of revolutionary extraction technology enabled the production of huge amounts of natural gas and lately of oil from shale rock (Hongxun and Jianglong, 2018, p. 1). This newly viable technology refers to the extraction method which employs hydraulic fracturing, or so-called fracking, "a combined process of vertical and horizontal drilling, which injects liquids at high pressure and induces seismicity to break the shale rock formation and releases the gas" (Kobek et al., 2015, pp. 8-9) and oil.

Consequently, many experts' claim of "peak-oil"[2] has fallen apart, and "U.S. proved reserves[3] of crude oil and lease condensate and total natural gas have increased by more than 50 % in the last decade" (EIA, 2018a). In addition, as International Energy Agency (IEA) concludes, combined U.S. oil and gas production output has skyrocketed to a level any other country has ever managed before (2017a). 87 and 50, those numbers represent percentage increase in production from the period before so-called shale revolution output levels to 2017 in crude oil and natural gas, respectively (EIA, 2019c; EIA, 2018a). Shale extraction development has significantly changed the rules of the game by transforming realities of energy

[2] The idea that reserves (even in Saudi Arabia) had topped off (Peakoilbarrel, 2019).
[3] "Proved reserves are estimated volumes of hydrocarbon resources […] are recoverable under existing economic and operating conditions" (EIA, 2018a). Due to this fact, "[r]eserves estimates change from year to year as new discoveries are made, as existing fields are thoroughly appraised, as existing reserves are produced, as prices and costs change, and technologies evolve" (EIA, 2018a).

security in the U.S. (Kobek et al., 2015, p. 9), already a net exporter of gas, world's largest crude oil producer (EIA, 2018c), and if the current trend continues as it has in the past, net exporter of oil in the early 2020s (IEA, 2018a, p. 48). By 2025, roughly every fifth barrel of crude oil and ever fourth cubic metre of natural gas globally come from the U.S. (IEA, 2018a, p. 24).

The American shale revolution is adding to the pressure on traditional oil and gas exporting countries, relying significantly on export revenues. Additional oil and gas supply has significant commercial implications (as U.S. production put downward pressure on global oil and gas prices), but also widereaching geopolitical consequences (Blackwill and O'Sullivan, 2014, p. 103). Some authors call current development as "[a]merica's path to energy independence" (Lack, 2018) or "geopolitical trump card" (Nye, 2014), whereas others do not believe that the U.S. is on track to energy independence since "world energy markets don't work that way" (The American Interest, 2019). Nevertheless, it is a matter of fact that the U.S. is becoming more energy secure by the day.

This master's thesis share the sentiment that U.S. shale development has had a significant impact not only on the U.S. economy (Raimi, 2018b; Kaya, 2017; Bilgili et al., 2016), but U.S. diplomacy and policy-making (Mandel, 2018). Given those facts, its is likely that as energy security realities has been enhancing, the content of U.S. governmental rhetoric concerning energy security policy would be more positive or at least less negative. Therefore, this master's thesis present comprehensive and systematic descriptive account of U.S. government perception of energy security and its evolution (if any), assessing whether and how implications of shale revolution have affected the highest policymaking levels in U.S. government. Main research question which this master's thesis tries to answer may be formulated as follows:

- *What are the consequences of shale revolution on U.S. governmental[4] perception of energy security? In other words, whether language used by U.S. presidents have followed "tectonic shift in the geopolitics of energy" (Nye, 2014) caused by shale revolution in past decade.*

There are three main reasons of this decision to conduct a content analysis to make a valid, objective and systematic inference from textual sources of U.S. government. First, despite these

[4] Although the shared responsibility of U.S. government in creating national policy is divided between legislative and executive branch (for purpose of this thesis the author intentionally omits third "judicial" branch), due to the immense amount of textual data of the latter one, and limited time and hardware/software capacity/capability of the author, the main research question is addressed by analyzing U.S. presidential speeches only (henceforth U.S. governmental means presidential perception).

revolutionary trends in the U.S. energy sector, being "unparalleled in the history of the hydrocarbons industry" (IEA, 2018a, p. 52), which has taken off in the past decade and have provided Washington with new capabilities for redesigning its national and foreign energy policies, and have been slowly but surely turning the U.S. from foreign energy addict (Bush, 2006) to world biggest energy producer and exporter (IEA, 2017a), the author sees a gap in current research to systematically capture the impact of these "geopolitical shifts" (Nye, 2014) on U.S. presidential perception of energy security. Second, availability of gigabytes of information in a form of digitized raw textual and many computer-aided qualitative or quantitative text analysis software such as ATALS.ti which have become accessible and affordable (even to students). And finally, even though the method of content analysis assertion in international relations (IR) field has gained momentum lately (e.g., Karlas and Parízek, 2016; Binder and Heupel, 2015; Liu and Yang, 2015), in the domain of energy, the application of such a method is rather rare (for few exception see Dunham and Schlosser, 2016; Below, 2013), and I would like to redound to the benefit of the subject matter.

Contribution in question is twofold. First, this master's thesis provides methodological toolkit for utilizing a content analysis to gain more holistic insights on the energy security deployments, further elaborating on existing literature (for assessing energy security see Hughes, 2012; Mänsoon et. al 2014; for assessing perception see Liu and Yang, 2015). For this purpose, the content analysis for understanding conflicts surrounding the energy security as well as perceptions is conducted. Second asset of the thesis is the attempt to usher the computer aided text analysis (CATA), using Boolean operators and locating words and phrases as contained in specific dictionaries created as a by-product during the content analysis[5]. Although the research question is settled by the former method, the author feels that CATA, using computation tools for the analysis of text, might offer great promise for scholars to control, measure, analyze and interpret difficult-to-capture phenomena hidden in big data (Short, McKenny and Reid, 2018, p. 417). Therefore, after the research question is answered, the same dataset of presidential speeches is processed using CATA. In addition, CATA method is tested on small sample of Congressional hearings. However, both attempts go outside the main inquiry of the thesis, aiming at utilizing dictionary-based CATA as another research technique only. The author sees significant advancements and great potential for researchers in the use of CATA in capturing public policy preferences in energy policy decisions by analyzing large amount of textual data, whose meaning would stay otherwise hidden. At the same time, the author hopes

[5] Henceforward the content analysis refers to the coding procedure conducted by human, (by the author of the thesis).

that this tiny part of the thesis might help guide the way as this technique continue to grow and flourish.

What follows in the first chapter is a brief historical hindsight of academia research on U.S. energy security, followed by an empirical overview which depicts outstanding development in production, import and export volumes, and prices. The purpose of this chapter is two-fold. First intent is to reinforce the claim of the gap in current research to systematically capture these geopolitical shifts. Second is to put my research in the context, thence provide a better understanding of shale revolution and show that its consequences on U.S. energy security have been profound. The second chapter highlights theoretical concepts, determining authors' three hypothesis. Two theoretical approaches are used, the concept of interdependence seen as an issue of vulnerability and power relations, and the securitization theory regarding the perception not only as objectively driven but also as intersubjective construct. Chapter three focuses on conceptualization of energy security and perception. Fourth chapter is devoted to the conceptual framework of employed method, the content analysis. This part addresses both analyses, the human one and CATA as well and defines all their conceptual components such as collection and selection of data, their operationalization, thence how semantic of coding units is defined, which analytical tools are used and how data are validated. Subsequent, the fifth chapter introduces results from conducted inquiry and deals with the main research question. This chapter also tackles with trustworthiness of data and introduces results of measuring reliability. Last part of my thesis introduces CATA results, enabling comparison with outcomes of humanly conducted content analysis of same data, and at the same time, provide inconclusive insight into legislative branch of U.S. government.

1. Historical Hindsight

1.1. History of Academia Research on Energy Security

Yet although many of scholars point to the event of meeting between President Franklin Delano Roosevelt and King Abd al Aziz aboard the U.S.S. Quincy at the end of WWII as having given birth to the concept of energy security in the U.S. (Below, 2013, p. 862; Blanchard, 2009, p. 3), energy security as a topic of political discussion has gained momentum after the first oil embargo of 1973 and has mainly focused on tackling the nation's dependence on foreign oil (energy.gov, 2017), thence on securing supplies of primary and secondary fossil fuels as the country's critical energy related vulnerability.[6] First debates within the academic sphere focusing on energy security have begun to appear in the late 1970s, e.g., book *Energy and U.S. Foreign Policy* published by scholars Joseph A. Yager and Eleanor B. Steinbers which focuses on U.S. foreign energy policy and advances the public discussion of that subject matter (see the book review in Schick, 1975), *The energy Crisis and U.S. Foreign Policy* by Joseph S. Szyliowicz and Bard E. O'Neil, which evaluated and contributed to American policy towards the Middle Eeastern oil producers (see the book review in Turner, 1977a), and *U.S. energy Policy: Alternatives for Security* by Douglas R. Bohi and Milton Russell (see the book review in Turner, 1977c), or *The United States and International Oil* by Robert B. Krueger (see the book review in Turner, 1977b), both considering best approaches of the U.S. government to secure its energy supplies. Reliability as a main national-security threat and its prospects are also discussed in the volume *Energy: Economics, Politics, and Security* by David A. Deese (1979). Debates went on in the 1980s and new scholars such as Joseph S. Nye or Michael B. Stoff stepped into a debate (see the review of collection of essays providing "a valuable introduction to energy problems" in Stoiber 1981, p. 1029; see the review of the book assessing "the place of the Middle East in American foreign relations during the 1940s" in Denovo, 1981, p. 477).

In the post-Cold war era, reducing dependency upon foreign sources of crude oil stayed at the top of the list of energy security agenda. The case in point is the conclusion of the National Energy Strategy (NES), claiming that the prospects of energy security must aim at reducing

[6] Because primary (oil) and secondary (gasoline) energy sources dominate U.S. energy consumption and are not easily substituted between one anorher or with alternatives in the short-term, when fuel's supply drops (Littlefield, 2012, p. 780).

nation's economic vulnerability to future disruptions of world oil supplies (Lamont and Schock, 1993). Another scholar, George C. Georgiou, also acknowledged that the oil will remain the most critical energy source into the 21st century (Georgiou, 1993, p. 831) and that tackling states' vulnerability stays the most reverberating task. Some researches attempted to review and compare energy consumption over the last 30 years (Sohn, 1990) or assess trends in domestic oil production and consumption to expose policy plans to cut oil imports (Crow, 1996). In virtue of a surge in popularity among academics and policymakers in the 2000s (Below, 2013, p. 860) and due to neoliberalism and September 11, new approaches have been employed in addressing energy security (Chalker, 2005, p. 117). The case in point is book *Energy and Security: Toward a New Foreign Policy Strategy* by Jan H. Kalicki and David L. Goldwyn, calling upon the need of economists playing a larger role in foreign policy discussion to better operation of energy markets (Van Doren, 2006, p. 186). Similar approach was lately elaborated by Jonna Nyman, stressing that "[m]oving energy out of the high politics of national security" would make cooperation among states more likely (2014, p. 44). In 2001, Vito A. Stagliano provided an insider's in-depth insight into the making of the NES leading up to Energy Policy Act of 1992 (Dahl, 2002).

More recently, empirical inquiries into the meanings of communication (Krippendorff, 2013) which has not heretofore been used in the field of energy (see exception in Dunham and Schlosser, 2016; Below, 2013), and new issues such as climate change and environmental protection (Dunham and Schlosser, 2016; Brown and Sovacool, 2017), China's economic rise and its increasing energy demand (Smith, 2016), and especially so-called shale revolution and its impact on energy security (Kobek et al., 2015; Nadejda, Nichols and Balash, 2014), market prices (Hongxun and Jianglong, 2018), environment (Dayal and Devleena, 2017; Gullion, 2015), geopolitics (Krane and Medlock, 2018; Blackwill and O'Sullivan, 2014; Kim and Blank, 2015) have continued to forge energy security debate. However, even the recent work, exploring shale revolution's "integrated value" (Yang et al., 2017) and evaluating 21 distinct indicators, does not take the public acceptance or perception of the energy security into account. Hence, despite the energy security is every government's universal concern, struggling for a sound policy as a (sustainable) solution, the gap in current research evaluating how politicians (no matter whether with executive or legislative power) communicate their energy policy preferences (see exception in Below, 2013) is to be seen.

The development in shale revolution has unequivocally made the U.S. more energy secure (apprehending as the security of supply), however, how has it affected presidential

understanding of the energy security, whether one threat has fade away, but the others may have arisen stays hidden in immense quantity of verbal statements and has not been explored yet.

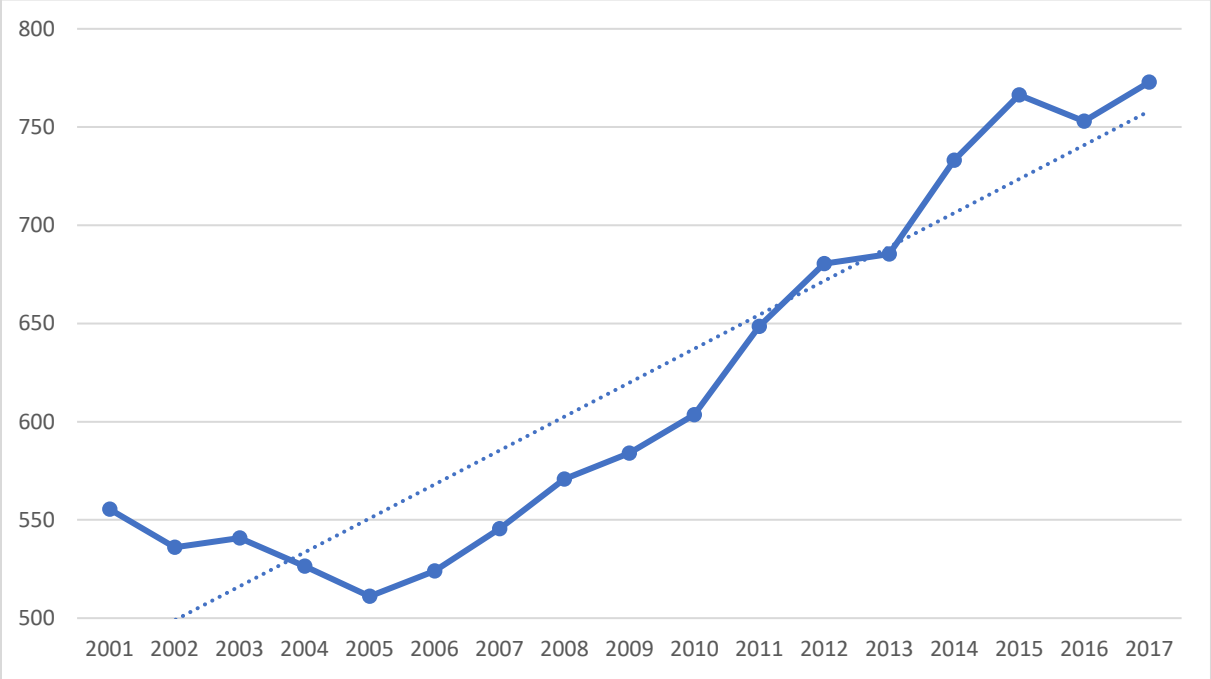
1.2.New Realities of U.S. Energy Security

Purpose of this chapter is to put subsequent content analysis into a context and make its findings clear and comprehensible. Therefore, a context is important conceptual part of content analysis. According to Krippendorff, it is the conceptual environment of analyzed texts, the situation in which it plays a role and explains how the texts came to be, what they mean and what they can tell or not (2013, p. 38).

What follows in this chapter is a brief empirical overview of what the shale revolution has brought about. On the one hand, rapid development in U.S. upstream shale production has reduced country's vulnerability to energy shocks with political origins, historically influencing oil availability and its prices, thence its affordability. In addition, supporters of shale gas also argue that increased shale gas production reduced gas prices and by replacing coal in electricity generation have lowered greenhouse gas (GHG) emissions (EIA, 2019n). On the other hand, shale gas industry and its acceptability is associated with many environmental fears such as contamination of groundwater and surface water, pollution of local air, methane leakages, or depletion of water reserves (Schleich, 2018). However, for purpose of this thesis the author sticks to positive impacts only.

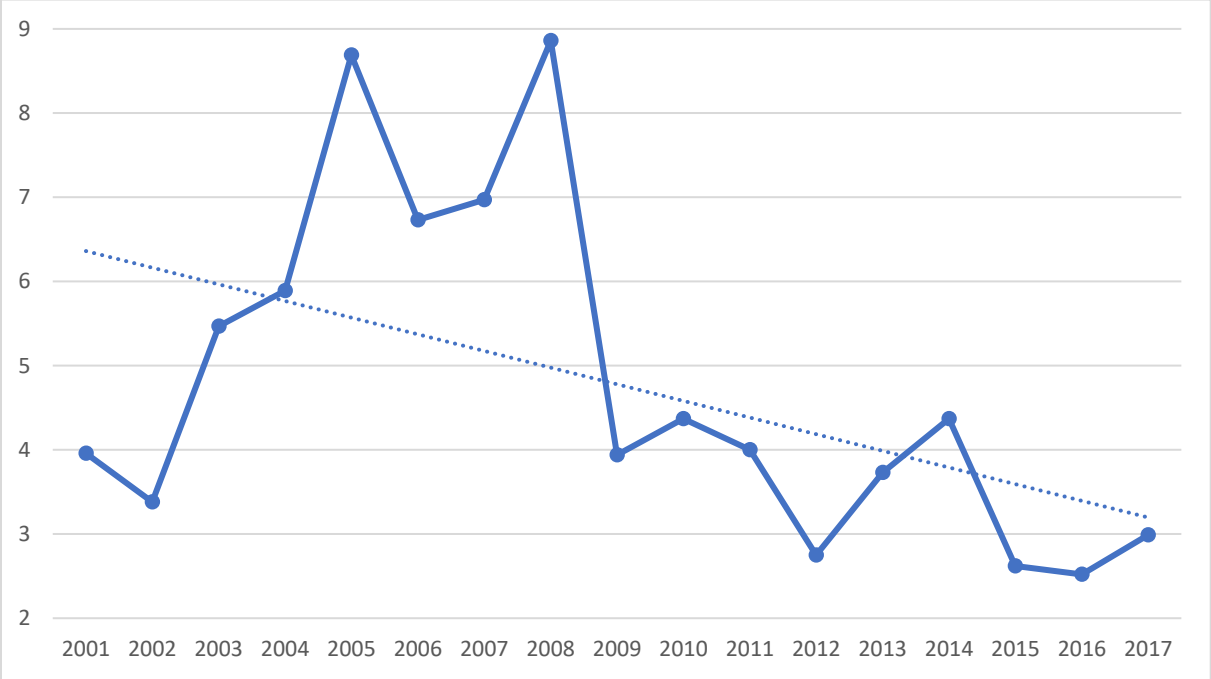
In 2014, Joseph S. Nye wrote the article “Shale gas is America's geopolitical trump card” (2014), since he recognized number of implications of the shale revolution not only for U.S. foreign policy, but for its economy and global energy markets. Shale upstream production boom, “turning toward a new extractable resource” (Kobek et. al., 2015, 9) has been the result of horizontal drilling and hydraulic fracturing techniques in tight geologic formations such as mostly a shale, sandstone or carbonate (EIA, 2018d) which became a commercial reality around 2000. However, most of the production increases have been seen since 2005, turning an expected natural gas deficit into a huge surplus. At the end of 2017, when the shale gas revolution was turning twelve years old, natural gas production reached the highest volume ever recorded (EIA, 2018e). U.S. natural gas output rose by more than 50% between 2005 and 2017 (EIA, 2019a) and has pushed prices down by two-thirds (EIA, 2019b). Later that year, the U.S. has become a natural gas net exporter on annual basis for the first time since 1957 (Winberg, 2018). Indeed, both patterns and trends are depicted in figure 1 and 2.

Figure 1: U.S. Dry Natural Gas Production (Bcm)



Source: EIA, 2019a

Figure 2: Henry Hub Natural Gas Spot Price (Dollars per MMBtu)

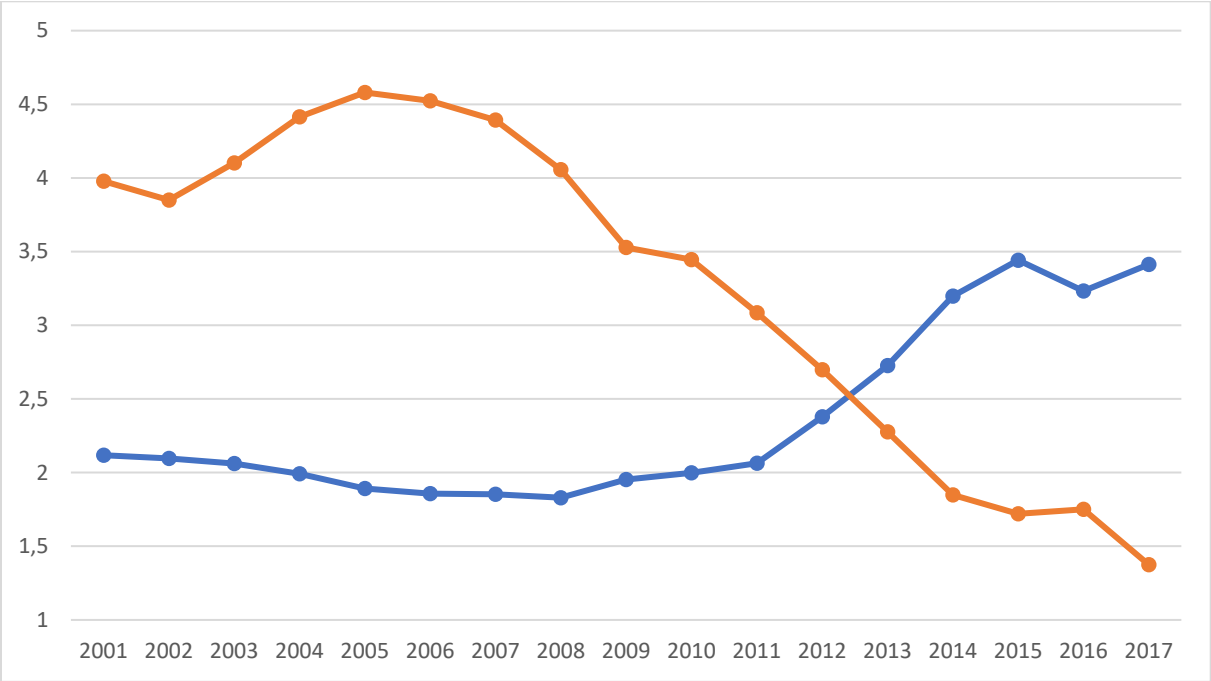


Source: EIA, 2019b

Overall crude oil production decreased each year between 1970 and 2008. However, in 2009, unconventional drilling methods reversed nearly four decades long pattern and extraction

began to rise. In 2015 and 2017, crude oil upstream production was the second and third highest on record, respectively (EIA, 2018f). As a result, the U.S. has been in a long-term trend of drilling its way to zero net oil imports. Between 2008 and 2017, overall crude oil output increased by almost 87 % (EIA, 2019c). Both trends, increased supply and reduction in the amount of imported oil are depicted in figure 3.

Figure 3: U.S. Production and Net Imports of Crude Oil and Petroleum Products (Billion Barrels)



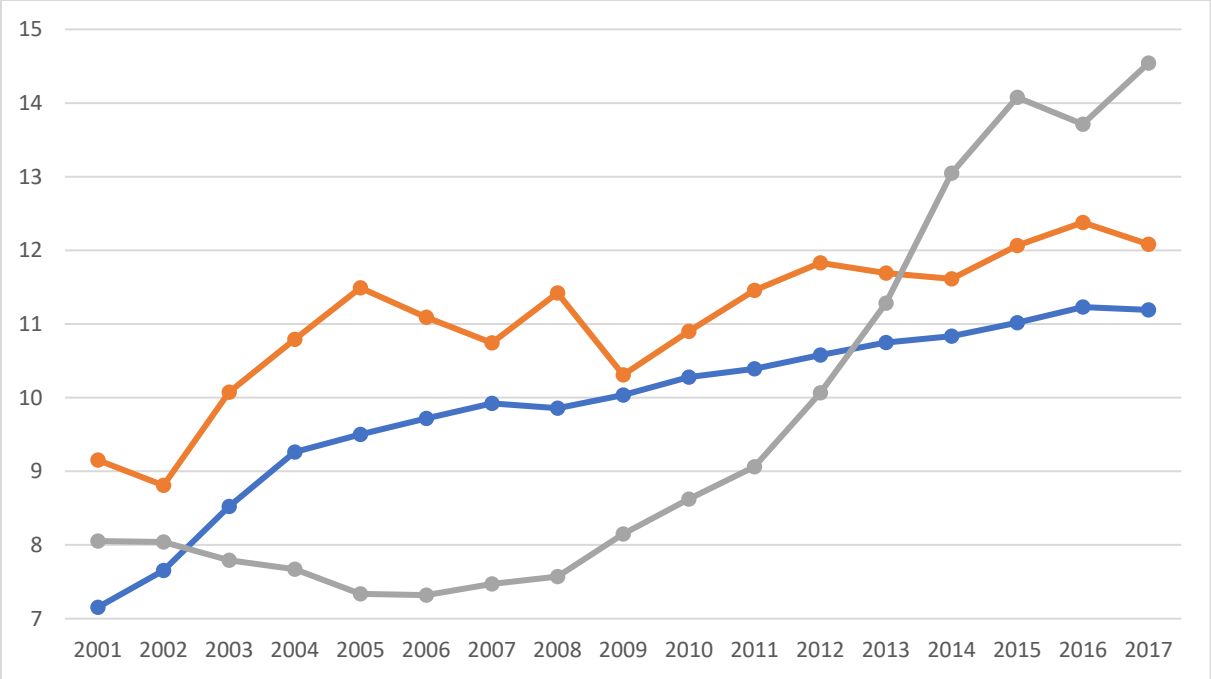
Source: EIA, 2019c; EIA, 2019d

Slightly different view on U.S. path to energy independence provides cumulative amount of production of crude oil, NGPL and other liquids and its comparison with other top world's producers. As figure 4 shows, in 2014, the U.S. become the largest global producer, overtaking Russia and Saudi Arabia (EIA, 2019e). EIA suggests that the U.S. has already surpassed Russia and Saudi Arabia to become even the world's largest crude oil producer earlier in 2018 (2018g). However, there are no data to confirm it yet.

Consequently, Saudi Arabia and other oil-exporting countries felt threatened and continued loss of market share led OPEC into a strategy of low prices which were supposed to drive American producers out of business. OPEC's price war started in 2014 and lasted to 2016, instead of cutting production to push up prices, it did the opposite: increased extraction and further plummeted prices (Austin, 2017). Oil prices fell to as low as $27 per barrel (EIA, 2019f).

Obviously, this strategy turned out to be huge miscalculation, since U.S. shale upstream industry responded by innovation, cost-cutting, and has become more efficient (Austin, 2017; Lack 2018).

Figure 4: Production of Crude Oil, NGPL, and Other Liquids (Million Barrels per Day)



Source: EIA, 2019e

As the history many times demonstrated, gasoline retail price (for its development see figure 5) poses significant factor of energy security, since rising energy prices impose costs on U.S. economy in general, and U.S. consumers in particular. Congressional Budget Office report published in 2012 suggests that the U.S. economy is more vulnerable to disruptions in oil markets than it is to distortions of other energy markets (Stocking, 2012, p. 5). According to EIA, crude oil price makes up 54% of gasoline retail price (2019g).

Unconventional drilling methods which enabled "to unlock sources once deemed commercially infeasible" (Blackwill and O'Sullivan, 2014, p. 102) have also reshaped U.S. crude oil and natural gas proved reserves. Both has skyrocketed and reached a new record levels. Although U.S. proved crude oil reserves creates only a fraction of the reserves of the global oil leaders such as Venezuela and Saudi Arabia (see country comparison in EIA, 2019h), they increased 19,5 % to 39,2 billion barrels at the end of 2017 (EIA, 2018h). Proved reserves

of natural gas surged by 3,49 Tcm (by 36,1 %) to 13,15 Tcm and the U.S. now holds the world's fourth largest natural gas reserves (EIA, 2018h).

Figure 5: Weekly U.S. Regular Conventional Retail Gasoline Prices (Dollar per Gallon)

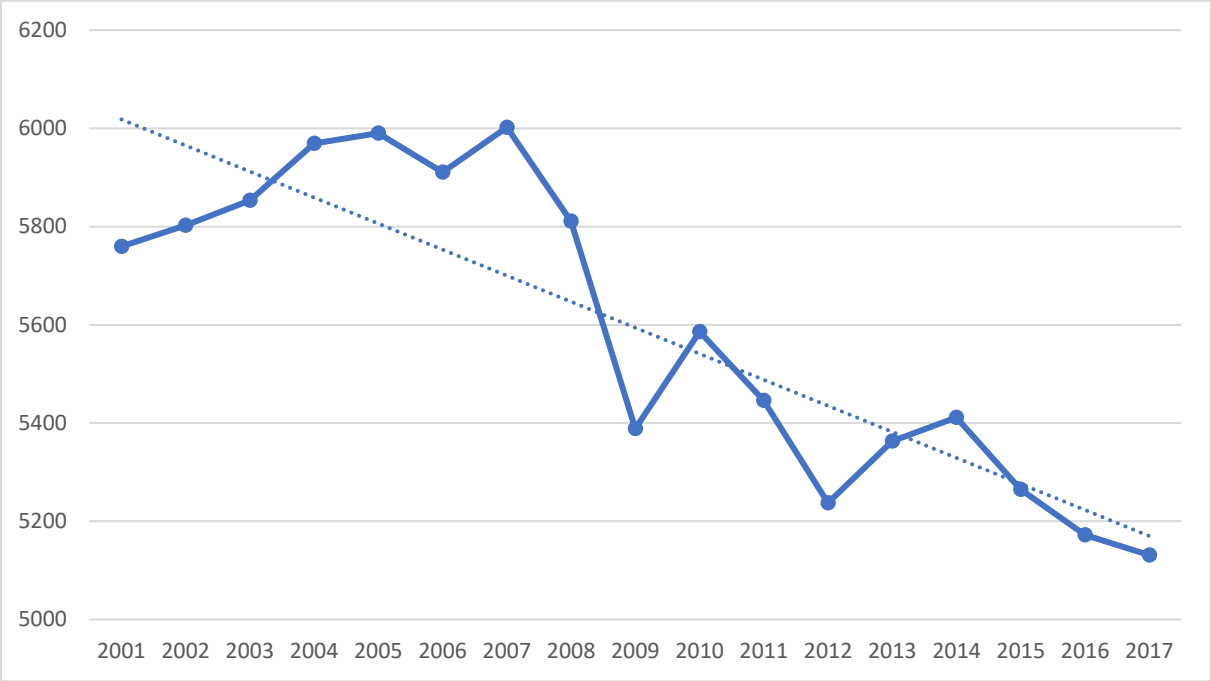
Source: EIA, 2019g

Finally, shale revolution has also environmental pros and cons. On the one hand, cheaper natural gas as fuel which produces much lower amounts of carbon dioxide emission when burned (EIA, 2019i) has displaced coal consumption in the electric power generation. This transition contributed to lower levels of energy-related CO_2 emissions (EIA, 2019j) (see such development in figure 6). Despite the U.S. economy grew by 20 % between 2005 and 2017, energy-related carbon dioxide emissions decreased, and they were 14 % lower than their 2005 levels (EIA, 2018i). However, on the other hand, besides this substantial near-term climate benefits, there are also significant environmental risks and concerns related to shale gas and oil industry, namely methane leakage[7] into the air from well, pipeline or processing facility, the wastewater discharge, contamination of groundwater, air pollution, exposure to toxic chemicals or shale ash disposal (Wan, 2019; Raimi, 2018a). Consequently, some countries such as (inter

[7] "[M]ethane's impact on the climate is roughly 84 times more powerful than CO_2 over a 20-year time frame and roughly 28 times more powerful over a 100-year time frame" (Raimi, 2018a).

alia) Scotland, have imposed "a moratorium on fracking while a public consultation and research is conducted to assess the impacts on public health" (PRI, 2017).

Figure 6: Total Energy Carbon Dioxide Emissions (Million Metric Tons of Carbon Dioxide)



Source: EIA, 2019j

2. Theoretical Framework: Vulnerability, Power Relations and Securitization

To understand why perpetual importance of energy to state survival and continued economic development, for a long time considered in policy discourse in the context of "high" politics, posing a direct threat to the national security, might be due to shale revolution moved out of the security sphere, away from state-centric paradigm to the realm of "normal" politics, the author develops a set of three hypotheses based on two theoretical frameworks, the concept of interdependence, and the securitization theory.

Firs concept used in this thesis is the concept of interdependence, seeing interdependence as an issue of state's vulnerability and as a form of power relations (Kroll, 1993, p. 325). To be interdependent is seen by Kroll as a relationship of states which must face a set of payoffs that depend, to a certain extent, on a behavior of the other state (1993, p. 324). He calls it "Fate Control" (1993, 325), since the state cannot influence its payoffs by its own choice of strategy, on the contrary, its final payoff can be dependent upon the actions of its opponent (Kroll, 1993, p. 325). Similarly, Baldwin (1980, pp. 496-497) treats dependency in power terms. Therefore, when a state is described as to be dependent, obviously it must be dependent with respect to other actor such as a state, other countries, or the capitalist regime etc. Since power relations must include both scope and domain, one state can be powerful or week with respect to some scopes of other actor and vice versa. Kroll, who further elaborates on Baldwin's conceptualization of interdependence concludes that "to be dependent is to lack power and to be independent is to have power" (1993, p. 323). He sees dependence as zero-sum game, since one cannot increase and at the same time decrease power, but when increase one, the other must decrease (Kroll, 1993, p. 323). Interdependence is, therefore, understood "as a question of a state's vulnerability […] where two actors find themselves in a relationship that would create large costs for both of them should it break down. However, if such costs are unequally distributed, then one can talk about dependent relationship" (Kroll, 1993, pp. 322-323). Therefore, the concept of a nation state which is highly dependent on other actor(s) with respect to some matters establishes a general principle of construction of my hypothesis.

Indeed, the case in point of such power relation since the first oil crisis until recently is the U.S. and its dependency upon foreign sources of oil. There are two major costs of energy dependency as recognized by Littlefield; first, national wealth is transferred to producing states and second, country's foreign policy is restrained by producing states (2012, p. 781). In

addition, energy has always played a vital role in state's development just like in U.S. economy (Kobek et al., 2015; Nyman, 2014; Littlefield, 2012; Below, 2013, pp. 863-864), especially in five major primary energy consuming sectors such as electric power, transportation, industrial, residential and commercial. Furthermore, primary energy fossil fuel sources have dominated U.S. energy mix for more than a century (EIA, 2018b), and energy issues have been traditionally bounded to national security. Because of first oil crisis of 1973, the issue that the U.S. is reliant on energy supply from hostile or unfriendly states or regions has been addressed by every incumbent of the Oval Office (see for example Bush, 2002). The policy prescription used to mold energy security, realizing independence and sustainability can be divided into two categories. In general, republicans favour supply side by increasing production (the most famous "drill baby drill", see more in Steele, 2008) and democrats favour demand side by reducing consumption (Littenfield 2012, 783). However, neither of this effort had been successfully delivered until the past decade's shale-energy revolution has taken off, and its consequences have created chain of side-effects for the oil & gas industry (Stage Completions, 2018). Spectacular increase in the U.S. output of tight oil which has emerged after 40 years of decline has derogated foreign oil dependency and depressed oil prices[8] (Hongxun and Jianglong, 2018, p. 1). Abundant shale gas extraction has created cheap energy source (IEA, 2017b, p. 2) that substituted the use of coal for electrical power generation (Stage Completions, 2018), helped reduce pollution and other emissions (IEA, 2017b, p. 2), and made the U.S. self-sufficient natural gas net exporter.

Nonetheless, the perception is a subjective belief or sight based on physical senses (Cambridge Dictionary, 2018) and discourse might be manipulated by different politicians "seeking to sway popular opinion" (Littlefield, 2012, p. 779). In IR and domestic policies as well, design of policies goes in line with politician's perceptions, even though perception may not equate to reality (Liu and Yang, 2015, p. 386). Since "[e]nergy is becoming more and more important to state survival and economic development, and increasingly considered as a matter of 'national security'" (Nyman, 2014, p. 43), author's hypothesis also draw on securitization theory. According to that theory, any "issue might become a security issue - not necessarily because a real existential threat exists but because the issue is presented as such a threat […] the meaning of a concept lies in its usage and is not something we can define analytically or philosophically according to what would be best" (Buzan, Weaver and Wilde, 1998, pp. 24-26). In addition, "[t]he meaning lies not in what people consciously think the concept means

[8] U.S. production has forced OPEC nations to flood global market in an effort to cut oil prices and undermine the profitability of American oil producers (Stage Completions, 2018).

[…] [i]n the case of security, textual analysis suggest that something is designated as an international security issue because it can be argued that this issue is more important than other issues and should take absolute priority" (Buzan, Weaver and Wilde, 1998, p. 24). Any public affair can be, therefore, located on the spectrum with two extreme points from nonpoliticized, where the state does not deal with the issue at all, to securitized, where the issue is presented as threat which must be treated with extraordinary measures (Buzan, Weaver and Wilde, 1998, pp. 24-25). The cornerstone of securitization is a specific verbal structure, often called a speech act which labels an issue a security threat and claims for actions outside the normal politics (Buzan, Weaver and Wilde, 1998, pp. 24-27). Since the 1980s, when the theory was established by the so-called Copenhagen School, the concept of securitzation has considerably developed beyond its focus solely on the speech acts, for example focusing on policy practices as well. The case in point is Balzacq's definition, he argues that securitization is "an articulated assemblage of practices whereby heuristic artefacts (metaphors, policy tools, image repertoire, analogies, stereotypes, emotions, etc.) are contextually mobilised by a securitizing actor, who works to prompt an audience to build a coherent network of implications (feelings, sensations, thoughts, and intuitions) about the critical vulnerability of a referent object" (Balzacq, Léonard and Ruzicka, 2016, p. 495). However, verbal acts still stay at the centre of securitization theory. Recent study by Thierry Balzacq, Sarah Léonard and Jan Růžička proves that national security issues do not necessarily reflects objective and material circumstances and are often the result of leaders' efforts to shape and transform social reality (2016, p. 495).

Although the whole concept of the theory consists of securitizing actor, referent subject or object, the securitization act which gives to an issue sufficient salience and the audience which assent is necessary to authorize to treat the issue by any means (Buzan, Weaver and Wilde, 1998, p. 31; Balzacq, Léonard and Ruzicka, 2016, p. 495), for purpose of this thesis the author focuses on the securitization act only. Therefore, he does not assess whether an issue was successfully delivered/accepted by the audience or not, but only whether presented as a threat, therefore, portrayed negatively or not. Based on these two theoretical concepts, three hypotheses are as follows:

Hypothesis 1*: Oil and gas production growth and its spin-offs have positively affected U.S. presidential long-term perception of energy security. The author expects to see positive correlation between energy production and overall perception of energy security.*

***Hypothesis 2**: Fading scarcity of energy resources (availability and affordability) should have positively affected or in certain point even moved U.S. presidential rhetoric out of the security sphere, away from a state-centric national security paradigm. This is a key pattern the author expects to see over time. However, harsh rhetoric related to energy security won't completely disappear, not because there is a risk of energy shortages but because the issue is deliberately presented as a threat.*

***Hypothesis 3**: Although higher utilisation of cheaper natural gas instead of coal in power generation has cut GHG emissions, growing production as such might have raised environmental fears. On the one hand, the author anticipates growing attention devoted by U.S. presidents to acceptability of energy resources driven by pros and cons of the shale revolution. On the other hand, positive achievements in GHGs reduction won't be sufficiently enough to offset growing environmental concerns. Therefore, the author expects to see shift in the pattern of U.S. presidential perception of acceptability of energy resources toward negative trend because of growing upstream domestic production.*

3. Conceptualizing U.S. Governmental Perception of Energy Security

Before delving into the discussion about used methodology and collecting and processing data to measure U.S. presidential perception of energy security, the author first discusses how energy security and perception are conceptualized. Therefore, this chapter provides an overview of definitions which are further used for quantitative evaluation of the U.S. governmental perception of energy security. To analyze energy system, both concepts must be parsed into measurable elements.

3.1. Framework for Analysis of Energy Security

Lack of consensus on energy security precise interpretation on the policy-making process in the U.S. makes different stakeholders such as (inter alia) market advocates, environmentalists or energy producers to see the road to energy security through different tools (Nadejda, Nichols and Balash, 2014, p. 26). Christian Winzer reviewed 36 definitions of energy security conception and pointed out that despite its high importance in policy, the term in not clearly conceptualized and such confusion is also reflected in political actions (2012, p. 36). Others researcher such as André Mänsson, Bengt Johansson and Lars J. Nilsson look at energy security from different perspectives of time-frames, e.g., those assessing longer ones are prone to value stability over cost-effectiveness and vice versa (2014, p. 2). Paradoxically, dependence on foreign oil was considered by some as the best way to ensure energy security, since import of oil from the Middle East was not only less expensive but would promote conservation and help secure long-term domestic supplies (Below, 2013, p. 863).

However, since the first oil crisis, majority of Western energy analysts have agreed that state's oil dependency put national security at an increased risk (Nadejda, Nichols and Balash, 2014, p. 26) and “[i]n the U.S. question[s] of energy security […] often center on fossil fuel use as the country’s critical energy-related vulnerability“ (Littlefield, 2012, p. 780). For instance, Bohi and Toman describe energy security as ”the loss of economic welfare that may occur as a result of a change in the price or availability of energy” (Littlefield, 2012, p. 780). Although the energy security is broader and more complex (Hippel et al., 2011, p. 6720), for purpose of this research the author uses definition of IEA, which defines energy security as the

uninterrupted physical availability of energy sources at a price which is affordable while respecting environmental concerns (2018b).

To conceptualize it, the author further elaborates on Victor Nadejda, Christopher Nichols and Peter Balash's energy security framework (2014, pp. 27-28) and Larry Hughes' "generic framework for the description and analysis of energy security in an energy system" based on three measurable indicators such as (1) availability – geological and geopolitical elements, (2) affordability – economical elements and (3) acceptability – environmental and societal elements (Hughes, 2012, pp. 224-225). However, for purpose of this master's thesis, another, fourth category must be added to this energy security indicator set, when dealing with terms which cannot be assigned to any of above-mentioned categories. Therefore, extended generic framework for analysis of energy security used in this master's thesis consists of four indicators/categories concerning (1) availability, (2) affordability, (3) acceptability of energy resources, and (4) energy category, concerning energy security in general terms. Energy security indicators and their brief descriptions are shown in table 1.

Table 1: Energy Security Indicators

	Description
Availability	Geological and geopolitical elements (availability of energy supply)
Affordability	Economical elements (current value of the affordability of an energy supply which is determined by upstream and downstream, transportation and environmental costs)
Acceptability	Environmental and societal elements (environmental impacts)
Energy	General, unidentifiable terms

Source: author

Additionally, it is worth to note that for purpose of this thesis, U.S. energy security remains centered on fossil fuel supply. Although IEA in its study on assessing interactions between energy security and climate policy suggests that "[t]he burning of fossil fuels – coal, gas and oil – to produce energy is by far the main source of anthropogenic GHG emissions" (2007, 28), it is rather third indicator of energy security, the acceptability of energy resources as a growing source of insecurity for the planet. Despite the fact the European Union considers climate change as the biggest threat in the 21st century and calls for climate-neutral, fully decarbonized economy by 2050 (European Commission, 2019), discussions occurring at state levels

(especially the eastern ones), but also at the other side of the Atlantic in the U.S., involve little consideration of climate yet and revolve around reliability of the energy supply.

3.2. Framework for Analysis of Perception

In current literature, there is no clear consensus about how to define and even measure perception (Liu and Yang, 2015, p. 389). We may of course find various definitions of perception, for instance, according to Cambridge Dictionary, perception is "a belief or opinion, often held by many people and based on how things seem" (2018). However, the author has to approach the concept of perception in an empirically measurable way to be able make inference and answer to the research question. Therefore, the author elaborated on Xinsheng Liu's and Yi Edward Yang's conceptualization of perception and used two of their three integral components for measuring it (2015, p. 389). First element of perception is an overall attention intensity, thus, how much attention the U.S. government pays to energy issues. Research on agenda-setting and attention dynamics (Zhang and Meadows, 2012) shows that a significant amount of attention indicates that the target issue is being prioritized on the agenda (Liu and Yang, 2015, p. 389). Therefore, the greater the number of observations (energy-related speeches or coding units, where the energy security indicators are mentioned), the higher the attention intensity (Liu and Yang, 2015, p. 392). Second component is an overall image, which essentially entails interpretation and judgment of the subject being perceived (Liu and Yang, 2015, p. 389). To analyse the image of energy security indicators in transcripts of presidential speeches[9], the author establishes a three-category image scheme and assigned them a numeric value: negative (-1), neutral (0), and positive (+1) (Liu and Yang, 2015, p. 394).

3.3. Perception of Energy Security

Based on the conceptualization above, the author intends to settle main research question by exploring two sub-questions:

a) *What is the overall attention intensity paid by the U.S. presidents to the energy security and how does the attention intensity change over time?*

[9] And lately also in Congressional hearings via CATA technique.

b) *What is the overall image of the energy security held by U.S. presidents and how does the image change over time?*

In order to do so, the author merges set of four energy security indicators as have been already conceptualized with two components of conceptualization of perception. Therefore, the first sub-question this thesis poses is to infer (1) the overall attention intensity paid by U.S. presidents to the energy security. This investigation is threefold. First, the author assesses the distribution of energy-related presidential speeches, however, this inquiry is conducted prior the content analysis as such. Second, the content analysis reveals the attention paid to the distribution of each energy security indicator, and finally, the attention to the distribution of each image. Next sub-question this thesis addresses is (2) what the overall image of the energy security held by U.S. presidents is. The author draws attention not only to how U.S. presidents perceive the availability, affordability, and acceptability of energy resources or the energy in general (fourth energy security indicator), but also what is the aggregate perception of energy security in respective year. Three measures capturing development of perception of energy security for entire 17-year study period are as follows. The annual arithmetic mean of each energy security indicator as the simplest form of assessing how U.S. presidents perceive the energy security, the annual composite index, which provides the complete picture of the U.S. governmental perception of energy security and is calculated as a sum of their weighted arithmetic means, and finally the so-called coefficient of imbalance which capture prevailing intuitions in "reporting" messages. All three measures range in value from -1 to +1. The higher the positive value indicates a more positive perception of energy security by the U.S. presidents and vice versa (respective formulas are described in sub-chapter 4.4 "Operationalization").

4. Content Analysis

A content analysis is very complex technique. There are no simple guidelines for analysis of data, each research is different (in some cases such as the energy security, research is still in its infancy), and the results of such method are very dependent on the skills, insights, knowledge and especially on analytic abilities of the analyst. In addition, enormous amount of time-consuming analytical work is required (Elo and Kyngäs, 2008, p. 113).

For purpose of this master's thesis the author follows definitions, emphasizing systematic nature, and ability to replicate inquiry as a key characteristic of a content analysis. The case in point is Weber's conceptualization, suggesting that the content analysis is a "systematic, replicable approach for compressing words of a text into fewer content categories based on explicit rules of coding" (Belderbos et al., 2017, p. 313). However, since the author mostly draws on Krippendorff's work, to preserve critical examination and comparison, repeatability, and to contribute to long-term systematic improvements, his conceptual framework is followed. According to Krippendorff, "[c]ontent analysis is as a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (2013, p. 24). Technique's aim is to provide knowledge, new insights, represent facts, to serve as a practical guide to action and to reach a condensed and broad description of observed phenomena (Elo and Kyngäs, 2008, p. 108). To fulfill above mentioned definition, six conceptual components is employed. They are as follows, (1) selection of data, (2) a research question, (3) a context, (4) operationalization or an analytical construct, (5) inferences and finally (6) validating (Krippendorff, 2013, p. 35). In subsequent part of this chapter, all these components (besides a context and research question, both being already discussed) are conceptualized.

4.1. Data Collection

In order to address the proposed research question, a content analysis of U.S. presidential speeches from January 20, 2001 to January 20, 2017 was conducted. It covered both tenures of 43rd president G. W. Bush (January 20, 2001 to January 20, 2009), both terms of 44th president B. H. Obama (January 20, 2009 to January 20, 2017) and first year of 45th president D. J. Trump (January 20, 2017 to January 20, 2018). Presidential speeches were selected for analysis as presidents use them for political purposes to convey policy preferences to legislators and bureaucrats or to gain public support for preferred policies as part of a permanent campaign (Below, 2013, p. 864). Those documents were collected using The American Presidency Project

database, which is non-profit and non-partisan source of presidential documents hosted at the University of California, Santa Barbara (2018). The author searched for documents (thenceforward “energy-related” documents) in 14 different categories and used their advance search engine to identify all documents containing energy-related keyword “energy”, “oil”, “gas” or “petroleum”. Selected categories were as follows:

- convention speeches,
- correspondents' association,
- debates,
- farewell addresses,
- interviews,
- miscellaneous remarks,
- news conferences,
- oral addresses,
- saturday addresses,
- spoken addresses and remarks,
- state dinners,
- state of the union addresses and
- weekly addresses.

This search retrieved a dataset with 2944 energy-related document out of 8389. Table 2 summarize search results, showing total and annual number of energy-related documents.

Table 2: Annual distribution of energy-related/all documents

Year	Energy-related documents	All documents	share of energy-related documents (%)
2001	157	595	26,4
2002	155	608	25,5
2003	168	489	34,4
2004	264	598	44,1
2005	143	494	28,9
2006	218	574	38
2007	141	505	27,9
2008	136	551	24,7
2009	281	589	47,7
2010	286	530	54
2011	177	427	41,5
2012	125	327	38,2
2013	165	390	42,3
2014	148	435	34
2015	144	409	35,2
2016	141	367	38,4
2017	96	501	19,2
Total	**2944**	**8389**	**35,1**

Source: author

4.2.Sampling Plan

Since the body of transcripts of presidential speeches is too large to be analyzed in its entity, it is necessary to draw representative sample of texts in order to limit the research to a manageable quantity. However, it is necessary to meet two criteria. First, the sample must be sufficiently large to answer the research question with confidence, and second, it is necessary to create a sampling plan to ensure that the textual units selected do not bias the answer as such (Krippendorf 2014, 114). For purpose of this analysis, two sampling techniques applicable to texts were utilized, namely stratified and systematic sampling.

4.2.1. Sample Size and Sampling Techniques

First, the author decided to use stratified sampling technique to divide the whole data set into distinct and isolated sub-populations (henceforward strata) that present certain level of homogenity and objects within a stratum are similar to each other (Zhao, Liand and Dang, 2018,

p. 419). In order to use such technique, energy-related documents were divided into 17 strata. Each stratum is defined as one year of presidential tenure starting on January 20 as president's inauguration day and ending on January 20 consecutive year. Average number of energy-related documents in each stratum is 173, however, the smallest stratum for period of January 20, 2017 to January 20, 2018 includes 96 and the largest of January 20, 2010 to January 20, 2011 contains 286 energy-related documents. Thence, when stata are determined, the author carried out systematic sampling within each stratum to select representative objects (Krippendorff, 2013, p. 116). However, before that, an appropriate sample size must be selected.

When determining appropriate sample size, a benchmark of 10 % of population, therefore 30 speeches as a minimum, was established (Liu and Yang, 2015, p. 392). However, the final strata sample set was extended by additional 10 speeches, thence 40 presidential speeches within each stratum, in total 680 energy-related speeches were coded. In addition, each stratum sample set of 40 energy-related speeches was broken down into distinct sub-sample sets of 10 energy-related speeches each and they were coded separately. The author followed simple but general logic, ”[w]hen the units of text that would make a difference in answering the research question are rare, the sample size must be larger than is the case when such units are common” (Krippendorff, 2013, p. 122). Hence, when additional sample set does not significantly change the overall pattern, the sample size may be considered as an appropriate. Selected sample of 40 speeches in each stratum accounts for 23% of all energy-related documents on average. Nonetheless, selected sample within the smallest stratum creates more than 42 %, in the largest stratum approx. 14 % of all strata energy-related documents. Ascending order of strata with sample size share is shown in Table 3.

Table 3: Ascending Order of Sample Size Shares

Year (stratum)	Energy-related documents	Sample size share (%)
2017	96	42,1
2012	125	32
2008	136	29,4
2007	141	28,4
2016	141	28,4
2005	143	28
2015	144	27,8
2014	148	27
2002	155	25,8
2001	157	25,5
2013	165	24,2
2003	168	23,8
2011	177	22,6
2006	218	18,3
2004	264	15,2
2009	281	14,2
2010	286	14
Total	**2944**	**23,1**

Source: author

Finally, since selected energy-related documents are regularly appearing and might be considered as repetitive or continuous events, a systematic sampling within each stratum was conducted. In such random sampling technique, every *k*th unit from a body of text after randomly determining the starting point is selected. The sampling interval *k* is a constant (Krippendorff, 2013, p. 114) and is calculated by dividing the strata size by required sample size (Bhat, 2019).

4.3.Coding Units

According to Krippendorff, coding units are units that are distinguished to be separately described and categorized and are contained in sampling units (2013, p. 100). On the one hand, a coding unit can consist of more than one sentence, or paragraph and, therefore, contain several meanings. However, on that account, categorization of such unit makes the analysis process very difficult and challenging since such units are too rich and complex to be coded reliably. On the other hand, too narrow coding unit such as one word may very often end up in fragmentation (Elo and Kyngäs, 2008, p. 109; Krippendorff, 2013, pp. 100-101). Therefore, “to

obtain reliable accounts of larger unit of texts, content analysts have found it convenient to describe smaller units on which they can more easily agree and then use analytic procedures to obtain descriptions of larger units" (Krippendorff, 2013, p. 101). Since it is desirable to define coding units as the smallest units that carry all needed information, for the purposes of this analysis, a coding unit as one sentence where energy-related keyword(s) appear(s) was determined. Table 4 shows distribution of coding units within each stratum. However, it is worth mentioning that energy-related keywords contained in coding units do not have to always refer to energy security, energy sources or any type of energy carrier. Energy or gas as noun might sometimes refer to human energy (e.g., energy of the people devoted to something), or to poison/mustard/sarin gas used as nerve agents. Hence, it is obvious that not all 3241 coding units are devoted to energy sources.

Table 4: Coding Units Distribution - Breakdown

Year (stratum)	**Sub-sample set 1**	**Sub-sample set 2**	**Sub-sample set 3**	**Sub-sample set 4**	**Total**
2001	55	35	57	54	**201**
2002	31	40	23	66	**160**
2003	34	62	30	28	**154**
2004	23	31	52	33	**139**
2005	42	85	49	62	**238**
2006	59	137	36	32	**264**
2007	33	36	63	96	**228**
2008	33	36	120	46	**235**
2009	31	30	22	30	**113**
2010	27	32	44	55	**158**
2011	52	19	15	35	**121**
2012	77	84	179	121	**461**
2013	71	33	22	26	**152**
2014	34	29	43	52	**158**
2015	37	45	69	36	**187**
2016	37	33	43	28	**141**
2017	37	27	42	25	**131**
Total	**713**	**794**	**909**	**825**	**3241**

Source: author

4.4. Operationalization

What follows in this chapter is description of the analytic process which was put together to make sense of the data and answer to the research question, therefore obtain a meaning of

whole. Guided by above mentioned conceptual framework a categorization matrix was developed (see table 5). Each coding unit was reviewed and coded by its date, energy security indicator and tone expressed. The content analysis was conducted using ATLAS.ti text analysis software. In this case, the software served as a systematic workbench only, mostly for arranging and managing bodies of textual sources. The coding as such was conducted by the author, therefore, the content analysis refers to a human-based content analysis. However, during the process of such, multiple dictionaries based on the results of coding were constructed. These dictionaries were in turn employed using query tools as an analytical toolkit based on Boolean and spatial operators, looking for words or phrases co-occurrence. This attempt to conduct computer-aided text analysis (CATA) and its purpose is further discussed in chapter 4.4.4.

Table 5: An Example from a Categorization Matrix

Coding Unit	Date	Energy security indicator	Image
We need to be less dependent—in order to make sure jobs stay in America, we need to become less dependent on foreign sources of energy.			

Source: author

4.4.1. Defining the Semantic of Coding Units

Besides the precondition that coder must have cognitive capacities to be able to recognize clearly what he/she reads (Krippendorff, 2013, p. 128), there are other two important requirements which enhance reliability of coding such as that categories should be mutually exclusive and exhaustive (Krippendorff, 2013, p. 132). “[E]xhaustive refers to the ability of a data language to represent all coding units, without exception. No unit must be excluded because of lack of descriptive terms. Mutually exclusive refers to the ability of a data language to make clear distinction among the phenomena to be coded” (Krippendorff, 2013, p. 132). However, the concept of mutually exclusive does not entail that content analysts must assign one and only one value to each coding unit (Krippendorf 2014, 155). Thus, coding units are not limited to “single-valued description” since they might afford multiple interpretations, might

have multi-valued narrative. Nonetheless, multiple categorizations may inflict problems for coding and data reliability, thence for their further validation (Krippendorf 2014, 155).

Following the energy security conceptualization, the coder after reading the coding unit might assign to it either one, or more category codes expressing respective energy security indicators. Even though majority of the coding units were semantically identified in only one category, there were some that required multi-valued description since their narrative was about more than one energy security indicator. It is important to note that one coding unit might be counted in more than one category. For example, a single case "[w]e've doubled our production of clean energy, even as we continue to produce traditional energy sources at an extraordinary pace, which means energy costs are lower here than they are in many other places around the world" (Obama, 2016) includes statement which fits within availability, affordability and acceptability category. On the other hand, there might be coding units which include energy-related keywords, however, do not express any of energy security indicator. As already mentioned, noun "energy" may also refer to human energy which someone devotes to something or someone. These coding units are labeled as "no code" category, excluded from coding unit list and are not further analyzed. It is not a surprise that the number of codes is different to the number of coding units. Table 6 shows their distribution within each stratum and its four sub-sample sets.

Table 6: Energy Security Codes Distribution - Breakdown

Year (stratum)	Sub-sample set 1	Sub-sample set 2	Sub-sample set 3	Sub-sample set 4	Total
2001	54	33	39	44	**170**
2002	19	29	22	76	**146**
2003	31	63	31	25	**150**
2004	15	29	56	33	**133**
2005	49	87	54	63	**253**
2006	62	150	30	29	**271**
2007	35	59	56	102	**252**
2008	27	33	89	42	**191**
2009	32	21	24	33	**110**
2010	21	32	39	50	**142**
2011	51	21	13	28	**113**
2012	82	93	145	119	**439**
2013	52	33	24	19	**128**
2014	38	21	46	50	**155**
2015	30	37	69	28	**164**
2016	39	36	20	25	**120**
2017	36	13	35	24	**108**
Total	**673**	**790**	**792**	**790**	**3045**

Source: author

For the image, or tone of each already coded coding units ("no code" category coding units excluded), the coder assign "-1" if the coding unit negatively portrayed or has unfavorable or critical view toward the respective energy security indicator; "+1" if the coding unit praised or described the respective energy security indicator in a positive way; and "0" if the coding unit has a neutral or mixed tone towards respective energy security indicator (Liu and Yang, 2015, p. 391). A list of examples from categorization matrix is shown in table 7.

Table 7: Examples from Categorization Matrix

Coding Unit	Date	Energy security indicator	Image
And as a result, we're finding in certain parts of the country that we're short on energy.	March 19, 2001	Availability	-1
In 2010, our oil dependence, the amount that we're bringing in, the percentage we're bringing in, was under 50 percent for the first time in 13 years.	March 15, 2012	Availability	+1
American families and small businesses across the country are feeling the pinch from rising gas prices.	April 16, 2005	Affordability	-1
The only certainty of the status quo is that the price and supply of oil will become increasingly volatile, that the use of fossil fuels will wreak havoc on weather patterns and air quality.	February 24, 2010	Affordability Acceptability Availability	-1 -1 -1
We also believe, strongly believe, that every child can learn, and with the right focus and right energy, every child will learn.	January 9, 2006	No code	

Source: author

4.4.2. Assessment Tools

As already mentioned, presented content analysis and its methods of quantification and categorization of coding units allows the author to calculate various indices and coefficients, serving as convenient instrument for obtaining valid answer to raised research question

(Krippendorff, 2013, p. 88). In this section, all utilized assessment tools and their formulas are reviewed.

4.4.2.1. Energy Security Indicator Index (ESII)

ESII is a measure of central tendency (the mean or arithmetic average) of image of each energy security indicator in respective year. As defined by Meier, Brudney and Bohte in chapter 5 (2012, pp. 79-96), this index yields the average value of annual image of respective energy security indicator. The ESII ranges in value from "-1" as completely negative to "+1" as completely positive. Therefore, every year, four (availability, affordability, acceptability and energy) energy security indicator indices are calculated. The procedure for calculation is defined as follows:

$$ESII = \frac{1}{n} * \sum_{i=1}^{n} I_i$$

ESII is computed as sum of all image values *I* related to particular energy security indicator divided by its count *n*.

4.4.2.2. Image Salience (IS)

Another measurement is IS which represents annual percentage frequency distribution of each image. Annual image salience is computed as a fraction of the annual number of observations of respective image as a numerator and the total annual number of all observations (therefore codes) as a denominator (Meier, Brudney and Bohte, 2012, pp. 64-65). The formula is defined as follows:

$$IS = \frac{N_{image}}{N}$$

where N_{image} is number of observations of respective image and *N* is number of total observations. Sum of all *IS* indices is equal to 1, when multiplied by 100, we receive the percentage distribution of each image.

4.4.2.3. Energy Security Indicator Salience (ESIS)

Third measurement is ESIS which represents percentage frequency distribution of the total observations of each energy security indicator and is calculated identically as preceding IS. The equation is as follows:

$$ESIS = \frac{N_{indicator}}{N}$$

where $N_{indicator}$ is number of observations of respective energy security indicator and N is number of total energy security observations (therefore codes). Sum of all ESIS indices is equal to 1 and when multiplied by 100, we get percentage distribution of each energy security indicator.

4.4.2.4. Composite Index (CI)

Third measure is CI, which is "a composite measure that combines several variables into a single unified measure of concept" (Meier, Brudney and Bohte, 2012, pp. 543). Based on the conducted analysis and quantifications, the author of the thesis defined the aggregated index, aimed to measure overall annual energy security image. The CI ranges in value from "-1" as completely negative to "+1" as completely positive. The CI is defined as follows:

$$CI = \sum_{i=1}^{4} ESII_i * ESIS_i$$

Annual CI is calculated as a sum of weighted average value of each energy security indicator. Thus, it is the sum of the ESII multiplied by their respective ESIS, representing salience. When broken down, the formula looks as follows:

$$CI = ESI_1 * ESIS_1 + ESI_2 * ESIS_2 + ESI_3 * ESIS_3 + ESI_4 * ESIS_4$$

Index number *i=1* is for availability, *i=2* for affordability, *i=3* for acceptability and *i=4* for energy. $ESII_I$ is energy security indicator index for availability, $ESIS_I$ is energy security indicator salience of availability and so forth.

4.4.2.5. Coefficient of Imbalance (CoI)

Last but not least, CoI capturing prevailing tone regarding (im)balance in reporting, is a tool measuring the degree to which favorable statements outnumber unfavorable (Krippendorff, 2013, p. 60). This technique is mostly used for evaluating whether journalists' practices are impartial, therefore, focusing on bias in favoring one side over the other (Krippendorff, 2013, p. 59). However, when substitute sides with image, CoI may serve as useful tool in assessing bias in addressing energy security. According to Krippendorff, there are two ways of evaluating (2013, p. 61):

$$CoI = \frac{f^2 - f * u}{N^2} \; when \; f \geq u; \; and \; CoI = \frac{f * u - u^2}{N^2} \; when \; f < u$$

where f is the number of favorable units (positive image) and u is the number of unfavorable units (negative image). The value of CoI ranges from -1 to +1 and measures deviations from the ideal point which is a balance between positive and negative reporting.

4.4.3. Dictionaries

Although the answer to the research question is guided by the inference from data retrieved by humanly conducted analysis, during the process as such, specified dictionaries for CATA were created. Hence, based on the results of the content analysis, eleven distinct dictionaries were constructed to detect “the verbal message” (Krippendorff, 2013, p. 241) of coding units. When applied, dictionaries help to infer the various energy security category and their emotional tone, coded as an image. First group of three dictionaries contain words/terms indicating which energy security indicator is addressed. Therefore, they detect mentions of (1) availability, (2) affordability and (3) acceptability. The unidentified coding units fall within energy security category which has been conceptualized as category “energy”. Second group of six dictionaries reveal the image category of coding units, already assigned to at least one

energy security indicator family. For this reason, each energy security category has its own two dictionaries with positive and negative terms, therefore: (4) positive availability, (5) negative availability, (6) positive affordability, (7) negative affordability, (8) positive acceptability and (9) negative acceptability. When image is not identified, tone is regarded as neutral. Last group of two dictionaries contain list of general terms with (10) positive and (11) negative connotations for fourth energy security category "energy" where all unidentified coding units fell (see Annex A for a list of dictionary terms).

4.4.4. Computer Aided Text Analysis

With the availability and accessibility of large textual databases (for U.S. politics for instance "The American Presidency Project" or "Government Publishing Office") and relevant content analysis software (e.g., ATLAS.ti, WordStat), CATA may be increasingly used in research to infer otherwise unobserved traits, and to perform it more reliably, with lower costs and more rapidly than human coding (Belderbos et. al, 2017, pp. 312-313). Since computers do not perform the analysis solely by itself (as artificial intelligence which is not invented yet), the analytical task is divided into "what humans do best and what computers do best" (Krippendorff, 2013, p. 212), thence computers with content analysis software might aid content analysis research. As everything in social sciences, it has several advantages just as disadvantages over surveys. On the one hand, computers' operations are always deterministic, sequential and thence perfectly reliable since uncertainties or ambiguities involved in manual data handling do not exist. On the other hand, CATA approach to data coding has also limitations and difficulties from which the ability to achieve semantic validity, thus how human coder interpret the text, is the most serious one (Krippendorff, 2013, pp. 208-211). Nonetheless, "CATA allows researcher to perform content analyses on large textual databases and construct indicators from dictionaries of keywords" (Belderbos et al., 2017, p. 313).

Although empirical part of the thesis is based on humanly conducted analysis, its time-consuming process does not allow the analysis of larger volumes of textual data (e.g., Congressional hearings' transcripts as it was originally intented). However, in order to do so, or at least to give it a try, various distinct dictionaries as a byproduct of conducted analysis done "by hand" were created and subsequently utilized using ATLAS.ti content analysis software. Preservation of ability to make sense of the text in a suitable computer language is approached via appropriate query tool algorithm. First, reliability of dictionary-based CATA was tested on

same sample set of presidential speeches and its outcomes compared with the content analysis findings. Secondly, CATA technique was employed on a small sample of congressional hearings.

4.4.4.1. CATA Dictionary Approach Process

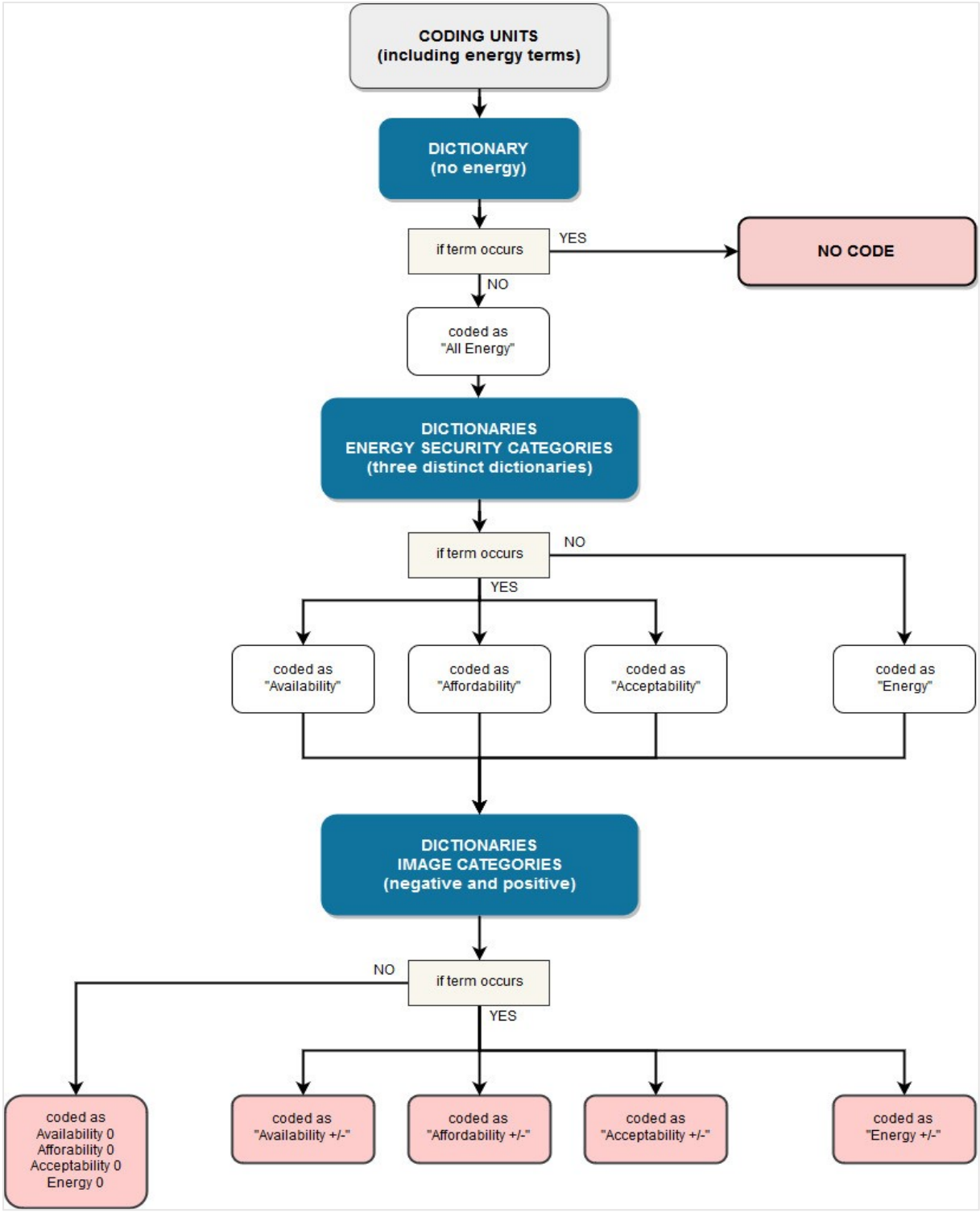
To classify each coding unit, query tool functions were used. A query is a search expression built on Boolean (AND, OR, NOT, XOR) and proximity (word/phrase precedes, follows, occurs) operators that define the conditions that expression must meet to be retrieved. The former allows combinations of search terms and define their relationship. The latter describes their spatial relationship, e.g., terms that are contained in one another, overlap one another, follow, or precede the other etc. (ATLAS.ti, 2013, pp. 258-280).

First step of CATA is to exclude all coding units, which include energy-related keywords, but semantically not refer to energy sources. The case is point may be "energy" as "human energy" or "gas" as "poisonous" agent. Second step is to determine energy security category. Just as in the content analysis, coding units are not limited to "single-valued description" since they might afford multiple interpretations, might have multi-valued narrative (Krippendorf 2014, 155). Therefore, one coding unit might be assigned to more than one energy security category. Determination is achieved through query analytical tool "COOCCUR", retrieving codes which occur in others, thus, dictionary expression occurring in coding unit. First, CATA proceeds with dictionaries containing energy security indicators word/phrases. Let's say we start with dictionary including terms related to "availability". If any of these terms occur within a coding unit, respective, thence "availability" energy security category is assigned to it. Since we have three energy security category dictionaries, this is a threefold process. The rest of coding units without any of dictionary terms fall in the fourth basket, the "energy" category[10]. After this, all coding units are assigned to a code characterizing at least one energy security category. Second step is to determine codes' image category. Like in a previous one, image of each code is determined through Boolean or spatial operators. Since each energy security category has its own two dictionaries containing positive and negative terms, each code is

[10] To classify all remaining coding units with no dictionary words/phrases as "energy" category, Boolean operators "OR" (|), "AND" (&), and "NOT" were used. The code, retrieving coding units belonging to "energy" category, translated in mathematic logic looks like this: (NOT (("ACCEPTABILITY" | "AFFORDABILY" | "AVAILABILITY") COOCCUR "ALL_ENERGY_CODING_UNITS") & " ALL_ENERGY_CODING_UNITS ").

analyzed with its respective image dictionaries. If term occurs, respective image category is assigned to it. If not, code's image is classified as “neutral”. Figure 7 provides a synthesized overview of CATA process.

Figure 7: Steps in Cata Schema



Source: author

4.5. Reliability

The most important precondition for valid inferences from texts is consistency. The categorization procedure must be reliable, thence different people (or same person, but in different time) should be able to code the same text in the same way, regardless of the circumstances of its implementation (Krippendorff, 2013, p. 267; Mackey and Gass, 2005, p. 128; Stemler, 2001, p. 3). In this chapter, used reliability measures to demonstrate the trustworthiness of data and their reliability are discussed.

Before the author will proceed to concrete reliability design, important circumstance must be acknowledged. There is only one coder, the author of this master's thesis, and no other available coders to ensure interrater reliability test. Therefore, intrarater test which is according to Krippendorff the weakest form of reliability (2013, p. 271) was carried out. No other option was at the author's disposal. As Mackey and Gass suggest, intrarater reliability is repeated data coding in two different periods (2005, p. 129). The main characteristic of intrarater reliability is that the same coder yields the same finding results at different times. Particularly, after the coding process the analysis starts again with sample of data and then compares the two results. Therefore, after some time has elapsed, one coder rereads, recodes and reanalyzes the same text (Krippendorff, 2013, p. 271). In the case of this thesis, the author randomly selected 68 presidential speeches (4 presidential speeches in each stratum) for the second re-code, thence met the standard 10 % sample threshold as recommended by Wimmer and Dominic (Liu and Yang, 2015, p. 392). The reliability was subsequently determined using two coefficients, (1) the coefficient of agreement, and (2) the Krippendorff's alpha coefficient. Both measures the agreement among observations. However, the former one is considered as the simplest method capturing the percentage of agreement (Mayring, 2014, p. 112), the latter one is arguably the most general measure with appropriate reliability interpretations (Krippendorff, 2013, p. 278). Since one coding unit is not limited to “single-valued description” (Krippendorf 2014, 155), the author measures agreement among presidential speeches as their composite indexes. To simplify the procedure of identifying the (dis)agreement between composite indices calculated from the original and repeated data, 11 nominal categories, limited by its minimal and maximal value were created (list of all categories is shown in table 8). Therefore, both composite indices scores for each coding unit are assigned to respective category. The agreement is when both find itself in the same category.

Table 8: Assessment categories

Category	CI ratio
a	(-1) - (-0,8)
b	(-0,79) - (-0,6)
c	(-0,59) - (-0,4)
d	(-0,39) - (-0,2)
e	(-0,19) - 0
f	0,01 - 0,2
g	0,21 - 0,4
h	0,41 - 0,6
i	0,61 - 0,8
j	0,81 - 1
N	no code

Source: author

As Krippendorff proposes (2013, pp. 278-279; 2011, pp. 3-4), the measurement of the deviation from perfect reliability in its most general form is as follows:

$$\alpha = 1 - \frac{D_o}{D_e}$$

where D_o is the average disagreement among values assigned to units of analysis, and D_e is the average difference one would expect when coding of units is attributable to chance rather than to the properties of these units. For two observations, the formula is:

$$\alpha = \frac{A_o - A_e}{1 - A_e} = \frac{(n-1)\sum_c o_{cc} - \sum_c n_c(n_c - 1)}{n(n-1) - \sum_c n_c(n_c - 1)}$$

where A_o is the percentage of observed matches in units and A_e is the percentage of matches obtained by chance, n is the total number of values for two observations (2 * 68), n_c is number of each possible value obtained by two observations, and o_{cc} is number of pairs in unit where match occurs. Alpha's value ranges from 1 as ideally reliable (perfect agreement) to 0 which indicates absence of any reliability (Krippendorff, 2011, p. 1). The author follows data reliability standards as have been adopted in numerous analyses in social sciences, recommending that we may rely on variables above α=0,8 and consider variables between α=0,667 and α=0,8 only for tentative conclusion (Krippendorff, 2013, p. 325) - i.e., the former value of α stands for almost perfect, the latter for substantial agreement (Landis and Koch,

1977, p. 165). Results of both coefficients fall within the “near perfect” agreement category (see more in chapter 6).

5. Findings

Results from the content analysis enable to infer whether the changing environment of availability of fossil energy resources (rising production of natural gas and crude oil), which on the one hand has caused the downward pressure on their affordability (decreasing spot prices at Henry Hub, downfall of crude oil prices in 2014), but might has on the other hand strengthen environmental concerns, thence their acceptability by U.S. society has affected U.S. presidential perception of energy security and whether language used by U.S. presidents had followed "tectonic shift in the geopolitics of energy" (Nye, 2014) caused by shale revolution.

To gain a better understanding of possible evolution and to arrive at a comprehensive answer to the research question, three distinct periods for further evaluation were created. First period, the pre-shale revolution era last from 2001 – 2008, the second period, the transition era last form 2009 – 2012, and the last period, the post-shale revolution era last form 2013-2017. Although the shale gas production in the U.S. has started in 2005, the author, when demarcating pre-shale period, decided to "wait" on beginning of boom in tight oil production since security of supply of crude oil and its derivates has always been main concern of U.S. energy strategy. Therefore, pre-shale revolution period ends in 2008 (year included) when tight oil production in the U.S. has taken off and when G. W. Bush's second term was about to end. At that time, U.S. shale gas and tight oil production accounted for 16 % of total gas and 12 % of total crude oil production. One decade later, U.S. shale gas and tight oil production more than quadrupled, accounting for 70 % of total natural gas, and 60 % of total oil production, respectively (EIA, 2019k). There was only small drop in tight oil production in 2015 in response to low oil prices, but not as significant as many[11] had anticipated (Hamilton, 2015). However, nowadays, the production is back and even greater (EIA, 2019l). Since there was no significant changeover in the production trend, the author decided to split president's Obama two terms and the first bound to transition era and the second one to post-shale revolution era.

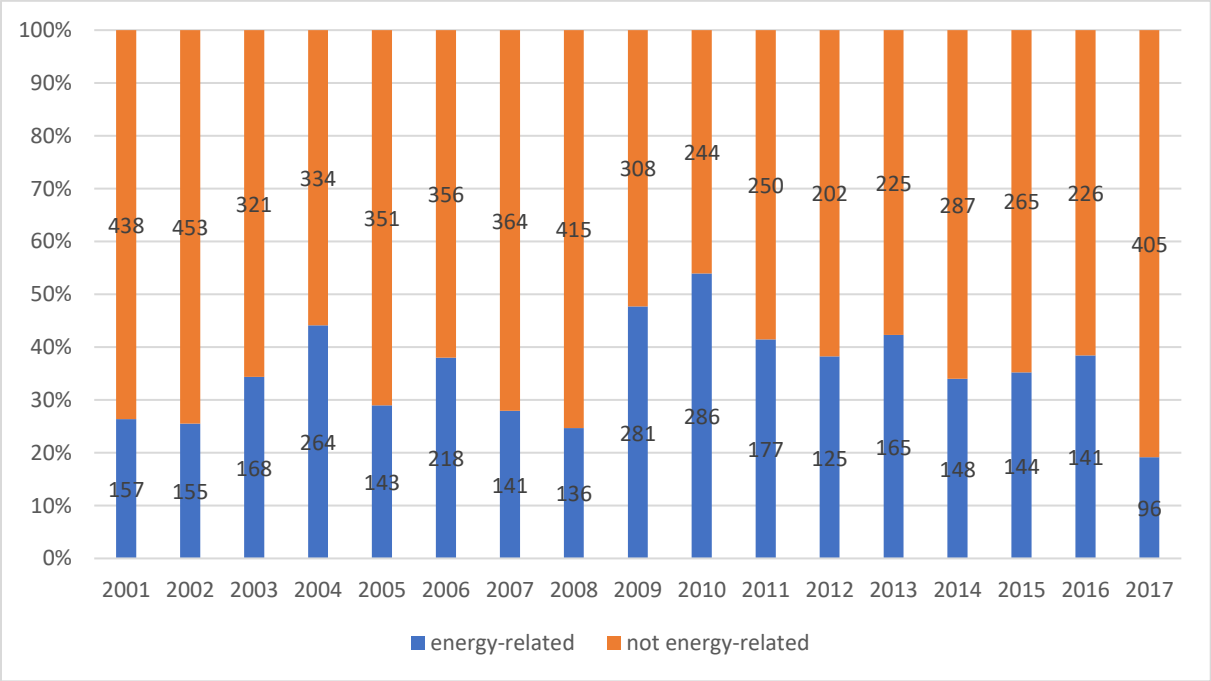
In addition, whether the author may trust and therefore rest on the results, Ordinary Least-Squares regression (OLS regression) as a statistical method for linear models is used[12].

[11] Especially OPEC countries.
[12] For more information about OLS regression see its descrption in Hutcheson, 2001.

5.1.Distribution of Energy-Related Speeches

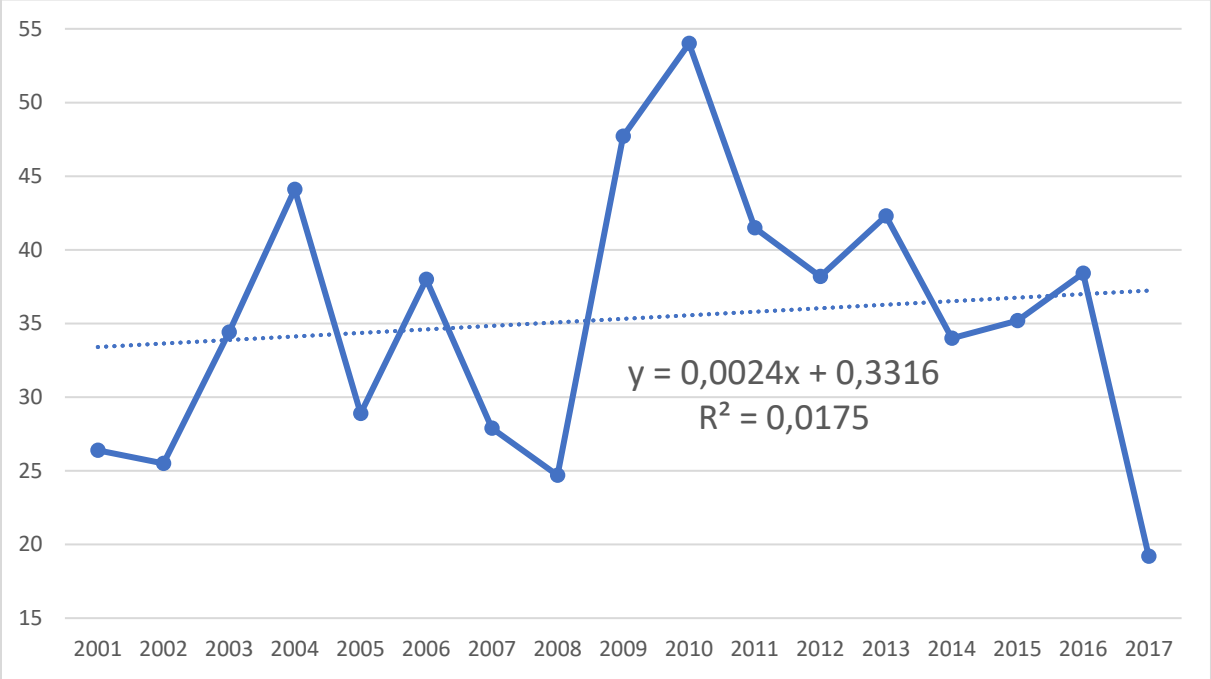
Even before the content analysis was conducted, the attention devoted to the energy security (as a measure which somewhat reflects the perceived importance granted to energy security) was perfunctorily examined. The author follows a simple logic, the greater the number of observations, the higher the attention intensity (Liu and Yang, 2015, p. 392). Both figures (8 and 9) graphically show what has been summarized in table 2, thus distribution of energy-related speeches over the 17-year period.

Figure 8: Presidential Speeches - Breakdown



Source: author

Figure 9: Distribution of energy-related speeches (%)



Source: author

On the one hand, the curve clearly indicates that there is no significant upward or downward pattern following growing energy production. OLS regression, using annual share of energy-related speeches as a dependent variable (DV) and year as independent variable (IV), confirms that this tiny upward trend ($\beta=0,0024$) is statistically insignificant ($p=0,61$) and that changes in IV are not associated with changes in the DV ($R^2=0,0175$). Therefore, distribution of speeches considering energy issues during observed period do not indicate to be conspicuously driven by the shale-revolution aftereffects (results are summarized in table 9).

Table 9: Distribution of energy-related documents (Results)

counts (%)	**pre-shale revolution era**	**transition era**	**post-shale revolution era**	**the bottom** (2010)	**the peak** (2017)	**the trend**	**p-value**
Energy-related documents	172,75 (31)	217,25 (46)	138,8 (33)	96 (19,2)	286 (54)	tiny upward	0,61

Source: author

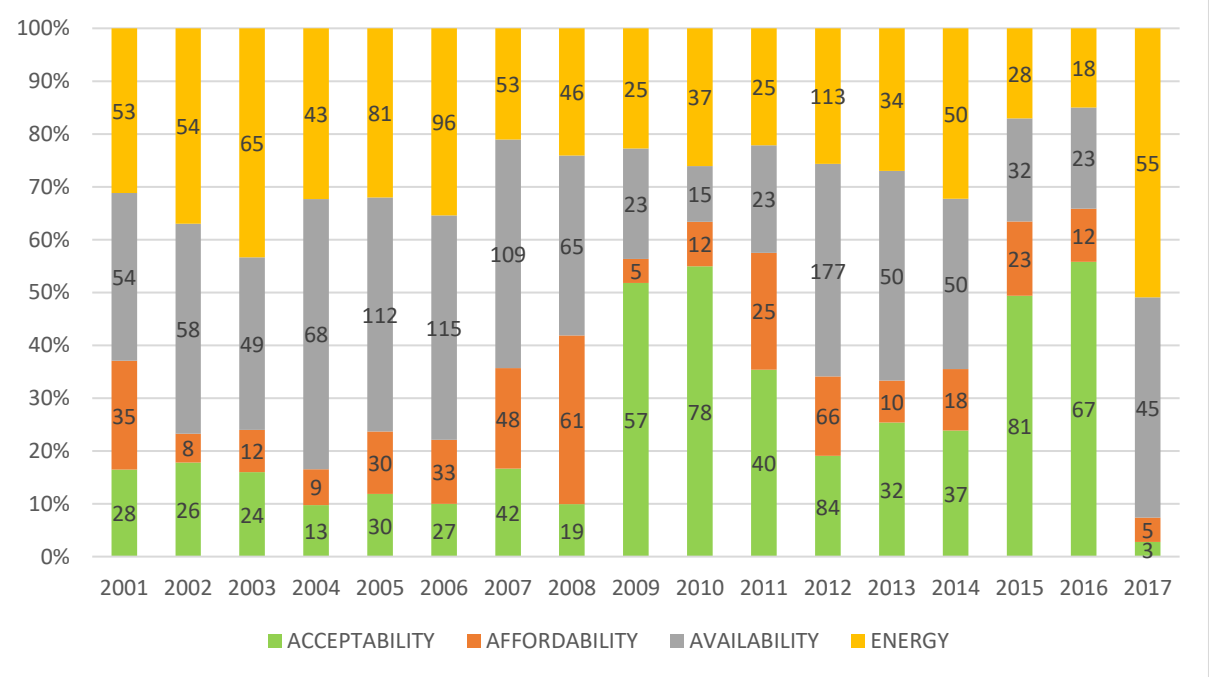
On the other hand, one point is evident at first glance. The president Obama during his two tenures devoted more attention to the energy security with an average of 183 energy-related speeches a year (42 % on average annually), then his predecessor G. W. Bush with an annual

average of 173 energy-related speeches (31 % on average annually) and his successor D. J. Trump with 96 (19 %) energy-related speeches delivered in his first year in the office. Strikingly enough, rather than rising domestic supply, it seems to be a party identification which affects attention devoted to the energy security. 2010 was a peak year, when the president Obama delivered 286 energy-related speeches out of 530, creating also the greatest share of energy-related speeches (54 % of all speeches). The lowest number of energy-related speeches was recorded in 2017. Although the president Trump delivered 501 speeches in that year, the energy security was touched in every fifth speech only. In total, 96 of his public speeches addressed energy-related issues.

5.2. Distribution of Energy Security Indicators

To investigate the overall attention that U.S. presidents devoted to the energy security in detail, annual distribution of its indicators, calculated as ESIS coefficient is examined (results are depicted in figure 10).

Figure 10: Energy Security Indicators Distribution



Source: author

However, to unveil distribution of individual issue categories, the "energy" as fourth energy security indicator, serving as a general basket for statements that cannot be assigned to any other thematic group (availability, affordability and acceptability) is excluded. Therefore, the author further works with adjusted distribution of three thematic categories (see figure 11).

Figure 11: Energy Security Indicators Distribution ("energy" excluded)

Source: author

As has been anticipated, overall attention, indicating that the target issue is being prioritized on the agenda, devoted to the availability and the affordability of energy resources had undergone steadily declining trend. On the other hand, overall attention devoted to the acceptability of energy resources had gone through the opposite development of upward trend toward being more ushered (see table 10).

First, growing shale gas and tight oil development has reduced U.S. vulnerability to supply disruptions and price shocks, thence has made those issues less salient in the domestic arena than in the past. Consequently, they had not been addressed that much as had been in pre-shale revolution era. Second, growing extraction of fossil fuels in general and impact of the shale industry in particular have raised many environmental issues such as (inter alia) air and water pollution, land use, waste management, extraction, processing, etc. Along with positive achievements in reducing GHG emissions, acceptability as an environmental element of the

energy security has got at the top of the list of energy agenda. Additionally, all three patterns are from time to time disrupted by sharp fluctuations, in most cases being clearly attributed to incidents (such as BP disaster in 2010), market shocks, but also domestic political/ideological changes in the Oval office. Since neither of these patterns were strong enough, these deviations make all three trends statistically insignificant.

Table 10: Distribution of Energy Security Indicators (Results)

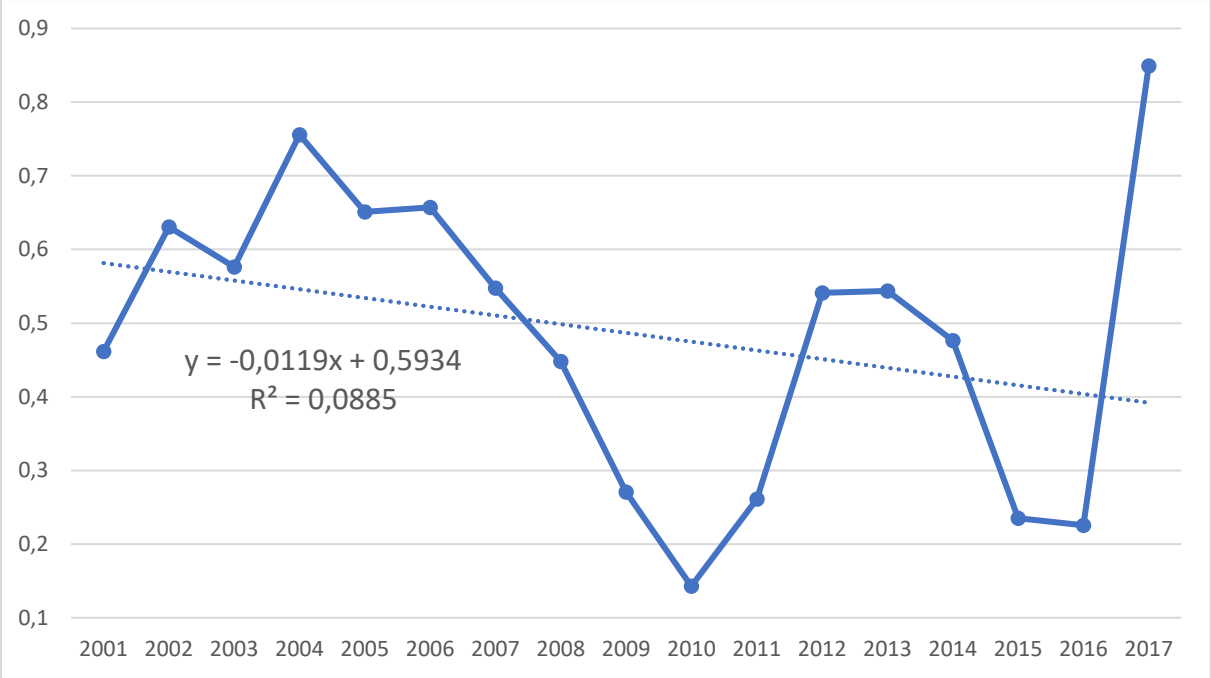
counts (%)	**pre-shale revolution era** (average)	**transition era** (average)	**post-shale revolution era** (average)	**the bottom** (2017)	**the peak** (2010)	**the trend**	**p-value**
the acceptability	26,13 (20,2)	64,75 (53,1)	44 (40,2)	3 (5,7)	78 (74,3)	upward toward more attention	0,24
the affordability	29,5 (20,7)	27 (16,5)	13,6 (13,2)	(2009) 5 (5,9)	(2008) 61 (42,1)	downward toward less attention	0,49
the availability	78,75 (59,1)	59,5 (30,4)	40 (46,6)	(2010) 15 (14,3)	(2017) 45 (84,9)	downward toward less attention	0,15

Source: author

When looking at U.S. presidential attention devoted to availability of energy resources (see figure 12), the most obvious deviation from general pattern came in 2017, when president Trump again raised the issue of availability of energy resources. On the one hand, the president was emphasizing all forms of abundant energy reserves as a vast energy wealth at U.S. disposal or praising the energy production reaching its all-time high. On the other hand, president Trump often criticized restriction and regulation imposed by previous administration on gas and oil upstream industry and as he often stated on “clean and beautiful coal” which the U.S. has a thousand years of supply (see for example Trump, 2017). Declining trend is also strongly disrupted in 2009, when president Obama came into the office. The author gives reasons for this bias to different Obama's attitude to energy in general, emphasizing environmental agenda

more than remaining two energy security categories. Additionally, acceptability of fossil fuels, especially of crude oil was called into question by the catastrophe of British Petrol (BP) well in 2010, causing large oil spills in the Gulf Coast. Although downward pattern toward less attention is apparent (*β=-0,0119*), with the average attention devoted to availability in pre-shale revolution of 60 %, and in post-shale revolution era of 47 %, OLS regression, using annual share of energy-related codes devoted to availability as DV and year as IV, shows that this trend is statistically insignificant and that changes in IV are not associated with changes in the DV (*p=0,24*).

Figure 12: Attention Devoted to Availability



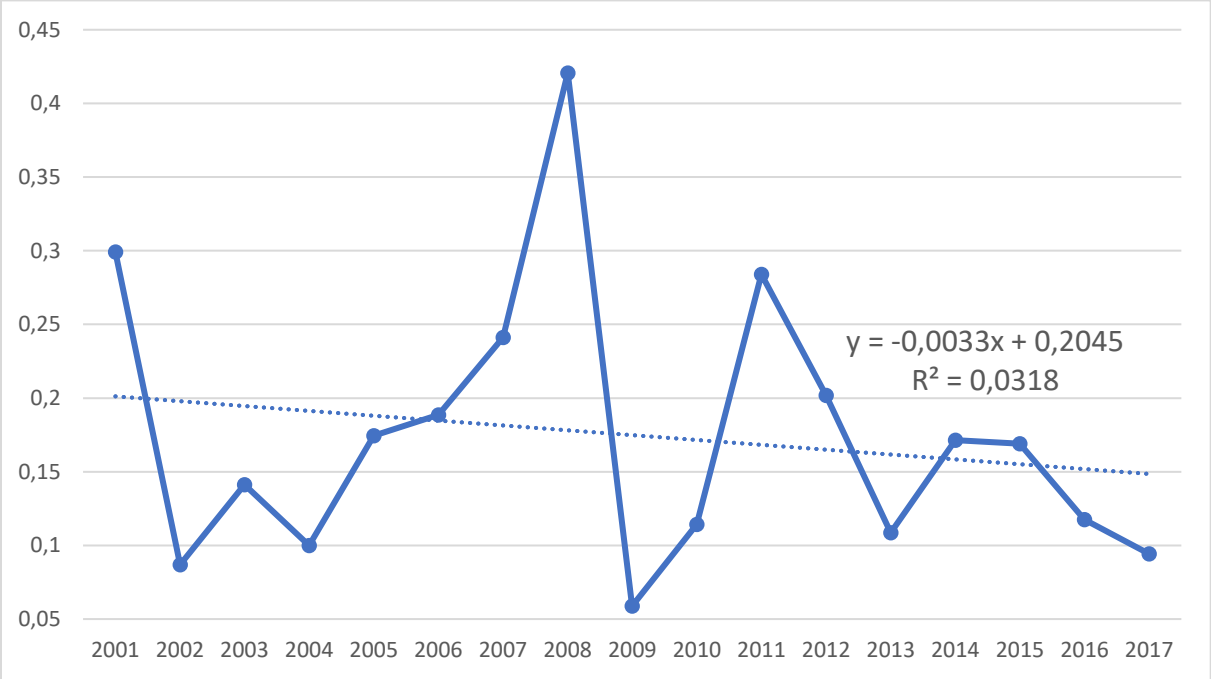
Source: author

Similar trend with more moderate decline is seen in attention granted to affordability of energy resources (see figure 13). Several noticeable fluctuations might be again apparent at first glance. However, when compared with development of U.S. retail gasoline prices (as the most sensitive political issue) as shown in figure 5, it is more than obvious that the peaks and toughs in attention devoted to economic side of energy were driven by the development of retail gasoline prices at pumps. In 2008, when the prices at gas stations hit the record high of more than $4 per gallon, the attention devoted to the affordability of energy resources became the main concern, accounting for 42 % share of all energy-related statements. Second peak

appeared in 2011, when prices skyrocketed to nearly the same value again and the issue of affordability of energy gained momentum second times. However, president's Obama determination to stimulate domestic and global climate legislation caused that environmental issues were at a top of the list of energy agenda at that time. Therefore, affordability of energy sources had not been as salient as three years ago and accounted for 28 % of all energy-related statements only. Conversely, steep drop in gasoline prices in 2008, ending up at $1,6 per gallon, is also followed by downfall in attention to affordability (almost disappearing from energy agenda, accounting for a share of 6 %). However, this trough is not solely made up by the downfall of gasoline prices but of the presidential transition too.

On the average, attention devoted to affordability moves from 21 % in pre-shale revolution era to 13 % in post-shale revolution era. But OLS regression where annual share of energy-related codes devoted to affordability is DV and year as IV, even though confirming very flat downward trend (β=*-0,0033*), shows that this trend is statistically insignificant and that changes in IV are not associated with changes in the DV (p=*0,49*).

Figure 13: Attention Devoted to Affordability

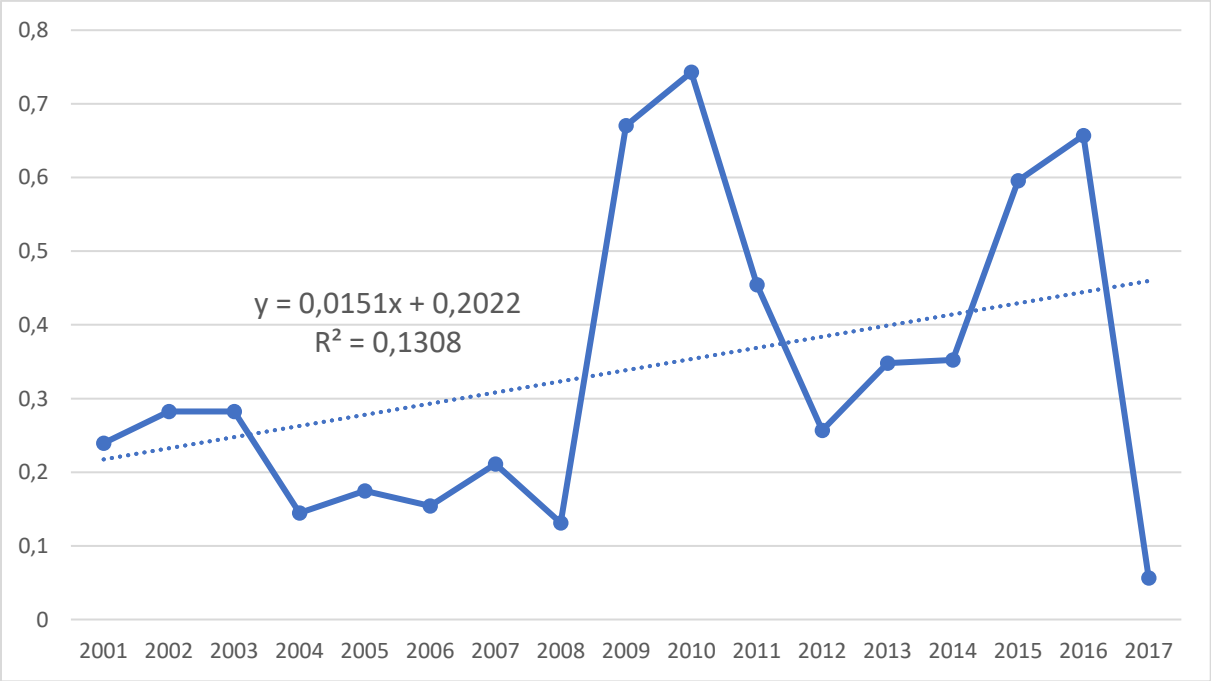


Source: author

Finally, third energy security indicator, the acceptability of energy sources (see figure 14), shows that attention granted to environmental impacts of energy resources had more than

double on average from pre to post-shale revolution era. This sharp increase in attention to acceptability came not only with the president Obama's environmental agenda, but also with extraction method of hydraulic fracturing, which along with increasing domestic natural gas and crude oil production raised environmental concerns. In addition, other factors such as the Deepwater Horizon explosion on the rig in April 2010 resulting in oil spill in the Gulf Coast, affected already rising attention devoted to acceptability. In 2010, BP oil crisis caused that acceptability became president's main concern within the field of energy (almost the only one with 75 % of attention intensity). After the steep decline in 2011, acceptability had again gained momentum in 2014 with the peak of 65 % in 2016 (obviously Paris Agreement). Quite the reverse: contemporary incumbent of the Oval office did not pay much attention to energy-related environmental issues. In 2017, attention toward acceptability hit the new low with share of roughly 6 % of energy-related speeches considering environment at all. Nevertheless, these huge peaks and drops strongly disrupted the overall, increasing trend (*β=0,0151)*. OLS regression, using annual share of energy-related codes regarding acceptability as DV and year as IV, suggests that changes in attention devoted to acceptability are not associated with changes in time and are statistically insignificant (*p=0,154*).

Figure 14: Attention Devoted to Acceptability

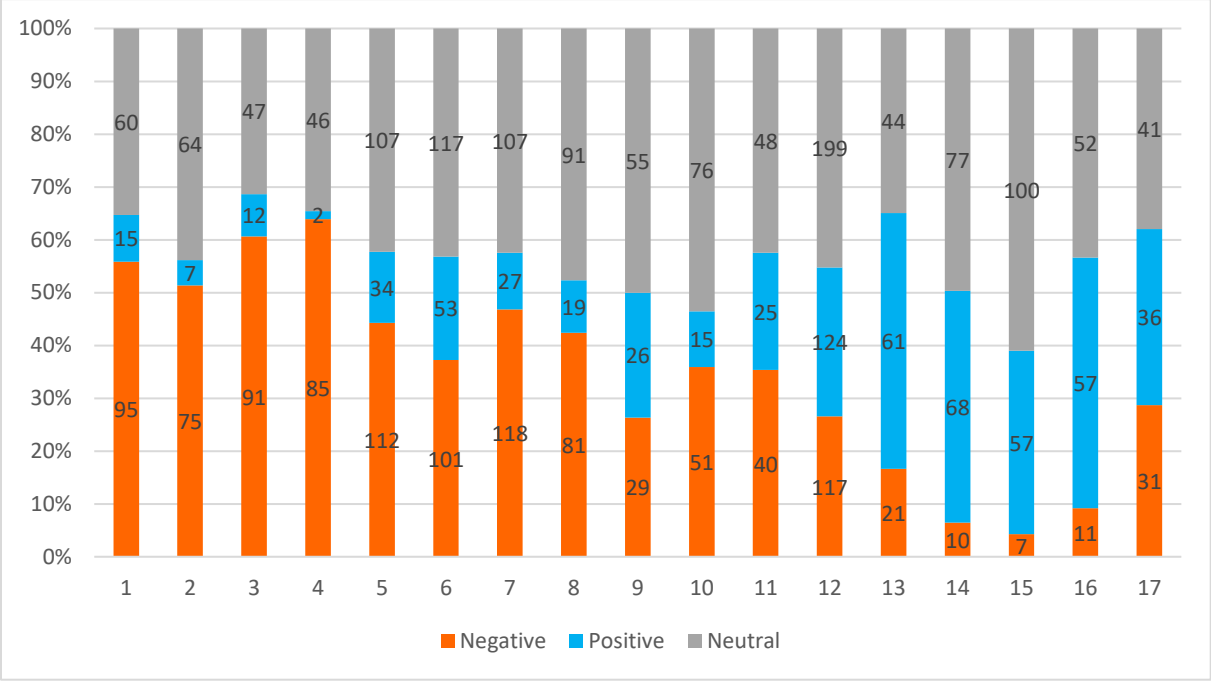


Source: author

5.3.Distribution of Images

The dataset also allows to calculate the image distribution, therefore, how much attention presidents devoted to negative, positive, and neutral image of the energy security over the 17-year period (see visualitzation in figure 15).

Figure 15: Image Distribution



Source: author

First trends which might be considered as statistically significant are distributions of negative and positive images. This means that what has been anticipated in hypothesis one and two might be regarded as valid. One can observe that during pre-shale revolution era the energy security was depicted more negatively and less positively than in post-shale revolution period. Between 2001-2008, on average more than 50 % of all energy-related statements were negative and less than 10 % were positive. On the contrary, when positive consequences of shale-revolution on domestic upstream industry, market prices and GHG emissions became apparent, only 13 % of energy security claims on average were portrayed negatively and more than 41 % were described positively. In other words, during pre-shale revolution era, negative image was overwhelmingly prevalent (5 times the size of positive image). In post-shale revolution era, the

distribution was quite the reverse, the positive image has become predominant (3 times the size of negative image). Table 11 summarizes distribution of all three images.

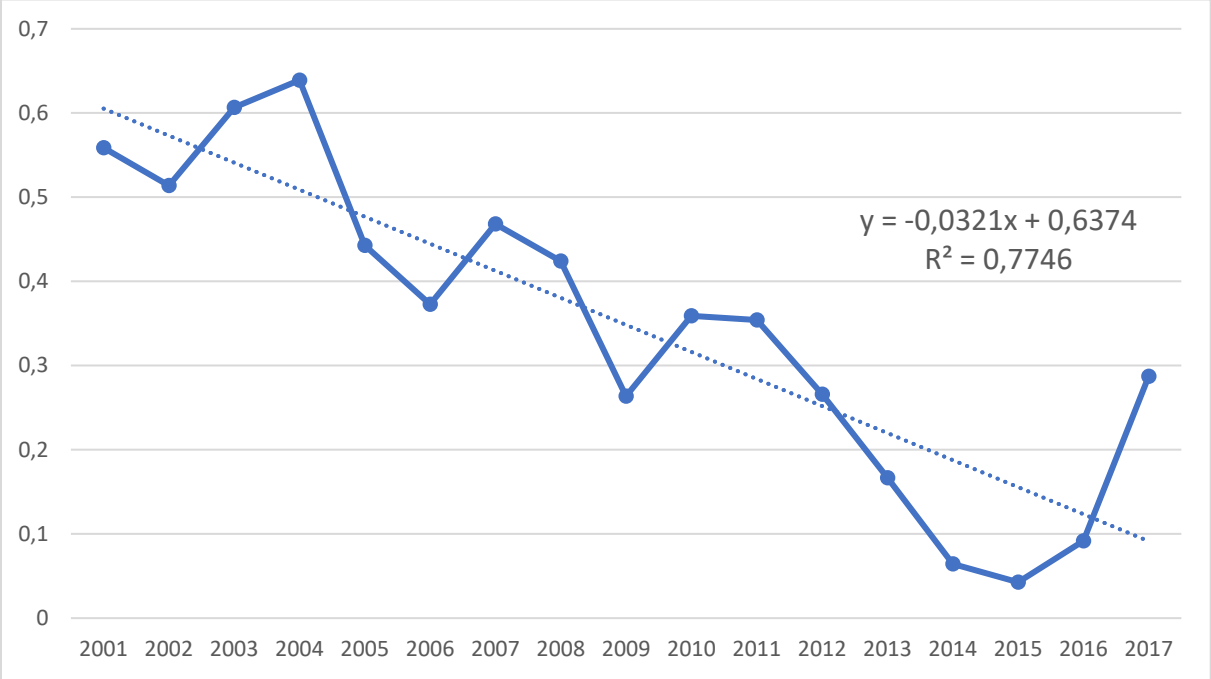
Table 11: Distribution of Images (Results)

counts (%)	**pre-shale revolution era**	**transition era**	**post-shale revolution era**	**the bottom** (2015)	**the peak** (2004)	**the trend**	**p- value**
negative	94,75 (50,3)	59,25 (31,1)	16 (13,1)	7 (4,3)	85 (63,9)	downward toward less attention	<0,001
				(2004)	(2013)		
positive	21,13 (9,6)	47,5 (21,1)	55,8(41,6)	2 (1,5)	61 (48,4)	upward toward more attention	<0,001
				(2003)	(2015)		
neutral	79,88 (40,1)	94,5 (47,8)	62,8 (45,4)	47 (31,3)	100 (61)	Tiny upward toward more attention	0,096

Source: author

Decreasing trend of negative statements (β=*-0,0321*), but without significant deviations is illustrated in figure 16. OLS regression, where annual share of energy-related codes with negative tone is DV and year as IV, confirms this strong downward trend and indicates that this pattern is statistically significant, thence that changes in IV are associated with changes in the DV (p<*0,001*).

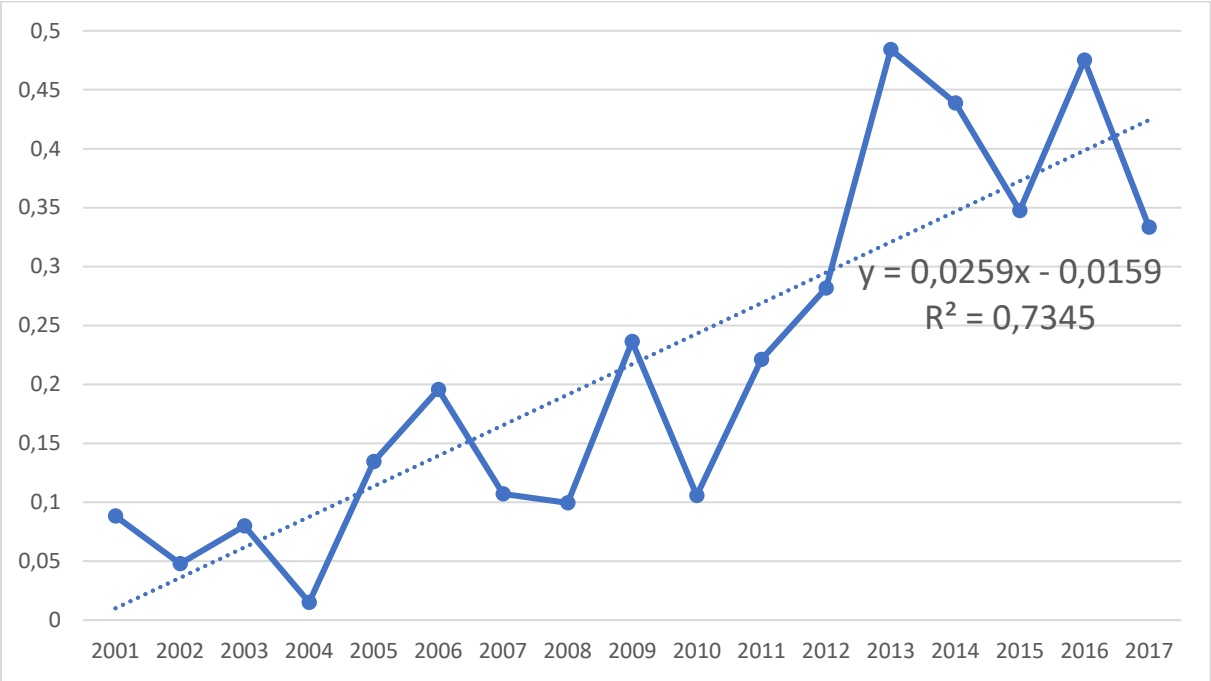
Figure 16: Distribution of Negative Images



Source: author

In contrast, the share of positive statements had grown considerably, showing that U.S. presidential perception of the energy security has been perceived more positively in post-shale revolution era than before (see figure 17). OSL regression, where annual share of energy-related codes with positive tone is DV and year as IV, not only confirms such pattern ($\beta=0,0259$), but also indicates that this trend is statistically significant, thence that changes in IV are associated with changes in the DV ($p<0,001$).

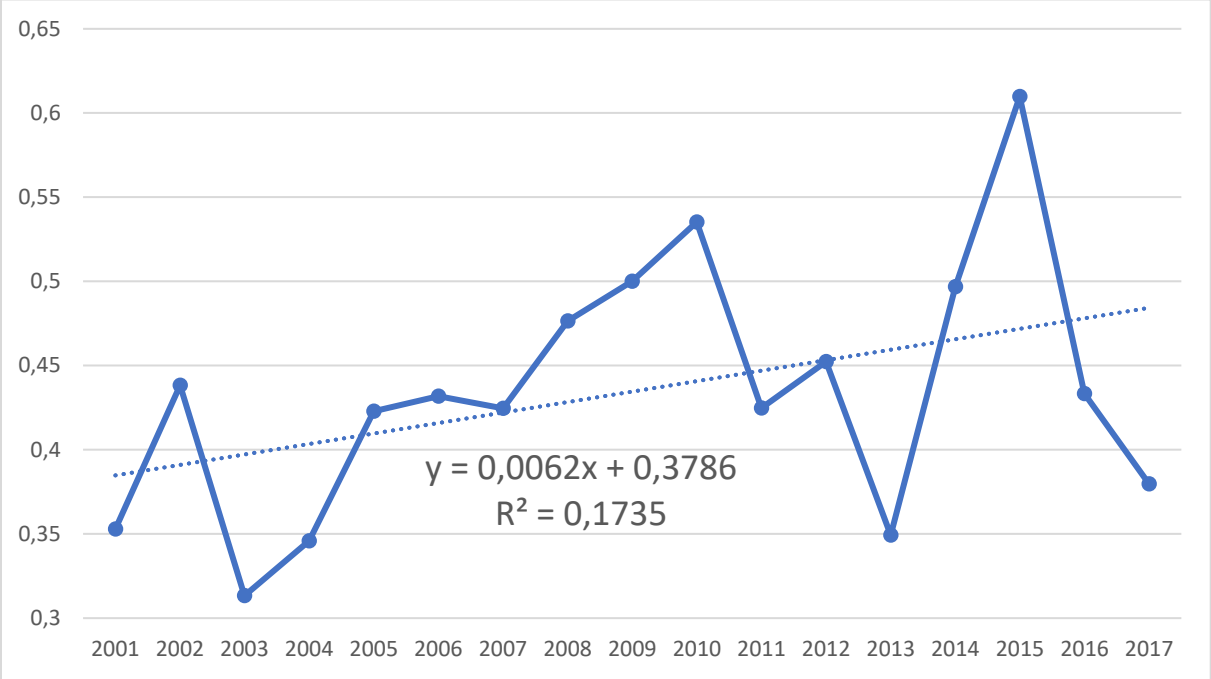
Figure 17: Distribution of Potitive Images



Source: author

Finally, codes with neutral tone as depicted in figure 18 stayed nearly flat (*β=0,0062),* slightly fluctuating around 40 %. Perhaps, it is not such a surprise that OSL regression, using annual share of energy-related codes with neutral tone as DV and year as IV, suggests that changes in distribution of neutral energy-related codes are not associated with changes in time and this relationship is therefore statistically insignificant (*p=0,096*).

Figure 18: Distribution of Netural Images



Source: author

5.4. Annual Average Image of Energy Security Indicators

After presenting the attention intensity, more nuanced analysis of U.S. presidential perception of the energy security, measured as an aggregate index (the composite index and the coefficient of imbalance) but also along four issues dimensions (conceptualized as energy security indicators) is undertaken. All three measures disclose whether there are some general trends and patterns over time and reveal the magnitude of positive or negative perception of the energy security. Indices may range from -1 as absolutely negative, to +1 as absolutely positive. Therefore, for instance the score of "-0,5" represents a much stronger negative image than score "-0,2".

The simplest form of evaluation is annual arithmetic mean of the image of each energy security indicator (computed as the ESII). As shown in table 12, perception of all four thematic dimensions of the energy security exhibit an upward trend toward the positive direction, indicating that the overall image of each energy security indicator gradually improved over the 17-year period (see list of ESII scores in Annex B).

Table 12: Energy Security Indicator Indices (Results)

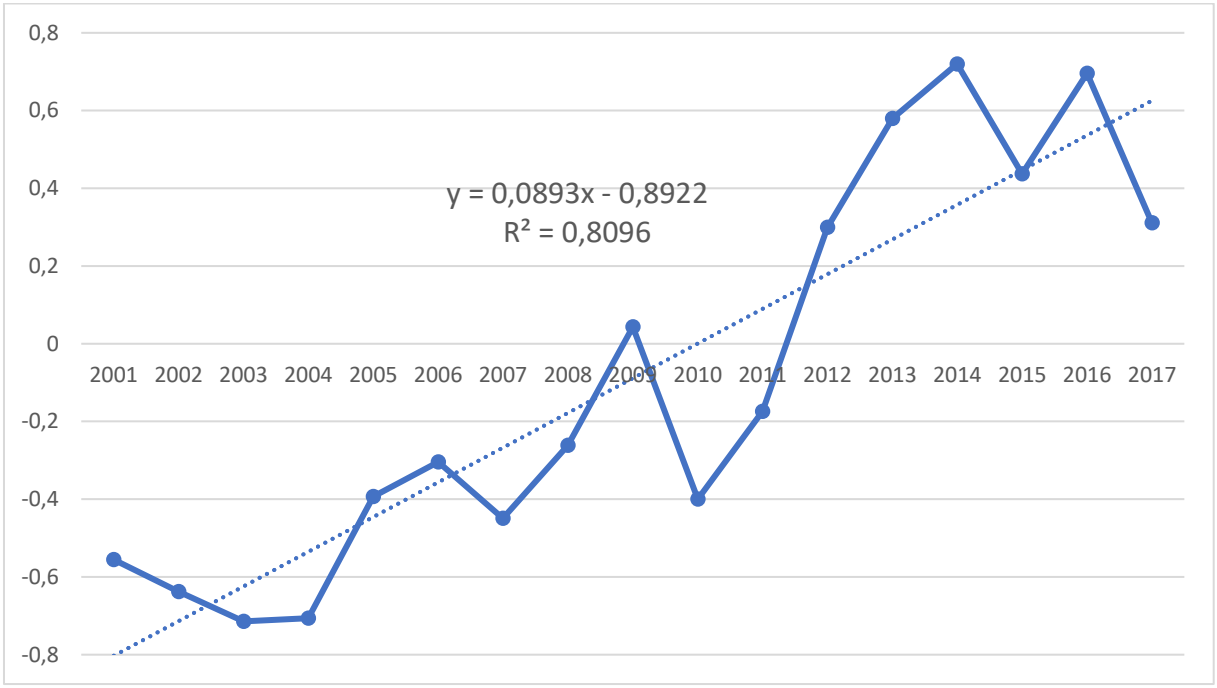
score	**pre-shale revolution era** (average)	**transition era** (average)	**post-shale revolution era** (average)	**the bottom** (2003)	**the peak** (2006)	**the trend**	**p-value**
the acceptability	-0,101	0,017	0,238	-0,375	0,333	upward toward positive direction with fluctuations	<0,001
the affordability	-0,586	-0,397	0,365	(2001) -0,857	(2016) 0,75	upward toward positive direction	<0,001
the availability	-0,503	-0,058	0,549	(2003) -0,714	(2014) 0,72	upward toward positive direction	0,004
the energy	-0,28	-0,182	0,011	(2004) -0,628	(2014) 0,16	upward toward positive direction	0,009

Source: author

The perception of availability shows the largest enhancement (see figure 19). In the pre-shale revolution era, the average score was -0,502 with the bottom of -0,71 of 2003. In the post-shale revolution period, availability was perceived positively with the average score of 0,55 with the peak of 0,72 in 2014. OSL regression, using annual average image of availability as DV and year as IV, suggests that this strong upward trend toward positive direction ($\beta=0,0893$) is statistically significant ($p<0,001$).

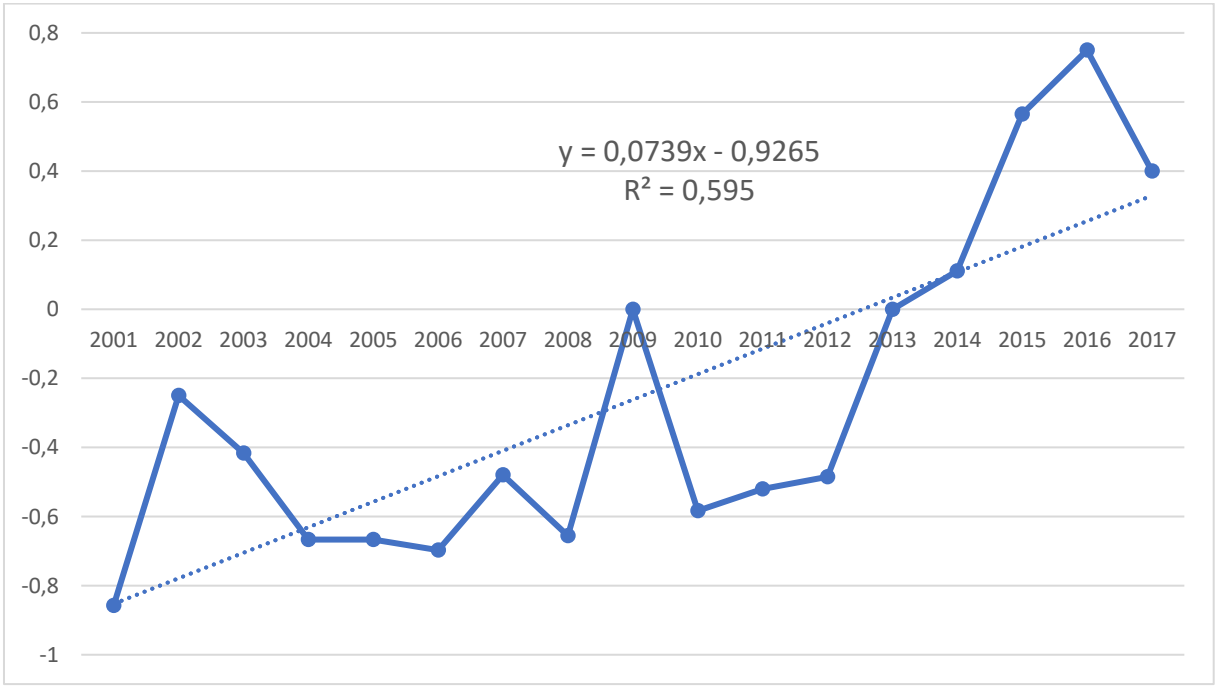
The economical aspect of energy security, the affordability of energy resources has also improved significantly (see figure 20). Its average image score during pre-shale revolution of -0,58 with the bottom score of -0,86 in 2001 began to move away from the predominantly negative perception during transition era to post-shale revolution period with an average image score of 0,37 with the peak score of 0,75 in 2016. OLS regression, where annual average image of affordability is DV and year is IV, indicates that this steady upward trend toward positive direction ($\beta=0,0739$) is statistically significant ($p<0,001$).

Figure 19: Annual Average Score - Availability



Source: author

Figure 20: Annual Average Score - Affordability

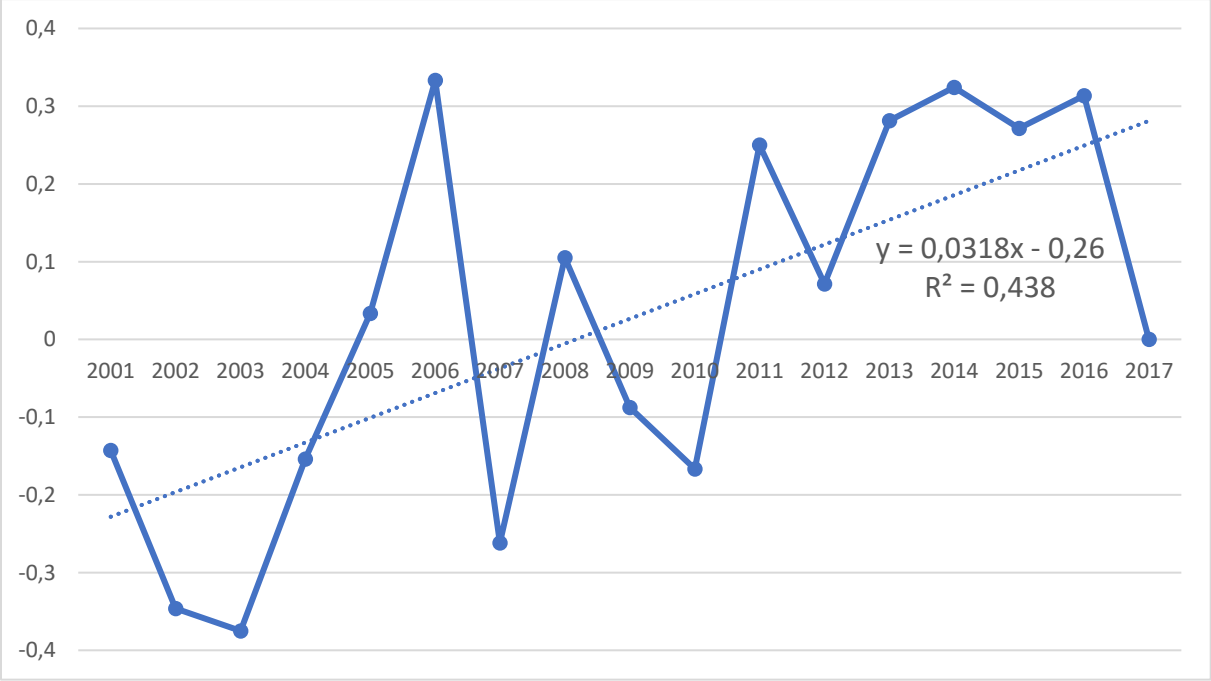


Source: author

Third energy security indicator, the acceptability of energy resources had not been perceived as negatively as previous two indicators. However, despite various fluctuations also

shows ascending pattern from mostly negative perception during the pre-shale revolution, with the average image of -0,1 and the bottom of -0,38 in 2003 to the average score of 0,24 in post-shale revolution period with the peak of 0,32 in 2014 (see figure 21). OSL regression, which uses annual average image of acceptability as DV and year as IV, indicates that this upward trend toward positive direction (*β=0,0318*) is statistically significant (*p=0,004*). This clearly manifests that positive achievements in GHG emission reduction caused by increased natural gas use in power sector (due to lower prices) prevailed over negative concerns from surging domestic energy production. Therefore, what has been anticipated by third hypothesis is wrong.

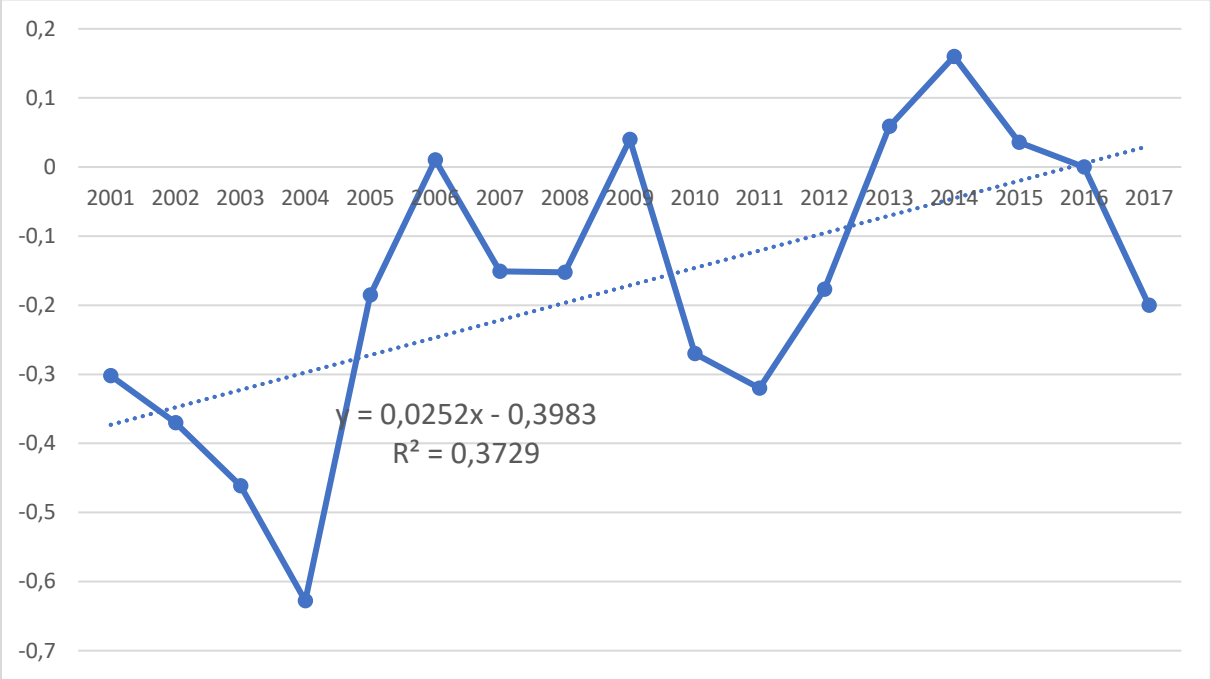
Figure 21: Annual Average Score - Acceptability



Source: author

Last but not least, the image of general or unidentifiable energy expressions assigned to the fourth energy security indicator category labeled as "energy" had also improved (see figure 22). Although to the lesser extent than previous indicators, the moderate upward trend toward the positive direction developed from pre-shale revolution era, having the average value of -0,28 with the bottom of -0,63 in 2004 to post-shale revolution era with the average image score of 0 with the peak of 0.16 in 2014. OSL regression, using annual average image of energy as DV and year as IV, proves that this dovish trend toward positive direction (*β=0,0252*) is also statistically significant (*p=0,009*).

Figure 22: Annual Average Score - Energy



Source: author

5.5.Composit Index

The composite index represents more robust tool aimed to measure the perception of energy security. In comparison with the energy security indicator index, the composite index allows us to compute overall annual image (perception) of energy security, by summarizing weighted average images of each energy security indicator. The author not only considers its value as representing the aggregate tone of the energy security expressed in all analyzed documents in respective year, but also as helpful instrument to identify general trend of how U.S. presidential perception of the energy security evolves over time. Results are summarized in table 13 and visually represented in figure 23 (see list of CI scores in Annex B).

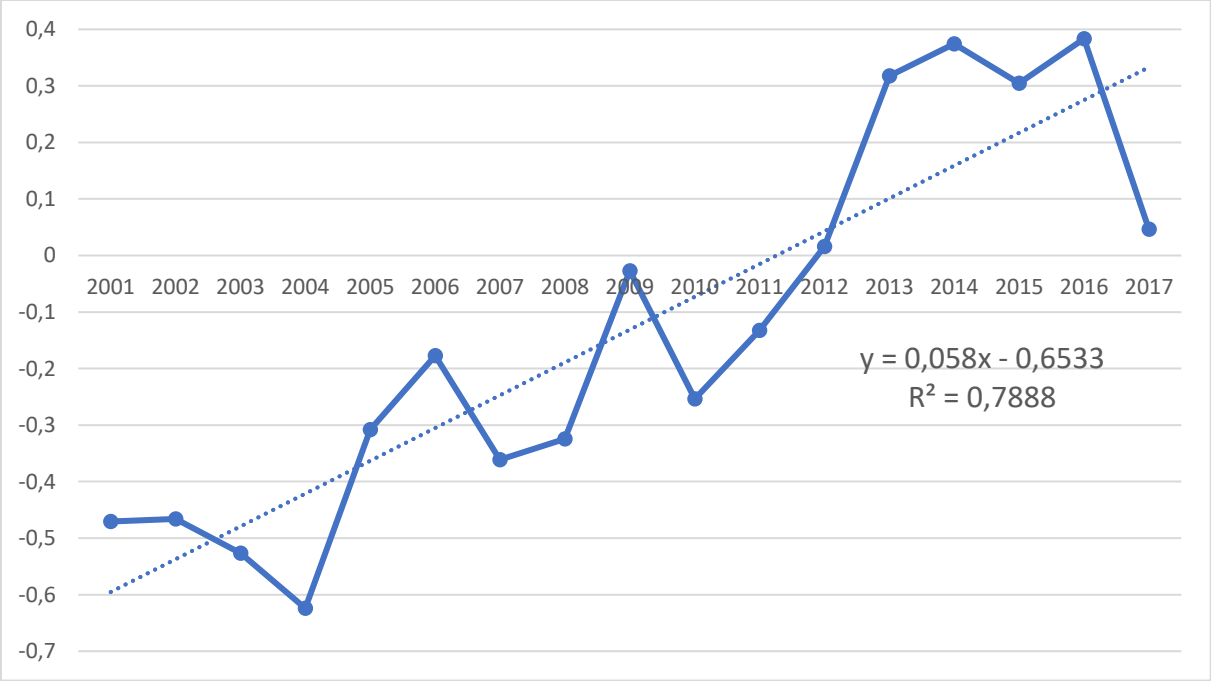
Table 13: Composite Index (Results)

score	**pre-shale revolution era** (average)	**transition era** (average)	**post-shale revolution era** (average)	**the bottom** (2004)	**the peak** (2016)	**the trend**	**p-value**
	-0,407	-0,1	0,285	-0,624	0,383	upward toward positive direction	<0,001

Source: author

Depicted curve exhibits an increasing trend toward positive direction and the dotted trend line indicates that the perception of energy security gradually improved over the 17-year period. In pre-shale revolution period, all 8 years had a negative score, averaging at -0,41 with the bottom of -0,62 in 2004. In transition period, starting from 2009, the annual score began moving closer to positive values, however with the still negative average score of -0,1. Nonetheless, in 2012, the overall perception of the energy security was for the first time positive. Since then, the energy security had been perceived positively, with the average score of 0,29 and the peak of 0,38 in 2016. Strong upward trend toward positive direction is also confirmed by OLS regression, using annual composite index score as DV and year as IV. Analysis proves that this trend ($\beta=0,058$) is statistically significant ($p<0,001$).

Figure 23: Visualization – Composite Index



Source: author

5.6. Coefficient of Imbalance

Last but not least, data of the coefficient of imbalance are examined. Even though, this measurement has originally focused on bias in reporting whether a media favors one side of a "controversy" over the other or not (Krippendorff, 2013, p. 59), the author sees it as a new and an accurate approach to assess the presidential reporting on the energy security towards its audience. Results are summarized in table 14 and visually represented in figure 24 (see list of CoI scores in Annex B).

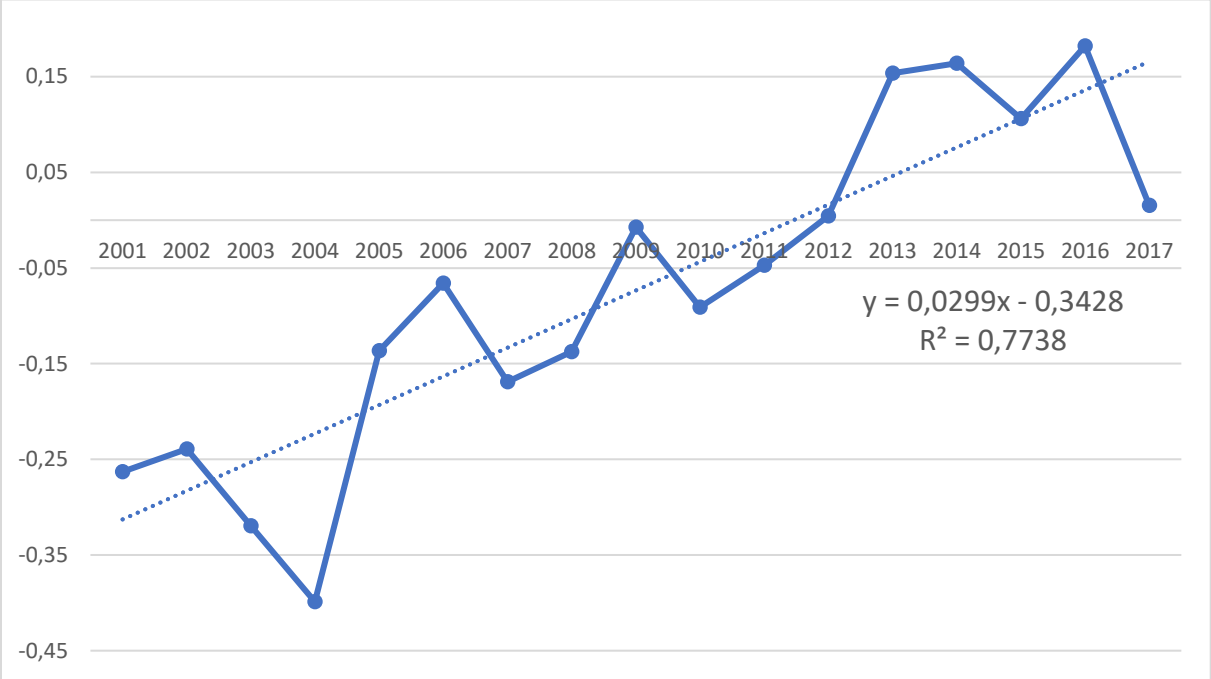
Table 14: Coefficient of Imbalance (Results)

score	**pre-shale revolution era** (average)	**transition era** (average)	**post-shale revolution era** (average)	**the bottom** (2004)	**the peak** (2016)	**the trend**	**p-value**
	-0,216	-0,035	0,124	-0,399	0,182	upward toward positive direction	<0,001

Source: author

Almost the same pattern as in the composite index is apparent. Data shows that in pre-shale revolution era the average score of the coefficient of imbalance was -0,22 with the bottom of -0,4 in 2004, in transition period the average value of -0,04 was still negative but very close to 0, and in post-shale revolution era the scores were in positive numbers with the average of 0,12 and the peak of 0,18 in 2016. OLS regression, using annual of coefficient of imbalance as DV and year as IV, indicates that this increasing trend toward positive direction ($\beta=0,0299$) is also statistically significant ($p<0,001$).

Figure 24: Visualization – The Coefficient of Imbalace



Source: author

5.7. Inference

Conducted inquiry clearly showed that U.S. presidential perception of the energy security has evolved significantly during the period from 2001-2017. First, hypothesis one and two are met. In pre-shale revolution era, half of all energy security speeches addressed were painted negatively and one tenth of them treated the energy security positively. On the contrary, in post-shale revolution period, four out of ten energy related speeches were positive, whilst only one speech out of ten was addressing energy as a problem or threat to national security. Both aggregated indices, measuring overall energy security image, as well as all four energy security indicator images, when measured separately, also validate both hypotheses. Data shows that oil and gas production growth and its spin-offs (gradual decrease in Henry Hub prices, drop in crude oil prices in 2014) have positively affected the U.S. presidential long-term perception of energy security and moved U.S. presidential rhetoric out of the security sphere, away from a state-centric national security paradigm.

However, what has been anticipated by third hypotheses has proven to be wrong. Although there is an obvious positive trend in attention devoted to acceptability of energy resources, those changes in time are statistically insignificant. In addition, expected negative trend in perception of acceptability of energy resources did not occur. Conducted analysis arrived with the

ascending pattern from mostly negative perception during the pre-shale revolution to the positive perception in the post-shale revolution era.

Finally, as also expected, various fluctuations are apparent. Unequivocally, there were other drivers (mainly incidents and changes in the White House) influencing the perception of energy security than solely consequences of the shale-revolution. The most obvious one is the steep decline towards negative perception in 2017. This drop is observable not only in overall aggregate perception, but when looking at each energy security indicator as well. There is also considerable exchange in attention intensity devoted to availability at the expense of acceptability. While the attention toward availability almost quadrupled, the attention devoted to environmental concerns almost disappeared. There is also a huge drop in attention devoted to affordability between 2008 and 2009 (7 times less) driven also by steep drop in the cost of crude oil, but on the other, accompanied by a significant increase in attention devoted to acceptability (5 times more). Since the shifts in attention devoted to affordability is clearly correlated with crude oil prices, attention toward acceptability is unambiguously B. Obama's favored agenda, whereas for D. Trump not worth to even mention it.

6. Sample Size Trustworthiness and Reliability of Coding Agreeement

To answer the research question with sufficient confidence, adequate sample size had to be determined. In order to do so, the author not only decided to exceed minimum sample size benchmark of 10 % of a population in each stratum (Liu and Yang, 2015, p. 392), but also to divide each strata sample size into a distinct sub-sample sets of 10 speeches and code them separately. The simple logic was followed, when additional sample set does not significantly change the overall pattern, the sample size may be considered as an appropriate. For purpose of sample size determination, the author compared scores of composite indices. Table 15 shows scores in each sub-sample set.

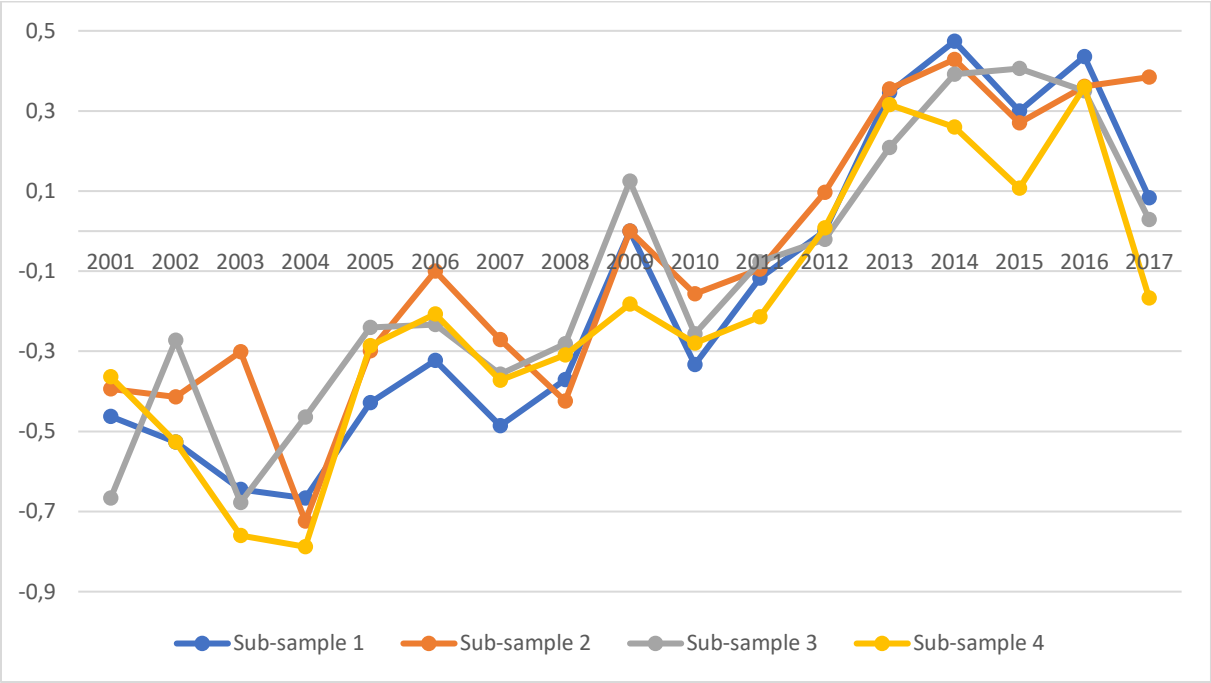
Table 15: Strata Sample Sets Composite Indices Scores

Year (stratum)	Sub-sample set 1	Sub-sample set 2	Sub-sample set 3	Sub-sample set 4
2001	-0,46	-0,39	-0,67	-0,36
2002	-0,53	-0,41	-0,27	-0,53
2003	-0,65	-0,3	-0,68	-0,76
2004	-0,67	-0,72	-0,46	-0,79
2005	-0,43	-0,3	-0,24	-0,29
2006	-0,32	-0,1	-0,23	-0,21
2007	-0,49	-0,27	-0,36	-0,37
2008	-0,37	-0,42	-0,28	-0,31
2009	0	0	0,13	-0,18
2010	-0,33	-0,16	-0,26	-0,28
2011	-0,12	-0,1	-0,08	-0,21
2012	0	0,1	-0,02	0,01
2013	0,35	0,35	0,21	0,32
2014	0,47	0,43	0,39	0,26
2015	0,3	0,27	0,41	0,11
2016	0,44	0,36	0,35	0,36
2017	0,08	0,38	0,03	-0,17

Source: author

When data are visualized (see figure 25), it is obvious that the same pattern (positive trend) with nearly the same fluctuations might be seen in each individual sub-sample set. Therefore, it is more than obvious that the sample size is sufficiently large to answer the research question with adequate confidence.

Figure 25: Sub-Sample Sets Composite Indices - Visualization



Source: author

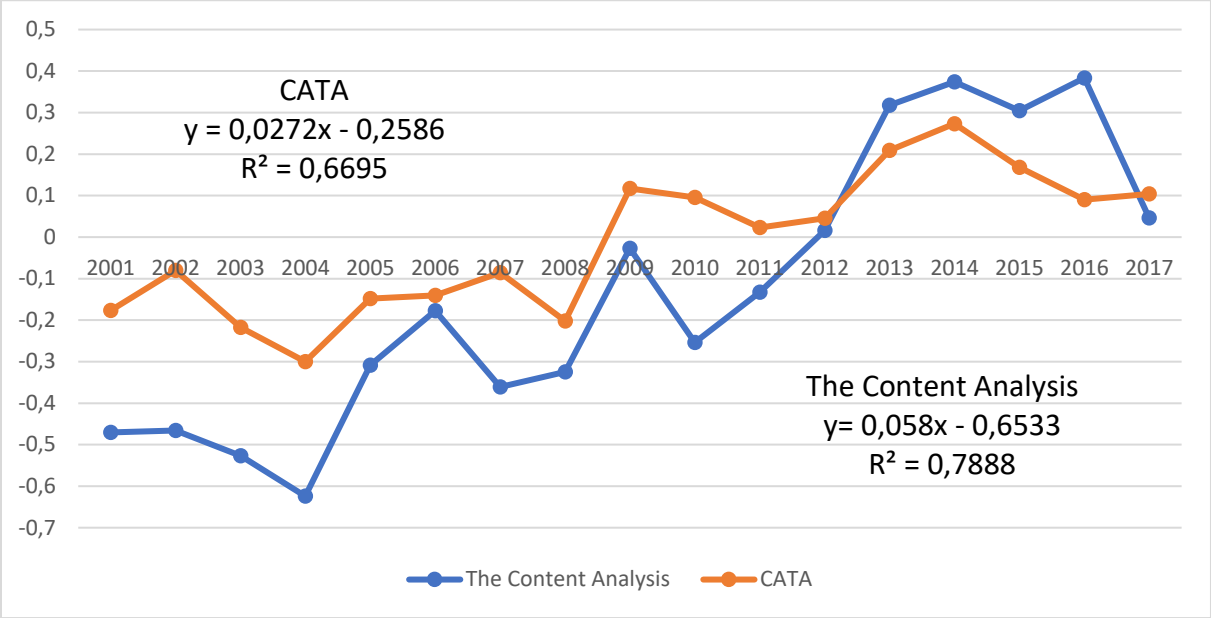
As conceptualized in previous chapter, two measures of data (inference) reliability, the coefficient of agreement, and the Krippendorff's alpha were used. The author retested 68 randomly selected presidential speeches, therefore, again meeting the standard 10 % sample benchmark (Liu and Yang, 2015, p. 392). Results of both coefficients, thence the consistence between the original and repeated coding, may be interpreted as almost perfect agreement (Landis and Koch, 1977, p. 165). The former and the simpler coefficient shows 84 % of agreement, the Krippendorff's alpha score is 0,82. Following Krippendorff's recommendation (2013, p. 325) we may rely on data above α=0,8.

7. Findings of Computer Aided Text Analysis

In this chapter, the author attempts to demonstrate the potential of CATA as a technique to operationalize hard-to-measure constructs, allowing to scholars to perform content analyses on large textual data (Belderbos et al., 2017, p. 312). First, same subset of 680 presidential speeches was analyzed using dictionary-based CATA technique as conceptualized in chapter 4.4.4. This helps to identify commonalities and differences and therefore evaluate operationalization of data by CATA method. Second, same CATA method was applied on selected sample of Congressional hearings. In this respect, it is worth mentioning that used CATA technique faces various methodological shortcomings, used content analysis software has substantial capability limitations, and its analytical tools have very narrow possibilities, basically constricted on Boolean and spatial operators and its combinations. From methodological point of view, the author had problem in determining how far to search for words/phrases (as contained in specified image-determining dictionaries) from other words/phrases (as contained in specific energy security indicator-determining dictionaries) when assessing their tone. Further research and multiple re-coding would be necessary in determining whether the location within the specified number of words (before, near or after), in the same sentence, or in the same paragraph would be the most suitable distance. Regarding analytical tools, another considerable bottleneck is that ATLAS.ti software cannot exclude words or phrases in italic, ushering and separating new issue agenda in transcripts or indicating question being asked in interviews.

However, despite all these weaknesses, the outcomes of dictionary-based CATA, comparing the composite indices with that of the original content analysis as defining measure, might be considered as satisfactory. Although the CATA analyzed 4326 coding units, thus, 1286 more than the content analysis performed by the author, the overall perception of the energy security measured as an aggregate composite index shows the same pattern, the increasing trend toward positive direction, even with the same peaks and troughs and nearly the same fluctuations. These very similar year-on-year trend flows (except 2016) are depicted in figure 26.

Figure 26: Composite Index – Content Analysis and CATA comparism



Source: author

As you see in Annex C, CATA composite indices' scores are significantly lower. The author ascribes this phenomenon to above mentioned drawbacks, due to which ATLAS.ti software detected more coding units with neutral images. Higher share of neutral coding units waters down the aggregate score, brings it nearer to zero, and makes overall trend slope less steep. Although the trend toward positive direction captured by CATA is not as steep as the original one, according to OLS regression, using annual composite index score as DV and year as IV, this trend ($\beta=0,0272$) is statistically significant ($p<0,001$).

Subsequently, the author attempts to carry out discretionary insight into the perception of energy security by legislative branch. In order to do so, the author decided to opt for Congressional hearings, serving as a formal meeting of (sub)committees to gather information, as a record of congressional discussion and debate, thus, reflecting policymakers' opinions and interests (Congress.gov, 2019a; Below, 2013, p. 864). Congressional hearing data were collected using the U.S. Government Printing Office's Federal Digital System (Govinfo.gov, 2019) and were filtered in a same manner as presidential speeches were. However, when attempting to proceed with CATA, the last of the three above mentioned drawbacks, serious software capability limitation, was encountered. Hence, due to the large magnitude of Congressional hearings' transcripts, the sample set had to be shrunk to 17 Congressional hearings only. Thence each stratum is represented by one, the most relevant[13] Congressional

[13] The one with the largest number of energy related key words.

hearing in that particular year, no matter whether held before the Senate or the House of Representative committee (see list of Congressional hearings in table 17).

Table 16: List of Evaluated Congressional Hearings

Year (stratum)	Committee	Chamber	Majority	Nr. of coding units
2001	on Resources	House of Representative	REP	460
2002	on Government Reform	House of Representative	REP	379
2003	on Foreign Relations	Senate	REP	1213
2004	on Science	House of Representative	REP	1484
2005	on Foreign Relations	Senate	REP	501
2006	on Foreign Relations	Senate	REP	641
2007	on Appropriations	Senate	NO	629
2008	on Energy Independence and Global Warming	House of Representative	DEM	331
2009	on Natural Resources	House of Representative	DEM	1008
2010	on Energy and Commerce	House of Representative	DEM	230
2011	on Natural Resources	House of Representative	REP	1033
2012	on Energy and Commerce	House of Representative	REP	362
2013	on Energy and Commerce	House of Representative	REP	428
2014	on Finance	Senate	DEM	255
2015	on Energy and Natural Resources	Senate	REP	423
2016	on Foreign Affairs	House of Representative	REP	344
2017	on Energy and Natural Resources	Senate	REP	290

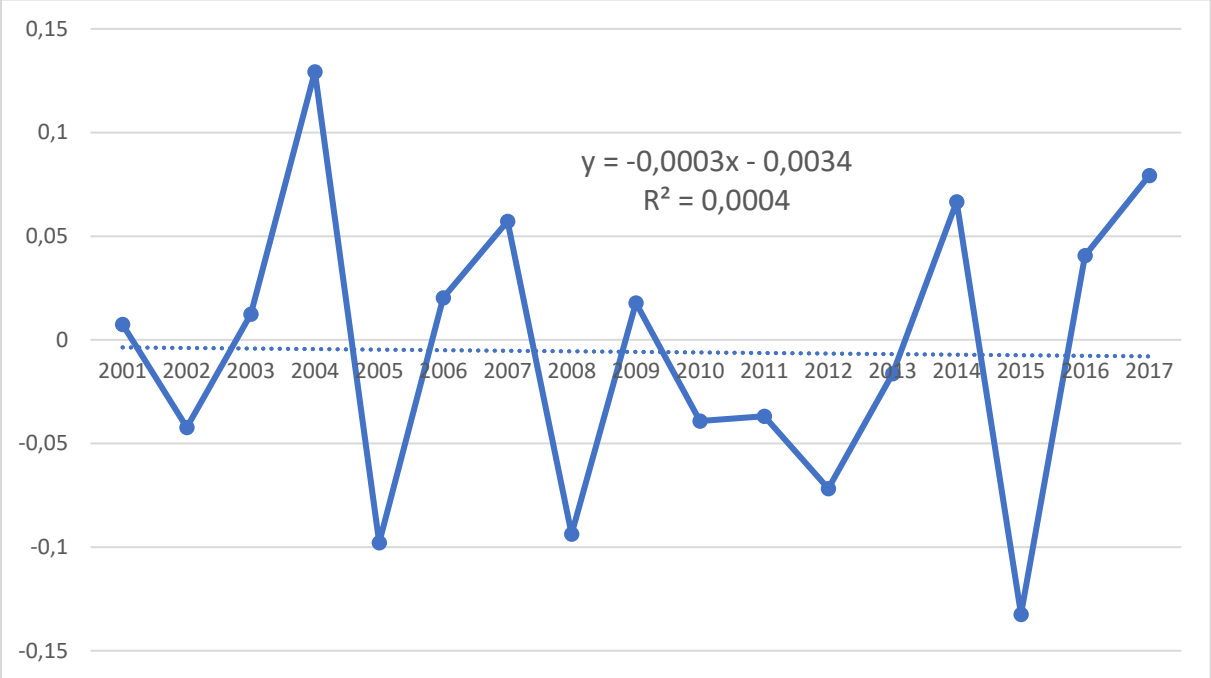
Source: author

Although 17 out of 10433 Congressional hearings regarding energy held between January 3, 2001 and January 3, 2018 is not a representative sample, thus definitely not reflecting characteristic of a population, the author had not been able to proceed larger sample set due to very limited capability of ATLAS.ti software. Therefore, the purpose of this attempt had to be rethought and narrowed to the very introduction of CATA technique in the field of energy security. Results of CATA of Congressional hearings as scores of composite indices are

summarized and aligned with outcomes of the content analysis and CATA of presidential speeches in annex C.

When visualized (see figure 27), you can clearly see that there is no pattern at all (dotted line), OLS regression outputs show that there is no variation between the composite index as DV and time as IV (*p=0,93; R² = 0,0004*). However, since the software incapacity to process sufficient and thus representative sample set, the author does not even try to infer from retrieved outcomes and leaves it open for further research and more importantly for more advance and capable quantitative application. Therefore, as already mentioned, the raison d'être of this attempt is to usher CATA method as a quantitative analytical technique into the field of the energy security and its perception.

Figure 27: Visulization – The Composite Index – CATA of Congressional Hearings



Source: author

9. Conclusion

In this master's thesis, the author set out to examine how U.S. government perceives its domestic energy security in the context of the shale revolution and the narrowing supply gap. The author conceptualized both the energy security and the perception, both as a multifaceted construct with various integral and measurable components; identified a proxy source, the American Presidency Project database, to pile up relevant data; and employed the content analysis method to carry out quantitative analysis of U.S. governmental perception of the energy security over a 17-year period from 2001 to 2017. The author also usher dictionary-based CATA method (utilizing yielded findings) as a useful technique designated to quantify and measure the energy security perception and allowing scholars to process large amounts of textual data otherwise hard to survey.

Acquired data reveal that U.S. governmental perception of the energy security is a complex phenomenon, however, the author draws the following conclusions. First, comparing the relative share and trend between positive and negative image, the author finds that the energy security being portrayed negatively dominated in pre-shale revolution era, but its distribution declined steadily over the whole period. Quite the reverse: positive image accounting for marginal share in pre-shale revolution era rose over the same period and has become the prevailing and dominant image of the energy security in post-shale revolution era. This shifting feeling goes along with changing realities of domestic energy security, reflecting the shale revolution major macro effects: diminishing scarcity of energy resources, reducing energy prices for customers as a clear economic, and reducing carbon emission caused by the use of shale gas products as a clear environmental benefit. Having said that, remaining outputs of attention intensity devoted to individual energy security indicators are not as informative (in a statistical way) as distribution of images. Although with obvious patterns, strong and frequent fluctuations made those trends to be statistically insignificant and therefore nothing could be inferred from them. However, they still could serve as salience coefficient when calculating aggregate image scores.

Second, aggregate indices reflecting overall perception of the energy security clearly demonstrate that U.S. government represented by presidents was aware of wide-ranging and mostly positive impact of shale revolution at the local, national but also international level. Hence during the post-shale revolution era, the energy security paradigm, regarding the security of supply as threat and making it an integral part of national security narrative has become obsolete. Regarding the composite index and the coefficient of imbalance, the author finds a

steep upward trajectory toward the positive territory showing that the U.S. presidential perception of energy security has been positively affected by this phenomenon and has moved after 4 decades out of the state-centric security realm to regular political agenda.

Finally, when breaking down the overall image into individual categories to examine their perception trajectories, we might observe the same pattern. Quite surprisingly, even the acceptability as a category related to environmental issues went through positive trend to being perceived more favorably in post-shale revolution era than before. This is the most startling ascertainment. In fact, G. W. Bush who devoted the most of his attention to the (un)availability of energy resources, when speaking about the acceptability of energy resources, his rhetoric very often encompassed concerns for fossil fuels' negative impact on environment. Conversely, his successor B. Obama, known for his environmental record, portrayed the acceptability of energy resources for the most of his tenure more positively than has been anticipated. Since 2011, when time blew over of the BP havoc, environmental concerns related to growing shale upstream industry such as water occupation, water and air contamination, methane leakage or solid waste pollution (Yang et al., 2017, p. 1469) have been outperformed by positive contribution of shale gas on GHG emissions' reduction within presidential discourse. Therefore, we may conclude that language used by U.S. high level policymakers has followed "tectonic shift in the geopolitics of energy" (Nye, 2014) caused by shale revolution, and that the verbal narrative regarding the energy security has been turned upside down.

These finding might also yield some implications for securitization theory. After the 1970s oil crises, oil has taken on strategic importance for the U.S. and the energy security turned to be an integral part of national security with the access to oil as an explicit foreign policy objective (Dolata, 2017, p. 92). Ever since, the security of supply has been politicized and sometimes even successfully securitised, with some real policy implications such as (inter alia) 1975 Energy Policy and Conservation Act, a.k.a. crude oil export ban or 2005 H. Res 344[14] calling for a presidential review of Chinese state-owned energy company exercising control of critical U.S. energy infrastructure and production capacity. The content analysis shows that since 2011, the energy security has been desecuritised and after more than 4 decades has returned energy issues to the realm of normal politics, where cooperation is possible. Besides the shift in presidential rhetoric, there are already political implications. The most significant case in point is the end of the long-lasting crude oil export ban in 2015, which is not only

[14] See more about the bill in Congress.gov (2019b).

important policy shift but also huge turnaround in American people's mindsets that free trade in oil does not equate to high gasoline prices (Dolata, 2017, p. 93).

While this thesis attempts to primarily settle research question in understanding U.S. presidential perception of energy security, it certainly attempts to provide methodological guidelines for utilizing the content analysis to gain a more holistic understanding of the energy security. This thesis also demonstrated potential value of CATA in research and adds to the scarce literature concerning the subject matter. This thesis should unequivocally lead to more questions and the author hopes that triggers more empirical but also methodological research on how to measure the perception of the energy security, especially in large datasets.

The shale revolution is a big geopolitical game-changer, for the U.S. it is a clear trump card, for the others it is a challenge, unequivocally worth to investigating. Nonetheless, there are even bigger challenges in the realm of energy ahead. The world stays on the brink of big decision, whether to follow commitments of the 2015 Paris Agreement (in force in 2020) to limit the increase in the global average temperature to well below 2 °C above pre-industrial levels. To achieve this, GHG emissions will need to be reduced substantially, this means almost full decarbonization of energy supply in all sectors by 2050. This will be costly and require fundamental change in the concept of the energy security. Public acceptance will be crucial for such transition and the perception of the energy security merits continued investigation, not only for academic but also for very ambitious policy reasons.

References

ATLAS.ti. (2019). *ATLAS.ti 8 Windows User Manual*. [pdf] ATLAS.ti Scientific Software Development, p. 224. Available at: http://downloads.atlasti.com/docs/manual/atlasti_v8_manual_en.pdf [Accessed 19 Apr. 2019].

Austin, S. (2017). Shale producers won OPEC's oil price war. *Oil-price.net* [online] Available at: http://www.oil-price.net/en/articles/shale-producers-opec-oil-price-war.php [Accessed 15 Apr. 2019].

Baldwin, A. (1980). Interdependence and power: a conceptual analysis. *International Organization*, 34(4), pp. 471-506.

Balzacq, T., Léonard, S., and Ruzicka, J. (2016). "Securitization" revisited: theory and cases. International Relations, 30(4), pp. 494–531. doi:10.1177/0047117815596590.

Belderbos, R., Grabowska, M., Leten, B., Kelchtermans, S. and Ugur, N. (2017). On the Use of Computer-Aided Text Analysis in International Business Research. *Global Strategy Journal*, 7(3), pp. 312–31. doi:10.1002/gsj.1162.

Below, A. (2013). Obstacles in energy security: An analysis of congressional and presidential framing in the United States. *Energy Policy*, 62, pp. 860-868. doi:10.1016/j.enpol.2013.07.013.

Bhat, A. (2019). Systematic sampling: definition, examples and types. *Questionpro*, [online] Available at: https://www.questionpro.com/blog/systematic-sampling/ [Accessed 16 Apr. 2019].

Bilgili, F., Emrah, K., Ümit B. and Nedim S. (2016). How Did the US Economy React to Shale Gas Production Revolution? An Advanced Time Series Approach. *Energy,* 116(1), pp. 963–77. doi:10.1016/j.energy.2016.10.056.

Binder, M. and Heupel, M. (2015). The Legitimacy of the UN Security Council: Evidence from Recent General Assembly Debates. *International Studies Quarterly*, 59(2), pp. 238-250. doi: 10.1111/isqu.12134.

Blackwill, R. D. and O'Sullivan, M. L. (2014). America's Energy Edge: The Geopolitical Consequences of the Shale Revolution. *Foreign Affairs*, 93(2), pp. 102-114.

Blanchard, C. (2009). *Saudi Arabia: Background and U.S. Relations* [pdf] Congressional Research Service, p. 47. Available at: https://www.everycrsreport.com/files/20091116_RL33533_e63bc64602188b00f4eb8bd7b6108158240e3274.pdf [Accesed 10 Mar. 2018].

Brown, G. and Sovacool, B. (2017). The presidential politics of climate discourse: Energy frames, policy, and political tactics from the 2016 Primaries in the United States. *Energy Policy,* 111, pp. 127-136. doi: 10.1016/j.enpol.2017.09.019.

Bush, G. (2002). Remarks at a Fundraiser for Senatorial Candidate Greg Ganske in Cedar Rapids. *The American Presidency Project* [online] Available at: https://www.presidency.ucsb.edu/documents/remarks-fundraiser-for-senatorial-candidate-greg-ganske-cedar-rapids [Accessed 15 Apr. 2019].

Bush, G. (2006). State of the Union Address by the President. *The White House* [online] Available at: https://georgewbush-whitehouse.archives.gov/stateoftheunion/2006/ [Accesed 12 Jan. 2018].

Buzan, B., Weaver, O. and Wilde, J. (1998). *Security: a new framework for analysis*. London: Lynne Reinner Publishers, Inc.

Cambridge Dictionary. (2018). *Meaning of perception in the English Dictionary*. [online] Available at: https://dictionary.cambridge.org/dictionary/english/perception [Accessed 11 Aug. 2018].

Congress.gov. (2019a). *Glossary.* [online] Available at: https://www.congress.gov/help/legislative-glossary#glossary_hearing [Accessed 19 Apr. 2019].

Congress.gov. (2019b). H.Res.344. [online] Available at: https://www.congress.gov/bill/109th-congress/house-resolution/344 [Accessed 28 Apr. 2019].

Crow, P. (1996). Rising tide of U.S. oil imports sparks debate on energy security." *Oil and Gas Journal,* [online] 94(25). Available at: https://www.ogj.com/articles/print/volume-94/issue-25/in-this-issue/general-interest/rising-tide-of-us-oil-imports-sparks-debate-on-energy-security.html [Accessed 20 Nov. 2018].

Dahl, C. (2002). Review of *A policy of discontent: The making of a National Energy Strategy,* by Vito A. Stagliano. *Energy Journal*, 23(4), pp. 109-112.

Dayal, M. and Devleena, M. (2017). *Shale Gas: Exploration and Environmental and Economic Impacts*. Amsterdam: Elsevier.

Deese, D. (1979). Energy: Economics, Politics, and Security. *International Security*, 4(3), pp. 140-153. doi:10.2307/2626698.

Denovo, J. (1981). Review of *Oil, War, and American Security: The Search for a National Policy on Foreign Oil, 1941-1947* by Micheal B. Stoff. *The American Historical Review*, 86(2), pp. 477-478. doi:10.2307/1857608.

Dolata, P. (2017). The End of the Energy Security Paradigm under Obama – Trump and Energy Security: Revival of an Old Concept? *Journal of Military and Strategic Studies*, 17(3), pp. 92-106.

Dunham, I. and Schlosser, K. (2016). Energy security discourses and environmental protection measures in U.S. federal energy legislation: An introductory exploration. *Extractive Industries and Society,* 3(1), pp. 86-94. doi: 10.1016/j.exis.2015.11.015.

EIA. (2018a). *Oil and Natural Gas Proved Reserves, Year-end 2016.* [online] Available at: https://www.eia.gov/naturalgas/crudeoilreserves/ [Accessed 10 Sep. 2018].

EIA. (2018b). *U.S. Energy Facts Explained.* [online] Available at: https://www.eia.gov/energyexplained/?page=us_energy_home [Accessed 10 Sep. 2018].

EIA. (2018c). *The United State is now the largest global crude oil producer*. [online] Available at: https://www.eia.gov/todayinenergy/detail.php?id=37053 [Accessed 12 Sep. 2018].

EIA. (2018d). *Where Our Natural Gas Comes From.* [online] Available at: https://www.eia.gov/energyexplained/index.php?page=natural_gas_where [Accessed 3 Dec. 2018].

EIA. (2018e). *By some measures, U.S. natural gas production set a record in 2017.* [online] Available at: https://www.eia.gov/todayinenergy/detail.php?id=35712 [Accessed 3 Dec. 2018].

EIA. (2018f). *U.S. Energy Facts Explained.* [online] Available at: https://www.eia.gov/energyexplained/?page=us_energy_home [Accessed 3 Dec. 2018].

EIA. (2018g). *The United States is now the largest global crude oil producer*. [online] Available at: https://www.eia.gov/todayinenergy/detail.php?id=37053 [Accessed 12 Sep. 2018].

EIA. (2018h). *U.S. Crude Oil and Natural Gas Proved Reserves, Year-end 2017.* [online] Available at: https://www.eia.gov/naturalgas/crudeoilreserves/ [Accessed 29 Nov. 2018].

EIA. (2018i). *U.S. energy-related CO2 emissions fell slightly in 2017.* [online] Available at: https://www.eia.gov/todayinenergy/detail.php?id=36953 [Accessed 5 Sep. 2018].

EIA. (2019a). *U.S. Dry Natural Gas production.* [online] Available at: https://www.eia.gov/dnav/ng/hist/n9070us2A.htm [Accessed 16 Apr. 2019].

EIA. (2019b). *Henry Hub Natural Gas Spot Price.* [online] Available at: https://www.eia.gov/dnav/ng/hist/rngwhhdA.htm [Accessed 16 Apr. 2019].

EIA. (2019c). *Crude oil Production.* [online] Available at: https://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_a.htm [Accessed 16 Apr. 2019].

EIA. (2019d). *U.S. Net Imports of Crude Oil and Petroleum Products.* [online] Available at: https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mttntus2&f=a [Accessed 16 Apr. 2019].

EIA. (2019e). *Production of Crude Oil, NGPL, and Other Liquids.* [online] Available at: https://www.eia.gov/beta/international/data/browser/#/?pa=0000000000000000000000000000000008&c=00000000000000000000000000000000000000500000002&ct=0&tl_id=5-A&vs=INTL.55-1-RUS-TBPD.A~~INTL.55-1-USA-TBPD.A~~INTL.55-1-SAU-TBPD.A&cy=2016&vo=0&v=T&start=2001&end=2017 [Accessed 16 Apr. 2019].

EIA. (2019f). *Weekly Europe Brent Spot Price FOB*. [online] Available at: https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=rbrte&f=w [Accessed 16 Apr. 2019].

EIA. (2019g). *Gasoline and Diesel Fuel Update.* [online] Available at: https://www.eia.gov/petroleum/gasdiesel/ [Accessed 16 Apr. 2019].

EIA. (2019h). *Crude Oil Proved Reserves.* [online] Available at: https://www.eia.gov/beta/international/data/browser/#/?pa=0000000000000000000008&c=ruvvvvvfvtvnvv1urvvvvfvvvvvvfvvvou20evvvvvvvvvvnvvuvo&ct=0&tl_id=5-A&vs=INTL.57-6-VEN-BB.A~~INTL.57-6-USA-BB.A~~INTL.57-6-SAU-BB.A&cy=2018&vo=0&v=T [Accessed 16 Apr. 2019].

EIA. (2019i). *How much carbon dioxide is produced when different fuels are burned?* [online] Available at: https://www.eia.gov/tools/faqs/faq.php?id=73&t=11 [Accessed 16 Apr. 2019].

EIA. (2019j). *Carbon Dioxide Emissions From Energy Consumption by Source.* [online] Available at: https://www.eia.gov/totalenergy/data/browser/?tbl=T12.01#/?f=A&start=1973&end=2018&charted=13-14 [Accessed 16 Apr. 2019].

EIA. (2019k). *EIA adds new play production data to shale gas and tight oil reports.* [online] Available at: https://www.eia.gov/todayinenergy/detail.php?id=38372 [Accessed 15 Feb. 2019].

EIA. (2019l). *U.S. Field Production of Crude oil.* [online] Available at: https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPUS1&f=A [Accessed 19 Apr. 2019].

EIA. (2019m). *Natural gas plant liquids.* [online] Available at: https://www.eia.gov/tools/glossary/index.php?id=Natural%20gas%20plant%20liquids [Accessed 19 Apr. 2019].

EIA. (2019n). *U.S. energy-related CO2 emissions expected to rise slightly in 2018, remain flat in 2019.* [online] Available at: https://www.eia.gov/todayinenergy/detail.php?id=34872 [Accessed 15 Apr. 2019].

Elo, S. and Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing,* 62(1), pp. 107-115. doi: 10.1111/j.1365-2648.2007.04569.x.

Energy.gov. (2017). *Valuation of energy Security for the United States*. [online] Available at: https://www.energy.gov/policy/articles/valuation-energy-security-united-states [Accessed on 18 Nov. 2018].

European Commission. (2019). *2050 long-term strategy.* [online] Available at: https://ec.europa.eu/clima/policies/strategies/2050_en [Accessed 16 Apr. 2019].

Georgiou, G. (1993). US energy security and policy options for the 1990s. *Energy Policy,* 21(8), pp. 831-839. doi:10.1016/0301-4215(93)90168-F.

Govinfo.gov. (2019). *About govinfo*. [online] Available at: https://www.govinfo.gov/about [Accessed 10 Mar. 2019].

Gullion, S. (2015). *Fracking the Neighborhood: Reluctant Activists and Natural Gas Drilling*. Cambridge, MA: MIT Press.

Hamilton, J. (2015). U.S. Tight Oil Production Decline. *Resilience* [online] Available at: https://www.resilience.org/stories/2015-09-01/u-s-tight-oil-production-decline/ [Accessed 11 Apr. 2019].

Hippel, D., Suzuki, T., Williams, J., Savage, T. and Hayes, P. (2011). Energy security and sustainability in Northeast Asia. *Energy Policy,* 39(11), pp. 6719-6730. doi: 10.1016/j.enpol.2009.07.001.

Hongxun, L. and Jianglong, L. (2018). The US Shale Gas Revolution and Its Externality on Crude Oil Prices: A Counterfactual Analysis. *Sustainability,* 10(3), pp. 1-17. doi: 10.3390/su10030697.

Hughes, L. (2012). A generic framework for the description and analysis of energy security in an energy system. *Energy Policy,* 42, pp. 221-231. doi: 10.1016/j.enpol.2011.11.079.

Hutcheson, D. (2011). Ordinary Least-Squares Regression. In: L. Moutinho and G. Hutcheson, ed., *The SAGE Dictionary of Quantitative Management Research*, SAGE Publications Ltd., pp. 224-228. [online] Available at: https://datajobs.com/data-science-repo/OLS-Regression-[GD-Hutcheson].pdf [Accessed 10 Apr. 2019].

Chalker, J. (2005). Review of *Energy Security, Managing Risk in a Dynamic Legal and Regulatory Environment* by Barry Barton, *Energy Journal*, 26(3), pp. 117-119.

IEA. (2007). *Energy Security and Climate Policy: Assessing Interactions.* [pdf] International Energy Agency, p. 145. Available at: https://www.iea.org/publications/freepublications/publication/energy_security_climate_policy.pdf [Accessed 16 Apr. 2019].

IEA. (2017a). *World energy Outlook 2017*. [online] Available at: https://www.iea.org/weo2017/ [Accessed 21 Nov. 2018].

IEA. (2017b). *Gas 2017.* [pdf] IEA Publications, p. 5. Available at: https://www.iea.org/Textbase/npsum/gas2017MRSsum.pdf [Accessed 19 Nov. 2018].

IEA. (2018a). *World Energy Outlook 2018*. France: IEA Publications, p. 643.

IEA. (2018b). *Energy security*. [online] Available at: https://www.iea.org/topics/energysecurity/ [Accessed 24 Mar. 2018].

Karlas, J. and Parízek, M. (2016). Aktivita členských států WTO v Mechanismu přezkoumávání obchodní politiky. *Mezinarodni Vztahy,* 51(2), pp. 30-49.

Kaya, S. (2017). Review of *The Domino Effect: How the Shale Revolution Is Transforming Energy Markets, Industries and Economies* by Braziel E. Russell. *Insight Turkey*, 19(4), p. 187.

Kim, Y. and Blank, S. (2015). US Shale Revolution and Russia: Shifting Geopolitics of Energy in Europe and Asia. *Asia Europe Journal*, 13, pp. 95-112. doi:10.1007/s10308-014-0400-z.

Kobek, P., Luisa, M., Ugarte, A. and Aguilar, C. (2015). Shale Gas in the United States: Transforming Energy Security in the Twenty-first Century * / Gas de lutita en Estados Unidos: la transformación de la seguridad-energética en el siglo XXI. *Norteamérica*, 10(1), pp. 7-38.

Krane, J. and Medlock, K. (2018). Geopolitical dimensions of US oil security. *Energy Policy,* 114, pp. 558-565.

Krippendorff, K. (2011). *Computing Krippendorffs alpha reliability.* [online] Available at: https://repository.upenn.edu/cgi/viewcontent.cgi?article=1043&context=asc_papers [Accessed 21 Nov. 2018].

Krippendorff, K. (2013). *Content analysis: an introduction to its methodology*. 3rd ed. Los Angeles: SAGE.

Kroll, J. (1993). The Complexity of Interdependence. *International Studies Quarterly,* 37(3), pp. 321-347. doi: 10.2307/2600811.

Lack, S. (2018). America's Path To Energy Independence: The Shale Revolution. *Forbes*, [online] Available at: https://www.forbes.com/sites/simonlack/2018/06/04/americas-path-to-energy-independence-the-shale-revolution/#7837fd237554 [Accessed 15 Apr. 2019].

Lamont, D. and Schock, N. (1993). *Energy technology assessments for energy security: working Group report*. [online] Available at: https://www.osti.gov/servlets/purl/10158892 [Accessed 12 Now. 2018].

Landis, R. and Koch, G. (1977). The Measurement of Observer Agreement for Categorical Data. *Biometrics*, 33(1), pp. 159-174.

Littlefield, S. (2012). Security, independence, and sustainability: Imprecise language and the manipulation of energy policy in the United States. *Energy Policy*, 52, pp. 779-788.

Liu, X. and Yang, E. (2015). Examining China's Official Media Perception of the United States: a Content Analysis of People's Daily Coverage. *Journal of Chinese Political Science*, 20(4), pp. 385-408. doi: 10.1007/s11366-015-9340-8.

Mackey, A. and Gass, S. (2005). *Second Language Research: Methodology and Design*. London: Lawrence Erlbau Associates, Inc., Publishers.

Mandel, M. (2018). Experts: Shale revolution has improved U.S. energy security and is 'shifting the geopolitical balance'. *Energy in Depth* [online] Available at: https://www.energyindepth.org/experts-shale-revolution-improved-u-s-energy-security-shifting-geopolitical-balance/ [Accessed 25 Sep. 2018].

Mänsson, A., Bengt, J. and Nilsson, L. (2014). Assessing energy security: An overview of commonly used methodologies. *Energy*, 73, pp. 1-14. doi: 10.1016/j.energy.2014.06.073.

Mayring, P. (2014). *Qualitative Content Analysis: Theoretical Foundation, Basic Procedures and Software Solution.* Klagenfurt, Austria: Beltz.

Meier, K., Brudney, J. and Bohte, J. (2012). *Applied Statistics for Public and Nonprofit Administration*. Cengage Learning.

Nadejda, V., Nichols, C. and Balash, P. (2014). Analysis: The impacts of shale gas supply and climate policies on energy security: The U.S. energy system analysis based on MARKAL model. *Energy Strategy Reviews*, 5, pp. 26-41. doi: 10.1016/j.esr.2014.10.008.

Nye, J. (2014). Shale Gas Is America's Geopolitical Trump Card. *Wall Street Journal,* [online]. Available at: https://www.wsj.com/articles/joseph-nye-shale-gas-is-americas-geopolitical-trump-card-1402266357 [Accessed 13 Dec. 2018].

Nyman, J. (2014). Red Storm Ahead: Securitisation of Energy in US-China Relations. *Millennium: Journal of International Studies*, 43(1), pp. 43-65.

Obama, B. (2016). Remarks at the SelectUSA Investment Summit. *The American Presidency Project* [online] Available at: https://www.presidency.ucsb.edu/documents/remarks-the-selectusa-investment-summit [Accessed 11 Aug. 2018].

Peakoilbarrel. (2019). *What is Peak Oil?* [online] Available at: https://peakoilbarrel.com/what-is-peak-oil/ [Accessed 11 Apr. 2019].

PRI. (2017). *Evolving risks and opportunities in fracking.* [online] Available at: https://www.unpri.org/environmental-issues/evolving-risks-and-opportunities-in-fracking-/439.article [Accessed 15 Apr. 2019].

Raimi, D. (2018a). The Shale Revolution: Climate Opportunities and Risks. *Resources* [online] Available at: https://www.resourcesmag.org/archives/the-shale-revolution-climate-opportunities-and-risks/ [Accessed 16 Apr. 2019].

Raimi, D. (2018b). The Economic Impact of the Shale Revolution. *Resources for the Future*, 18(3), pp. 1-2.

Short, J., McKenny, A. and Reid S. (2019). More than Words? Computer-Aided Text Analysis in Organizational Behavior and Psychology Research. *Annual Review of Organizational Psychology and Organizational Behavior*, 5, pp. 415–35. doi:10.1146/annurev-orgpsych-032117-104622.

Schick, J. (1975). Review of *Energy and U.S. Foreign Policy* by Joseph A. Yager and Eleanor B. Steinberg. *World Affairs*, 138(3), pp. 256-257.

Schleich, J. (2018). Why increasing shale gas production won't reduce greenhouse gas emissions. *The Conversation*, [online] Available at: http://theconversation.com/why-increasing-shale-gas-production-wont-reduce-greenhouse-gas-emissions-92804 [Accessed 10 Apr. 2019].

Smith, P. (2016). Energy Security and the US-China Dyad: Is Sustained Energy Cooperation Possible? *Journal Of Energy & Natural Resources Law*, 34(4), pp. 417-442. doi:10.1080/02646811.2016.1216693

Sohn, I. (1990). US energy security. Problems and prospects. *Energy Policy* 18(2), pp. 149-161. doi:10.1016/0301-4215(90)90140-Y.

Stage Completions. (2018). *The Evolution of the U.S. Shale Revolution.* [online] Available at: http://www.stagecompletions.com/evolution-u-s-shale-revolution/ [Accessed 13 Sep. 2018].

Steele, M. (2008). Transcript of Michal Steele RNC speech. *Free Republic* [online] Available at: http://www.freerepublic.com/focus/f-news/2074519/posts [Accessed 15 Apr. 2019].

Stemler, S. (2001). An Overview of Content Analysis. *Practical Assessment, Research & Evaluation,* [online] 7(17), Available at: https://pareonline.net/getvn.asp?v=7&n=17 [Accessed 8 Nov. 2018].

Stocking, A. (2012). *Energy Security in the United States* [pdf] The Congressional Budget Office, p. 29. Available at: https://www.cbo.gov/sites/default/files/112th-congress-2011-2012/reports/05-09-energysecurity.pdf [Accessed 15 Apr. 2019].

Stoiber, C. (1981). Review of *Energy and Security* by David A. Deese, Joseph S. Nye. *The American Journal of International Law,* 75(4), pp. 1029-1030. doi:10.2307/2201396.

The American Interest. (2019). *Shale Boom: America's "Trump Card*". [online] Available at: https://www.the-american-interest.com/2014/06/10/shale-boom-americas-trump-card/ [Accessed 11 Apr. 2019].

The American Presidency Project. (2018). *About the Presidency Project*. [online] Available at: https://www.presidency.ucsb.edu/ [Accessed 11 Aug. 2018].

Trump, D. (2017). Remarks at the 'Congress of Tomorrow' Republican Member Retreat in Philadelphia, Pennsylvania. *The American Presidency Projects* [online] Available at: https://www.presidency.ucsb.edu/documents/remarks-the-congress-tomorrow-republican-member-retreat-philadelphia-pennsylvania [Accessed 15 Mar. 2019].

Turner, L. (1977a). Review of *The Energy Crisis and U.S. Foreign Policy* by Joseph S. Szyliowicz and Bard E. O'Neill. *International Affairs*, 53(1), pp. 162-163.

Turner, L. (1977b). Review of *The United States and International Oil: A Report for the Federal energy Administration on U.S. Firms and Government Policy* by Robert B. Krueger. *International Affairs*, 53(1), pp. 162-163.

Turner, L. (1977c). Review of *U.S. Energy Policy: Alternatives for Security* by Douglas R. Bohi and Milton Russell. *International Affairs*, 53(1), pp. 162-163.

Van Doren, P. (2006). Review of *Energy & Security: Toward a New Foreign Policy Strategy*, by Jan H. Kalicky and David L. Goldwyn. *Energy Journal,* 27(2), pp. 182-187.

Wan, Q. (2019). *Environmental impacts of oil shale and pollution control technologies*. [pdf] Coal, Oil Shale, Natural Bitumen, Heavy Oil and Peat. Available at: http://www.eolss.net/Sample-chapters/C08/E3-04-04-06.pdf [Accessed on 11 Apr. 2019].

Winberg, S. (2018). AES Colon Natural Gas Power Plant Inauguration. *Energy.gov*, [online] Available at: https://www.energy.gov/fe/articles/aes-colon-natural-gas-power-plant-inauguration [Accessed 15 Apr. 2019].

Winzer, C. (2012). Conceptualizing energy security. *Energy Policy*, 46, pp. 36-48. doi: 10.1016/j.enpol.2012.02.067.

Yang, Y., Limao, W., Yebing, F., and Chufu, M. (2017). Integrated value of shale gas development: A comparative analysis in the United States and China. *Renewable & Sustainable Energy Reviews*, 76, pp. 1465-1478.

Zhang, C. and Meadows, C. (2012). International coverage, foreign policy, and national image: exploring the complexities of media coverage, public opinion, and presidential agenda. *International Journal of Communication*, 76, pp. 76-95.

Zhao, X., Liang, J. and Dang, C. (2018). A stratified sampling based clustering algorithm for large-scale data. *Knowledge-Based Systems*, 163, pp. 416-428.

Annex A Dictionary Key Terms

Energy security indicator	Key terms
Availability (geological and geopolitical elements)	Conservation, conserve Consume, consumption Deliverability, delivery, deliveries Demand Developing new (energy) Diversification, diversity Drill Efficiency Exploration, explore, exploring Forms of power Gas line(s), pipeline(s), networks for moving (energy) Generation, generating Get (oil/energy/gas/petroleum) Import(s) Independence Infrastructure Liquified natural gas, lng, portal(s), terminal(s) North dakota, offshore, onshore, anwr (arctic national wildlife refuge) Production, produce, producing Purchase Reserves, source(s) Rig(s), well(s) Supply, supplies Use/using
Affordability (economical elements)	Bill(s) Cost(s) Dollar(s) Economic, economy Galon(s) Gas pump Money Price(s) Rate(s) Revenues(s) Tax(es)

Acceptability (environmental and societal elements)	Clean (source, energy, energies) Earth Ecosystem Emission(s) Environment, environmental Greenhouse gase(s), GHG Gulf coast Planet Renewable Sea level(s) World

Perception (image) indicator	**Key terms**
Negative (universal)	Blackmail Bubble Catastrophe Cloudy Concern(s), concerned Crippling Crisis Difficult, difficulty, difficulties Do not love, don't love, does not love, doesn't love Fail/failed (to address energy) Frustrated/frustration Got to, have got to, have to, we've got to, must, ought to Havoc Hardship Hazardous Headwind Horribly/horrible Hostage Challenge(s) Issue(s) Loophole(s) Mess National interest National security, national energy strategy, national interest, strategy Necessity Obstacle(s) On a lot of folk's minds Pain, painful Pressure

	Problem Rigging Risk Situation Subsidizing/subsidy/subsidies (oil industry - only obama see it as negative) Terrible, terribly Threat, threatening Trouble/troubling Tumultuous Uncertainty Unstable Volatile Vulnerable, vulnerability Worried
Negative (availability)	2 percent, 20 percent, over 60 percent, 25 percent, more than 50 percent A lot of Addiction, addicted Already sucked up out of the gound Barrier Blackout Bottleneck California (always related to negative) Cannot/can't meet (energy need) Cut (production) Dependent, dependency, dependence, depending Did not/didn't/will not allow (exploration) Disrupt, distubtion Fall behind Foreign countries/country Have not enough, haven't had enough, not enough, don't have enough Hooked on Important Less Limited Long gas lines Make sure Middle eastern Need, need more Not exploring (enough) Not self-sufficient Not keeping pace with Outstrip(s), outstripping Overseas

	Peak
	Rely on, rely upon, reliant upon, reliant on, rely
	Remote
	Restriction, restrictions
	Rise
	Run out/ ran out/ running out
	Short, shortages
	Situation
	Strategy reduce
	Tight
	Use more wisely
Negative (affordability)	100
	Aren't going to drop
	Cannot afford, can't afford
	Costly
	Drive up, drove up
	Fight for lower
	Four, 4, three, 3 (dollars per gallon)
	Go up
	Great depression
	High/higher
	Increase
	Jump/jumped
	Kick up
	Loophole
	Out of sight
	Paying an extra
	Rise, rising
	Skyrocket, skyrocketing/sky-high (price)
	Spike, spikes, spiking (price)
	Subsidize (bush considers as negative)
	Swing (in energy price)
	Tripled (price)
	Up
	Wasting
	Wild (prices)
	Weapon (economic weapon)
Negative (acceptability)	Big globs (of oil)
	Birds
	Cannot survive, can't survive
	Carbon pollution, carbon
	Contain the oil

	Contributing
	Cost (environmental)
	Creates air (pollution)
	Cut investments
	Dangerous/danger
	Damaging, damage
	Dirty
	Disaster
	Energy waste, wasting
	Escaping, escape (oil)
	Expose/exposed (to oil spills)
	Fall, falling behind
	Flood, floods, flooded
	Global warming
	Greenhouse gases
	Harm
	Hit shore(s)/beach(s)
	Changing climate, climate change
	Chemicals
	Increased (concentration of GHG)
	Kill/killed (animals)
	Largest emitter, biggest emitter
	Leak
	Lot of (emissions)
	Mess
	Oil has hit shore
	Pollute
	Rising
	Risk
	Spill
	Spreading (oil)
	Tragedy/tragic
	Turtles dying
	Warm
	Warming problem
	Wrecked bp well, wrecked well
Positive (availability)	10 year(s) (decrease gasoline usage)
	100 year(s) (supply that can last)
	12 billion barrels (reduce consumption)
	16 year(s) (highest production in..)
	20 percent (reduce gasoline usage)
	38 million (opened new acres for exploration)
	8 years (production more than at any time in the last 8 years)

8-year high
Abundant
Allowing the development
Boom/booming
Breakthrough
Closer to energy independence
Cut/cuts (energy/oil consumption/imports)
Diversification (away)
Dominance
Double/doubling
Dozens (of new pipelines)
End (dependence)
Energy production up
Enourmous/huge strides
First time (energy exporter)
Gasoline savings
Generating enough/more
Gone/is down (dependence)
Great oil reserves
Great opportunities/opportunity
Help reduce
Higher/highest (level)
Hundred (100) years
Change our (dependence)
Less (importing/dependent/million barrels of oil a day/relied/using)
Increased/increasing (production/independence/supply)
Incredible (resources)
Independent
Kicked our addiction
Largest
Leading
Major (exporter of energy)
Massive
Millions (of acres/barrels)
Miracle
More/so much (oil, gas, solar, wind, biofuels, producing, drilling)
New (oil/gas pipeline/technologies/ways of producing)
Number one
On the path to greater energy independence
One third (import cut)
Opened up/opening up/opens up/opened
Plentiful (supply)
Quadrulped/tripled/multipled/quadrulping/tripling/multipling
Ramped up

	Record/extraordinary pace
	Reduce(d)/reducing (our reliance)
	Right direction
	Rich
	Rising (output)
	Saudi arabia of natural gas
	Shlashed (our dependence)
	Speed up
	Streamline
	Tap into (the vast energy)
	Than ever before
	Thousand(1000) years (of supply)
	Tremendous progress
	Under 50 percent (energy dependence)
	Unleashing
	Unparalleled
	Unprecedented
	Going down (use, consumption)
	Vast potential
	Vibrant energy producer
Positive (affordability)	2 bucks/2 dollars
	30 (percent cut energy bills)
	Beneficial
	Cut
	Gone down/come down/coming down/going down/down (prices)
	Cheaper
	Less vulnerable
	Low/lower/lowest
	Most affordable
	Not raising
	Plummeted/plummeting (costs)
	Pressure off (price)
	Saving/save/saves (money)
	Spending less (money)
Positive (acceptability)	Accelerating (clean energy)
	Best conservation record
	Boom/booming
	Boost
	Breakthrough(s)
	Cap the well
	Cleaner
	Combat(s)

	Creating (clean energy) Cuts/cut (GHG) Decrease/decreased/decreasing (GHG) Development (clean energy) Does not/doesn't harm Double/doubled/doubling (renewable energy) Energy track Enough Generate/generating (renewable energy) Global(world) leader/lead/led Gone down (pollution) Has reduced/reduces/reduce (GHG emission) Help protect/protecting (the environment) Investing/invest/invested/investment(s) (in clean energy) Jump-start (clean energy) Leadership/leading (with respect to climate change) Less (dirty/energy/use less) Lowest/lower (pollution) More (clean energy) No impact (environment) Production up (clean energy) Progress Protecting/protect Plummeted/plummeting (GHG) Reduce/reduced/reducing (GHG) Revolution (clean energy) Rising/rised/increased/increasing (fuel efficiency standards/production of clean energy) Slashing (carbon emissions) Spending more (on clean energy) Transition/transitioning (to clean energy) Tripled Turn the corner (energy use) Up (clean energy is/ramped up) Wasting less Without producing (GHG)
Positive (universal)	Applaud Best Boom/booming Boom/booming Boost Breakthrough Dominance

	Extraordinary
	Fast-growing
	Good
	Greater
	Largest
	Leadership/leading (with respect to energy)
	Major
	More
	Progress
	Revolution
	Right direction
	Strenghtening (energy security)
	Success
	Unparalleled
	Unprecedented
	We have a sound (energy policy)
No code	Spend more resources
	Focus our time
	Of the people
	Talent
	Time
	Mustard
	Sarin
	Poison
	Devoting/devote
	Harness
	Foot on the gas
	Kinetic energy

Source: author

Annex B Presidential Speeches – Annual Scores

Presidential Speeches – Energy Security Indicator Index

Year (stratum)	Availability	Affordability	Acceptability	Energy
2001	-0,556	-0,857	-0,143	-0,302
2002	-0,638	-0,25	-0,346	-0,37
2003	-0,714	-0,417	-0,375	-0,462
2004	-0,706	-0,667	-0,154	-0,628
2005	-0,393	-0,667	0,033	-0,185
2006	-0,304	-0,697	0,333	0,01
2007	-0,45	-0,479	-0,262	-0,151
2008	-0,262	-0,656	0,105	-0,152
2009	0,043	0	-0,088	0,04
2010	-0,4	-0,583	-0,167	-0,27
2011	-0,174	-0,52	0,25	-0,32
2012	0,299	-0,485	0,071	-0,177
2013	0,58	0	0,281	0,059
2014	0,72	0,111	0,324	0,16
2015	0,438	0,565	0,272	0,036
2016	0,696	0,75	0,313	0
2017	0,311	0,4	0	-0,2

Source: author

Presidential Speeches - The Composite Index

Year (stratum)	Score
2001	-0,471
2002	-0,466
2003	-0,527
2004	-0,624
2005	-0,308
2006	-0,177
2007	-0,361
2008	-0,325
2009	-0,027
2010	-0,254
2011	-0,133
2012	0,016
2013	0,317
2014	0,374
2015	0,305
2016	0,383
2017	0,046

Source: author

The Presidential Speeches - The Coefficient of Imbalance

Year (stratum)	Score
2001	-0,263
2002	-0,239
2003	-0,32
2004	-0,399
2005	-0,136
2006	-0,066
2007	-0,169
2008	-0,138
2009	-0,007
2010	-0,091
2011	-0,047
2012	0,004
2013	0,154
2014	0,164
2015	0,106
2016	0,182
2017	0,015

Source: author

Annex C Composite index - Comparism

The Composite Index – Both Branches and Both Techniques - Comparism

Year (stratum)	Content Analysis Presidential Speeches	CATA Presidential Speeches	CATA Congressional Hearings
2001	-0,471	-0,177	0,007
2002	-0,466	-0,08	-0,042
2003	-0,527	-0,218	0,012
2004	-0,624	-0,3	0,129
2005	-0,308	-0,148	-0,098
2006	-0,177	-0,141	0,02
2007	-0,361	-0,086	0,057
2008	-0,325	-0,202	-0,094
2009	-0,027	0,117	0,018
2010	-0,254	0,095	-0,039
2011	-0,133	0,023	-0,037
2012	0,016	0,046	-0,072
2013	0,318	0,209	-0,016
2014	0,374	0,273	0,067
2015	0,305	0,168	-0,132
2016	0,383	0,09	0,041
2017	0,046	0,104	0,079

Source: author

Univerzita Karlova
Fakulta sociální věd
Institut politologických studií

Diploma thesis project

Examining Perception of United States' Energy Security by its Government Officials in period 2001 – 2017: a Content Analysis

Name: Jan Mazač
Academic advisor: Dr. rer. Pol. Michal Parízek, M.Sc., Ph.D.
Study programme: Mezinárodní vztahy
Year of project submission: 2018

Introduction to the topic

Worldwide energy production has begun to move away from traditional suppliers in Eurasia, the Middle East and Latin America, as producers tab unconventional gas and oil resources around the world, from coastal waters of Australia, Brazil, Africa, and the Mediterranean to the oil sands of Alberta, Cold Lake or Peace River in Canada, and Permian, or Eagle Ford shale plays in Texas. However, the greatest revolution has taken place in the United States (U.S.). American entrepreneurship has taken advantage of new technological development and has become a pioneer in its application. This newly viable technology refers to the extraction method which employs horizontal drilling and hydraulic fracturing (Blackwill and O'Sullivan 2014). As a result, resources once regarded commercially infeasible have been unlocked. Consequently, many experts' claim of "peak-oil"[15] has fallen apart, and "U.S. proved reserves[16] of crude oil and lease condensate and total natural gas have increased by more than 50% in the last decade" (EIA 2018a). In addition, combined U.S. oil and gas production output has skyrocketed to a levels "any other country has ever managed before" (International Energy Agency 2017a). Shale extraction development – „the most important energy development since WWII" (Clemente 2018) - has significantly changed the rules of the game by transforming realities of energy security in the U.S. (Kobek et al. 2015, 9), already a net exporter of gas and if the current trend continues as it has in past, the world's largest oil producer by 2023 (Kent and Puko 2018) and a net exporter of oil in the late 2020s (International Energy Agency 2017a).

Although, energy policy as a topic of political discussion has been here for over a century, energy security policy as its subset has quite shorter existence (Below 2013, 860) and related debates have gained momentum after the 1970s oil embargoes and shortages (Department of Energy 2017). Discussions within the academic sphere haven't fallen behind and have begun to appear in the late 1970s and early 1980s (Yager and Steinbers 1974[17]; Szyliowicz and O'Neil 1975[18]; Bohi and Russell 1975; Krueger 1975[19]; Deese 1979; Deese and Nye 1981[20]; Stoff 1980[21]).

---

[15] The idea that in specific point in the time global oil supply will reach its maximum rate of global extraction. This theoretical concept is based on King Hubbert's assumptions and predictions (see more in OILPRICE 2018).
[16] "Proved reserves are estimated volumes of hydrocarbon resources […] are recoverable under existing economic and operating conditions" (EIA 2018a). Due to this fact, "[r]eserves estimates change from year to year as new discoveries are made, as existing fields are thoroughly appraised, as existing reserves are produced, as prices and costs change, and technologies evolve" (EIA 2018a).
[17] Schick 1975, 256-257.
[18] Turner 1977.
[19] Ibid.
[20] Stoiber 1981, 1029.
[21] Denovo 1981, 477.

Prospects of the energy security in the post-Cold war era remained the same as it were in the past, aiming at reducing nation's economic vulnerability to future disruptions of oil supplies (Lamont and Schock 1993; Georgiou 1993). However, surge in popularity among academics and policymakers in the 2000s (Below 2013, 860) and due to neoliberalism and September 11, new approaches have been employed in addressing energy security (Chalker 2005, 117). More recently, empirical inquiries into the meanings of communication (Krippendorff 2013) which has not heretofore been used in the field of energy (Dunham and Schlosser 2016; Below 2013), and new issues such as climate change and environmental protection (Dunham and Schlosser 2016; Brown and Sovacool 2017), China's economic rise and its increasing energy demand (Smith 2016), and especially so-called shale revolution and its impact on energy security (Kobek et al. 2015; Nadejda et al. 2014), market prices (Hongxun and Jianglong 2018), or its geopolitical dimensions (Krane and Medlock 2018; Blackwill and O'Sullivan 2014) have continued to forge energy security debate.

Nevertheless, comprehensive and systematic descriptive account of U.S. Government perception of energy security, assessing whether and how implications of shale revolution[22] have affected its highest policymaking levels, has not been made so far. My proposed dissertation thesis will address such an issue and investigate evolution (if any) of U.S. Government perception of energy security from 2001 until 2017.

There are three main reasons of my decision to conduct a content analysis to make a valid, objective and systematic inference from textual sources of U.S. executive and legislative branches of government. First, despite these revolutionary trends in the U.S. energy sector which took off in the past decade, have provided Washington with new capabilities for redesigning its national and foreign energy policies, and have been slowly but surely turning the U.S. from foreign energy addict (Bush 2006) to world biggest energy producer and exporter (International Energy Agency 2017a), I see a gap in current research to systematically capture these "geopolitical shifts" (Nye 2014) within energy policy debate. Second, availability of a large amount of raw textual data in digital form and many computer-aided qualitative text analysis software such as Atlas.ti or WorldStat which have become accessible and affordable (even to students). And finally, even though the method of content analysis assertion in IR field has gained momentum lately (Karlas and Parízek 2016; Binder and Heupel 2015; Liu and Yang 2015), in the domain of energy an application of such a method is rather rare (Dunham and

[22] Fracking has boosted oil and gas production, therefore the economy, wich produces more jobs, reduces imports, helps balance of payments. New tax revenues ease government budgets, makes cheaper energy, makes industry more competitive internationally, etc.

Schlosser 2016; Below 2013), and I would like to redound to the benefit of the method in energy field.

Research target, research question

Therefore, the main question of my thesis is what are the consequences of shale revolution on U.S. Government perception of energy security? In other words, whether language used by U.S. high level policymakers has followed „tectonic shift in the geopolitics of energy" (Nye 2014) caused by shale revolution in past decade.

Literature review

In the first place, key literature I will draw on in my thesis will be (inter alia) journal articles related to energy matters, especially to (1) new phenomena of shale extraction, e.g. *Shale Gas in the United States: Transforming Energy Security in the Twenty-first Century* by Parraguez Kobek, Maria Luisa, Alberto Ugarte, and Georgina Campero Aguilar, *The impacts of shale gas supply and climate policies on energy security: The U.S. energy system analysis based on MARKAL model* by Victor Nadejda, Christopher Nichols and Peter Balash; (2) policymaking process in the U.S. such as *Security, independence, and sustainability: Imprecise language and the manipulation of energy policy in the United States* by Scott R. Littlefield, or paper *Red Storm Ahead: Securitisation of Energy in US-China Relations* by Jonna Nyman; and to (3) energy security, particularly the article *Obstacles in energy security: An analysis of congressional and presidential framing in the United States* by Amy Below[23], the only one I have found so far using content analysis to investigate whether different branches of U.S. Government have defined energy security in same way, but also papers such as *A generic framework for the description and analysis of energy security in an energy system* by Larry Hughes, *Conceptualizing energy security* by Christian Winzer, *Assessing energy security: An overview of commonly used methodologies* by Johansoon Bengt, Andre Mansoon and Lars J. Nillson, and *Energy security and sustainability in Northeast Asia* by David Von Hippel, Tatsujiro Suzuki, James H. Williams, Timothy Savage, and Peter Hayes, putting forward a conceptual framework for analysis of energy security.

Secondly, article *Examining China's Official Media Perception of the United States: a Content Analysis of People's Daily Coverage* by Xinsheng Liu and Yi Edward Yand gives worth advice on how to define and measure perception.

[23] Which is the „state of the art" on the subject matter.

Thirdly, I cannot omit book *Content Analysis: An Introduction to Its Methodology* by Klaus Krippendorff which provides me with conceptual and methodological aspects of content analysis research.

Finally, neither sound energy research can be done without access to the U.S. Energy Information Administration, which collects, analyses, and provides independent and impartial up to date energy data, and the International Energy Agency and its annual flagship *World Energy Outlook*.

Conceptual and theoretical Framework, research hypotheses

Energy Security

Lack of consensus on energy security precise interpretation on the policymaking process in the U.S. makes different stakeholders such as (inter alia) market advocates, environmentalists or energy producers see the road to energy security through different tools (Nadejda et al. 2014, 26). Christian Winzer reviewed 36 definitions of energy security conception (Winzer 2012), others such as André Mansson, Bengt Johansson and Lars J. Nilsson were looking at energy security from different perspectives of timeframes, e.g. those assessing longer ones are prone to value stability over cost-effectiveness and vice versa (Mansson et al. 2014, 2). However, "[i]n the U.S. question[s] of energy security […] often center on fossil fuel use as the country's critical energy-related vulnerability" (Littlefield 2012, 780), for instance Bohi and Toman describe energy security as „the loss of economic welfare that may occur as a result of a change in the price or availability of energy" (Littlefield 2012, 780). Although, energy security is broader and more complex (Hippel et al. 2011, 6720), for purpose of my research I use definition of International Energy Agency, which defines energy security as the uninterrupted physical availability of energy sources at a price which is affordable while respecting environmental concerns (International Energy Agency 2018). To conceptualize it, I further work with Victor Nadejda, Christopher Nichols and Peter Balash's energy security framework (2014, 27-28) and Larry Hughes' "generic framework for the description and analysis of energy security in an energy system" (2012, 221) based on three measurable indicators such as (1) availability – geological and geopolitical elements, (2) affordability – economical element and (3) acceptability – environmental and societal elements (Hughes 2012, 224 - 225).

Perception

In current literature, there is no clear consensus about how to define and even measure perception. For instance, according to Cambridge Dictionary, perception is "a belief or opinion

[…] based on how things seem“ (2018). However, I have to approach the concept of it in an empirically measurable way to be able make inference and answer to my research question. Therefore, I use Xinsheng Liu‘s and Yi Edward Yang‘s two of their three components of conceptualization of perception (2015). First, an overall attention intensity, or how much attention the U.S. Government pays to energy issues. Research on agenda-setting and attention dynamics (Zhang and Meadows 2012) shows that a significant amount of attention indicates that the target issue is being prioritized on the agenda (Liu and Yang 2015, 389). That being said, the greater the number of sentences or paragraphs where the energy security indicators are mentioned, the higher the attention intensity (Liu and Yang 2015, 392). Second, an overall image, which essentially entails interpretation and judgment of the subject being perceived (Liu and Yang 2015, 389). To assess the image of energy security indicators in transcripts of presidential speeches and congressional hearings, I established a three category image scheme and assigned them a numeric value: negative (-1), (0) neutral, and positive (+1) (Liu and Yang 2015, 394).

Energy Security Perception

To address my research question, I merge set of three indicators based on conceptualization of energy security with two components of conceptualization of perception. Therefore, the main objective of conducted content analysis will be to infer (1) what is the overall attention intensity paid by U.S. Government, and (2) what is the overall image held by U.S. Government to/of (a) availability, (b) affordability and (c) acceptability of energy sources.

Based on the quantification of three energy security indicators, I defined the composite index (CI). This index provides the complete picture of the U.S. Government energy security perception and is calculated as a sum of their weighted arithmetic means. CI might reach the maximal value of 1 and the minimal value of -1, a higher positive value of CI indicates a more positive perception of energy security by the U.S. Government and vice versa.

Research Hypothesis

My first three hypothesis come from the concept of interdependence seen as an issue of vulnerability or as a form of power (Baldwin 1980). Interdependence is understood “as a question of a state’s vulnerability […] where two actors find themselves in a relationship that would create large costs for both of them should it break down. If such costs are, however, unequally distributed, then one can talk about dependent relationship“ (Kroll 1993, 322-323). In case of energy dependence, there are two major costs; first, national wealth is transferred to producing states and second, country’s foreign policy is restrained by producing states

(Littlefield 2013, 781). Furthermore, Baldwin further concludes that "to be dependent is to lack power and to be independent is to have power" (Kroll 1993, 323). In addition, energy plays a vital role in U.S. economy (Kobek et al. 2015; Nyman 2014; Littlefield 2012; Below 2013), especially in five major primary energy consuming sectors such as electric power, transportation, industrial, residential and commercial, primary energy fossil fuel sources have dominated U.S. energy mix for more than 100 years (EIA 2018b), and energy issues are traditionally bounded to national security. The issue of oil dependency have been addressed[24] since early 1970s by every incumbent of the Oval Office. However, such efforts had not been successfully delivered until the past decade's shale-energy revolution has taken off, and its consequences have created chain of side-effects for the oil & gas industry. Spectacular increase in the U.S. output of tight oil[25] has derogated foreign oil dependency and depressed oil prices[26] (Hongxun and Jianglong 2018). Abundant shale gas extraction has created cheap energy source (International Energy Agency 2017b, 2) that substituted the use of coal for electrical power generation (Stage Completions 2018), helped reduce pollution and other emissions (International Energy Agency 2017b, 2), and made the U.S. self-sufficient natural gas net exporter. Therefore, my first three hypothesis are:

Hypothesis 1*: I presume that oil and gas production growth and its spin-offs have positively affected the U.S. Government long-term perception of energy security. I expect to see positive (time lagged) correlation between energy production and overall perception of energy security.*

Hypothesis 2*: Fading scarcity of energy resources (availability and affordability) should have therefore affected or in certain point even moved U.S. Government rhetoric out of the security sphere, away from a state-centric national security paradigm. This is a key pattern I expect to see over time.*

Hypothesis 3*: Even though higher utilisation of natural gas instead of coal in power generation has cut greenhouse gas emissions, growing production as such might have raised environmental fears. I anticipate long-term negative shift of the U.S. Government perception of*

[24] Via different means such as increasing supply or curtailing demand (see more Littlefield 2013).
[25] Production of crude oil decreased each year between 1970 and 2008 (EIA 2018b).
[26] U.S. production has forced OPEC nations to flood global market in an effort to cut oil prices and undermine the profitability of American oil producers (Stage Completions 2018).

acceptability of energy sources, thence emphasizing environmental and societal impacts. I expect to see negative (time lagged) correlation between energy production and the perception of energy acceptability.

On the other hand, perception is a subjective belief or sight based on physical senses (Cambridge Dictionary 2018) and discourse might be manipulated by different politicians "seeking to sway popular opinion" (Littlefield 2012, 779). This assumption is rooted in securitisation theory, the cornerstone of which is that labelling something a security issue impacts on policy, however, some "issue might become a security issue - not necessarily because a real existential threat exist but because the issue is presented as such a threat […] the meaning of a concept lies in its usage and is not something we can define analytically or philosophically according to what would be best" (Buzan et al. 1998, 24-26). In addition "[t]he meaning lies not in what people consciously think the concept means […] [i]n the case of security, textual analysis suggest that something is designated as an international security issue because it can be argued that this issue is more important than other issues and should take absolute priority" (Buzan et al. 1998, 24). My fourth hypothesis is therefore based on securitisation theory.

Hypothesis 4*: Despite my first two hypothesis, I assume that expected long term pattern might be from time to time disrupted by labelling any energy security indicator (especially availability and affordability) as a threat. Such efforts might be driven by policymaker's subjective intentions, e.g. to mobilize its constituents; or by geopolitical events and natural disasters objectively affecting energy prices and availability such as hurricanes, or armed conflicts and turmoils in largest energy producing regions. However, main long term pattern won't be affected.*

Empirical data and analytical technique

A Framework of content analysis

In order to address proposed research question a content analysis of U.S. presidential speeches and congressional hearings from 2001 to 2017 will be conducted. According to Klaus Krippendorff, „[c]ontent analysis is a research technique for making replicable and valid inferences from texts to the contexts of their use" (Krippendorff 2013, 24). To preserve critical examination and comparison, and to contribute to long-term systematic improvements, I therefore follow his few conceptual components (Krippendorff 2013, 35). Process starts with:

- A body of text.
- A research question that I seek to answer by exploring the body of text.
- A context, because "data enter a content analysis from outside and becomes texts to the analysis within the context" (Krippendorff, 2014, 38), therefore "context explains what analyst does with the text" (Krippendorff, 2014, 38) and makes his steps comprehensible to readers (Krippendorff, 2014, 40). The context I do work with is shale revolution.
- Operationalization of data (see more in next paragraph).
- Inferences
- Validating

Operationalization

In this content analysis I will assess textual sources of executive and legislative branch of the U.S. Government. Thence transcripts of the U.S. presidential State of the Union Addresses and Messages, Inaugural Addresses, Weekly Addresses and news conferences, and congressional hearings of Senate, House or joint committees of Congress from 1st January 2001 to 31st December 2017 will be explored.

Presidential speeches will be obtained from The American Presidency Project, which is non-profit and non-partisan source of presidential documents on the internet (The American Presidency Project 2018). Congressional hearings transcripts will be collected using the U.S. Government Publishing Office's Federal Digital System, which is the official source of Federal Government publications (Federal Digital System 2018). Both will be filtered through a search for texts containing any of keywords „energy", „oil", „gas", etc. The approximate estimate will be a several hundreds of retrieved U.S. presidential speeches and congressional hearings.

The content analysis will be conducted using Atlas.ti/Worldstat data analysis and research software. The software provides so-called word frequency, search using Boolean operators, or locates words preceding or following (in selected maximal distance) keywords or phrases within the same sentence or paragraph. Those words will be contained in specified dictionaries with shared meanings, in my case within three semantic categories of positive, negative and neutral outlook of availability, affordability and acceptability of energy sources. To construct them I will undertake expanded review of existing dictionaries such as the Merrian Webster thesaurus, the General Inquirer dictionary, Minnesota Contextual Content Analysis dictionary etc. However, In the first place, I will take advantage and further elaborate of/on already created dictionaries used in order to perform particular analysis within the energy field (Below 2013, 864).

For the image of each bit of the analysed text I code “-1“ if the text negatively portrays or has unfavorable or critical view of the energy security indicator; “0“ if the energy security indicator has a neutral, mixed or unidentifiable picture; and “+1“ if the text describes the energy security indicator in a positive or favorable tone (Liu and Yang 2015, 391).

Planned thesis outline

- Introduction
- A historical look at the U.S. energy data
- Conceptual and methodological Framework
- Data operationalization
- Empirical-analytical section/findings
- Validation
- Conclusions

References

Baldwin, A. David. 1980. “Interdependence and power: a conceptual analysis.” *International Organization 34(4), 471-506.*

Below, Amy. 2013. "Obstacles in energy security: An analysis of congressional and presidential framing in the United States." *Energy Policy 62, 860-868*. doi:10.1016/j.enpol.2013.07.013.

Bengt, Johansson, Mansson, Andre, and Nilsson, Lars J. 2014. "Assessing energy security: An overview of commonly used methodologies." *Energy 73, 1-14*.

Binder, Martin, and Monika Heupel. 2015. "The Legitimacy of the UN Security Council: Evidence from Recent General Assembly Debates." *International Studies Quarterly 59(2): 238-250*. doi: 10.1111/isqu.12134.

Blackwill, Robert D., and O'Sullivan, Meghan L. 2014. "America's Energy Edge: The Geopolitical Consequences of the Shale Revolution." *Foreign Affairs* 93(2):102-114.

Brown, George, and Sovacool, K. Benjamin. 2017. "The presidential politics of climate discourse: Energy frames, policy, and political tactics from the 2016 Primaries in the United States." *Energy Policy 111, 127-136*. doi: 10.1016/j.enpol.2017.09.019.

Bush, George W. 2006. “State of the Union Address by the President.” January 31, 2006. https://georgewbush-whitehouse.archives.gov/stateoftheunion/2006/.

Buzan, Barry, Weaver, Ole, and Wilde, Jaap de. 1998. *Security*. London: Lynne Reinner Publishers, Inc.

Cambridge Dictionary. 2018. “Meaning of perception in the English Dictionary.” Accessed August 11, 2018. https://dictionary.cambridge.org/dictionary/english/perception.

Deese, David A. 1979. "Energy: Economics, Politics, and Security." *International* ***Security***. 4(3):140-153. doi:10.2307/2626698.

Denovo, John A. 1981. "Oil, War, and American Security: The Search for a National Policy on Foreign Oil, 1941-1947 Micheal B. Stoff." *The American Historical Review*. 86(2):477-478. doi:10.2307/1857608.

Department of Energy. 2017. “Valuation of energy Security for the United States.” Accessed March 24, 2018. https://www.energy.gov/policy/articles/valuation-energy-security-united-states.

Dunham, M. Ian, and Schlosser, Kolson. 2016. "Energy security discourses and environmental protection measures in U.S. federal energy legislation: An introductory exploration." *Extractive Industries And Society 3(1): 86-94*. doi: 10.1016/j.exis.2015.11.015.

EIA. 2018a. “Oil and Natural Gas Proved Reserves, Year-end 2016.” Accessed August 10, 2018. https://www.eia.gov/naturalgas/crudeoilreserves/.

EIA. 2018b. “U.S. Energy Facts Explained.” Accessed August 11, 2018. https://www.eia.gov/energyexplained/?page=us_energy_home.

Federal Digital System. 2018. Accessed August 11, 2018. https://www.gpo.gov/fdsys/.

Clemente, Jude. 2018. “Reports Of The Death Of Oil’s ICE Are Greatly Exaggerated.” *Forbes*. August 19. Accessed September 4, 2018. https://www.forbes.com/sites/judeclemente/2018/08/19/reports-of-the-death-of-oils-ice-are-greatly-exaggerated/#463ca092203c.

Georgiou, George C. 1993. "US energy security and policy options for the 1990s." *Energy Policy* 21(8):831-839. doi:10.1016/0301-4215(93)90168-F.

Hongxun, Liu, and Jianglong, Li. 2018. "The US Shale Gas Revolution and Its Externality on Crude Oil Prices: A Counterfactual Analysis." *Sustainability* 10(3): 697. doi: 10.3390/su10030697.

Hughes, Larry. 2012. "A generic framework for the description and analysis of energy security in an energy system." Energy Policy 42, 221-231. doi: 10.1016/j.enpol.2011.11.079.

Chalker, James. 2005. "Energy Security, Managing Risk in a Dynamic Legal and Regulatory Environment." *Energy Journal 26(3):* 117-119.

International Energy Agency. 2017a. “World energy Outlook 2017.” Accessed August 10, 2018. https://www.iea.org/weo2017/.

International Energy Agency. 2017b. Gas 2017. Accessed September 4, 2018. https://www.iea.org/Textbase/npsum/gas2017MRSsum.pdf.

International Energy Agency. 2018. “Energy security.” Accessed March 24, 2018. https://www.iea.org/topics/energysecurity/.

Karlas, Jan, and Parízek, Michal. 2016. "Aktivita členských států WTO v Mechanismu přezkoumávání obchodní politiky." *Mezinarodni Vztahy 51(2): 30-49*.

Kent, Sarah, and Puko, Timothy. 2018. “U.S. Will Be the World’s Largest Oil Producer by 2023, Says IEA.” *The Wall Street Journal*, March 5, 2018. https://www.wsj.com/articles/u-s-will-be-the-worlds-largest-oil-producer-by-2023-says-iea-1520236810.

Kobek, Parraguez, Luisa, Maria, Ugarte, Alberto, and Aguilar, Campero Georgina. 2015. "Shale Gas in the United States: Transforming Energy Security in the Twenty-first Century * / Gas de lutita en Estados Unidos: la transformación de la seguridad-energética en el siglo XXI." *Norteamérica*. June 2015 10(1):7-38.

Krane, Jim, and Kenneth B., Medlock. 2018. "Geopolitical dimensions of US oil security." *Energy Policy* 114, 558-565.

Krippendorff, Klaus. 2013. *Content analysis : an introduction to its methodology*. n.p.: Los Angeles : SAGE, c2013, 2013.

Kroll, A. John. 1993. "The Complexity of Interdependence." *International Studies Quarterly 37(3):321-347.* doi: 10.2307/2600811.

Lamont, A. D., and Schock, R. N. 1993. "Energy technology assessments for energy security -- Working Group report." doi:10.2172/10158892.

Littlefield, Scott R. 2012. “Security, independence, and sustainability: Imprecise language and the manipulation of energy policy in the United States.” *Energy Policy 52*: 779-788.

Liu, Xinsheng, and Yang, Yi Edward. 2015. "Examining China’s Official Media Perception of the United States: a Content Analysis of People’s Daily Coverage." *Journal Of Chinese Political Science 20(4): 385-408*. doi: 10.1007/s11366-015-9340-8.

Nadejda, Victor, Nichols, Christopher, and Balash, Peter. 2014. "Analysis: The impacts of shale gas supply and climate policies on energy security: The U.S. energy system analysis based on MARKAL model." *Energy Strategy Reviews 5, 26-41*. doi: 10.1016/j.esr.2014.10.008.

Nye, Joseph S. 2014. "Shale Gas Is America's Geopolitical Trump Card." *Wall Street Journal (Online)*, June 9, 2014.

Nyman, Jonna. 2014. “Red Storm Ahead: Securitisation of Energy in US-China Relations.” *Millennium: Journal of International Studies 43 (1)*: 43-65.

OILPRICE. 2009. “What is Peak Oil Theory? A Thorough Look at This heavily Debated Topic.” Accessed September 22, 2018. https://oilprice.com/Energy/Crude-Oil/What-Is-Peak-Oil-Theory-A-Thorough-Look-At-This-Heavily-Debated-Topic.html.

Schick, Jack M. 1975. "Energy and U.S. Foreign Policy (A Report to the Energy Policy Project of the Ford Foundation) Joseph A. Yager Eleanor B. Steinberg." *World **Affairs***. 138(3):256-257.

Smith, Paul J. 2016. "Energy Security and the US-China Dyad: Is Sustained Energy Cooperation Possible [article]." *Journal Of Energy And Natural Resources Law 34(4): 417-442*.

Stage Completions. 2018. “The Evolution of the U.S. Shale Revolution.” Accessed September 13, 2018. http://www.stagecompletions.com/evolution-u-s-shale-revolution/.

Stoiber, Carlton. 1981. “Reviewed Work: *Energy and Security.* by David A. Deese, Joseph S. Nye.” *The American Journal of International Law* 75, no. 4: 1029-030. doi:10.2307/2201396.

The American Presidency Project. 2018. Accessed August 11, 2018. http://www.presidency.ucsb.edu/.

Turner, Louis. 1977. "The Energy Crisis and U.S. Foreign Policy/ The United States and International Oil/ U.S. Energy Policy (Book Review)." ***International** Affairs*. January 1977, Vol. 53 Issue 1, p162. 2p.

Von Hippel, David, Suzuki, Tatsujiro, Williams, James H., Savage, Timothy, and Hayes, Peter. 2011. "Energy security and sustainability in Northeast Asia." *Energy Policy* 39(11): 6719-6730. doi: 10.1016/j.enpol.2009.07.001.

Winzer, Christian. 2012. "Conceptualizing energy security." *Energy Policy 46, 36-48*. doi: 10.1016/j.enpol.2012.02.067.

Zhang, Cui, and Charles William, III Meadows. 2012. "International coverage, foreign policy, and national image: exploring the complexities of media coverage, public opinion, and presidential agenda." *International Journal Of Communication (Online)* 76.