
THE ENERGY ISSUES: A CORPUS-BASED ANALYSIS

Maria-Floriana Popescu¹

The energy-related issues have become of paramount importance in recent years due to the exhaustion of fossil fuel resources, their price variations and political dependence on nations with role of energy providers. In addition, the changing in climate conditions requires reduction emissions of greenhouse gases. Therefore, this paper proposes and assesses the novel idea of using constructions as a unit of analysis for corpus-based discourse analysis in the energy field. This article will use a standard method in linguistics to quantitatively investigate academic writings from both a lexical and a stylistic perspective. The present research paper aims to add to the knowledge about energy issues by conducting a data-driven analysis of economic academic discourse, through three periods of time and using secondary data analysis. The findings suggest the evolution of the energy sector throughout time and they gave interesting and different insights into the content of the discourses and enabled better comparison of corpora.

Keywords: Corpus-based approach, Climate change, Energy issues, Academic discourse

JEL Classifications: O13, Q32, R11, Y90

¹**Maria-Floriana Popescu**, International Business and Economics Department, Bucharest University of Economic Studies, Romania; e-mail: mariafpopescu@yahoo.com

Introduction

The nature and wealth of worldwide energy utilization has definitely changed during the last century. Understanding authentic patterns and moves in worldwide energy consumption is vital for getting a handle on the unpredictability and intricacy of energy use nowadays. Shifts in primary energy resources, expanding consumption, and the political ramifications of fossil fuel reliance can be observed throughout time, as developments were observed since fire was the first energy invention and wood was used as a fuel for many years.

The chronicled record of energy transitions highlights the predominance of fossil powers all through the last one hundred and fifty years and the significance of energy's strength for national and global security. As the world turns out to be more industrialized, the interest for energy is significantly incrementing. The dependence on fossil fuels is dangerous for countries as they try to secure sufficient supplies of energy and for the world as it fights ecological and social issues connected with the patterns in energy consumption.

The utilization of energy assets inexorably bargains the environmental sustainability. There are no energy sources that do not harm the nature, yet some are more destructive than others. Air contamination, water pollution, and soil erosion are consequences of the extraction, transportation, preparation and burning of fossil fuels. Furthermore, combusted fossil energies discharge greenhouse gasses that effect environmental change. Nuclear energy, while it does not contaminate the air or release CO₂, presents its own issues to the wellbeing of citizens and the surrounding environment. Even renewable energy is not as green as it is promoted. Therefore, the issues generated by the use of fossil fuels, nuclear energy or even renewables are numerous and they bring unwanted outcomes to human and ecosystem wellbeing.

Nowadays, the issue of global warming gets a considerable measure of attention, incredible events being likable to occur if measures to alleviate the rise of Earth's temperatures are not taken, as the dependence on

fossil fuels is changing the worldwide climate, and the results of these changes are conceivably harming to people and the Earth's environment. All energy sources affect nature somehow, and hydropower is most likely the most harming to the earth of them all as huge dams are built to catch and store running water. These dams can immerse sizeable regions of land and can change the natural flow of streams and rivers (Moan and Smith, 2007: 63). While the advantages of dams may exceed the expenses for a few individuals, the downsides can be crushing for downstream clients.

Notwithstanding the various natural issues depicted above related to energy exploration, production, and processing, worldwide energy consumption raises also social concerns. Therefore, the issues in the social sphere incorporate decreasing sources of fossil fuels, conflicts that emerge because of concerns over energy security and imbalances in the overall accessibility to energy. It is essential to remember that a large number of the issues are unpredictable and multifaceted.

Literature review

After the oil embargo from 1973 until 1974 and the oil crises from 1973 and 1986, everybody speaks about energy and the issues related to this field. There is a constant relationship between the shortage of common assets and the overall financial process, but not everyone acknowledges it as there are some studies which argue that the limits of common assets cannot prompt to any intriguing conclusions (Hayek, 1952; Solow, 1973), as though the lack of resources is not the most important issue around which the financial framework turns and twists (Georgescu-Roegen, 1979).

Lately, with the expanding accessibility of online text information and computing power, there has been a fast increment in enthusiasm for corpus-based examination, especially among social sciences researches. The investigations in this field are concerned with how societal imperative issues and feelings are communicated through language

(Touileb and Salway, 2014). Corpus-based approaches have the advantage of using automated techniques to analyse large-scale discourses such as those in corpora of scientific articles, books, news and social media (Grundmann and Krishnamurthy, 2010; Fløttum et al., 2014; Kim, 2014). Therefore, the corpus-based studies are empirical analyses of how language is used (Goldschmidt and Szmrecsanyi, 2007). A few studies underline the significance of multi-word items in spoken and written discourse (Cowie, 1992: 1-12; Moon, 1997: 40-63; Moon, 1998; Biber, Conrad and Cortes, 2004). Analysing word blends or more lexical expressions, clusters, or collocation has been a particularly gainful approach in portraying specific characteristics of different works (Douglas and Conrad, 1999: 181-190; Biber and Barbieri, 2007; Hyland, 2008; Jablonkai, 2009).

The corpus-based analyses are extensive on academic discourse, but not the same can be declared about disciplines such as economics and sociology (Swales, 1990: 133), which only in the last 25 years have expanded the existing literature with a number of articles analysing written discourse in the field of economics, management, or marketing. There are still some studies that apply secondary data analysis on academic writing in economic journals (Tinberg, 1988; Lindeberg, 1994: 317-324; Lindeberg, 1996: 445-455). Lindeberg (1994, 1996) is tackling the discourses in economics, management, and business. A very interesting study is also Chevalier and Hudson's (2001), in which they conduct a lexical examination of purposeful dialect in scientific articles in the finance field. In the field of corpus-based research is also the article of Conrad (1996), who utilizes a corpus-based methodology in the biology field.

As for the energy related issues, in the article of Grundmann and Krishnamurthy (2010) which tackles the discourse of climate change – one of the problems of this century –, “*energy*” is one of the top content words for both United States and the United Kingdom corpora. Of the search terms, “greenhouse effect” is by all accounts more connected

with investigative reporting and less with political issues. Moreover, words such as “carbon”, “dioxide”, “scientists” and “warming” govern the list of the most frequently used words (Grundmann and Krishnamurthy, 2010). For the two most often utilized terms – “global warming” and “climate change” –, there is a distinction in substance in word recurrence between the US and the UK. While the US sources use words like “state”, “people” and “president”, clearly seeing the issue to a great extent as one to do with its own commonwealth and nation, the UK sources use “global” and “world”, which seem to indicate that more attention is given to the global dimension of the issue (Grundmann and Krishnamurthy, 2010). Also about the topic of climate change, a corpus-based study was conducted on 30 speeches of TED TALKS which showed that the first 20 most frequent words used, relating to climate change, were: “world”, “climate”, “change”, “ice”, “energy”, “earth”, “water”, “global”, “carbon”, and “warming” (Su and Ku, 2014).

Moreover, through a study of two American corpora – the Brown Corpus (compiled in the 1970s) and the Freiburg-Brown (Frown) Corpus (documents of the early 1990s) – the term “produce” is frequently associated with the term “energy” (Chung, 2011).

Further analysis of the content words was conducted in Jablonkai (2009): the two European Union-related registers show that most of the content words are nouns, like “Europe”, “Commission”, “states”, “year”, “member”, “countries” in the Online EU news corpus and “Council”, “Commission”, “Member”, “Minister”, “regulation”, “States”, “decision”, “government”, “Union”, “Community”, “article”, “State”, “energy” in the EU discourse corpus.

Research methodology

The energy issues are of high importance for every nation, but also for the entire world population, and using the current knowledge within the field, this paper will develop a corpus-based analysis that aims to capture the evolution of the energy related problems and concepts over time.

Therefore, there were built three corpora based on important research papers and books that were published in three periods of time: before 2000, between 2000 and 2008, and after 2008. The rationale for selecting these time spans was that they can be considered to represent milestones in the evolution of the energy sector. On one hand, the year 2000 represents the beginning of a new millennium, and therefore it comes with new goals to achieve. On the other hand, the year 2008 marks the beginning of the financial crisis and also it sets a new record for oil prices as it closes at a record of \$125.80 per barrel in May (Markham, 2015: 480). Moreover, it is the year when the President of the United States promoted the idea of a future of energy security as an investment in the legacy of next generations (The White House, 2010). For the analysis, each corpus for the three time spans was constructed using five research articles and one book which were considered as being suitable in the research of energy related issues. All these scientific works have developed the idea of energy as a matter of high importance and are proposing different approaches to the problems related to energy. The papers included in each of the three corpora are the following:

- Before 2000 corpus (420,620 words):
 - Stewart, I. (1975) Issues in Energy Policy – energy costs and policy analysis both at a global and also Canadian level;
 - Mead, W. (1979) The Performance of Government in Energy Regulations – argues that the price regimes prevailing before and after 1973-1974 are best explained by appealing to the change in ownership patterns that transpired in the early 1970s;
 - Berndt, E. (1990) Energy Use, Technical Progress and Productivity Growth: A Survey of Economic Issues – the interpretation of several of the most important aspects

- underlying relationships among technical progress, productivity growth, and energy use;
- O’Keefe, P., and Soussan, J. (1991) *Energy: Power to Some People – an analysis of the effect of the 1979 oil crisis which raised attention on energy planning, and the impact of the measures that were taken on various African countries*;
 - Sadorsky, P. (1999) *Oil price shocks and stock market activity – the development of a Vector Autoregressive model which shows that oil price played a pivotal role in explaining the US broad-based stock returns*;
 - Yergin, D. (1991) *The Prize: The Epic Quest for Oil, Money, and Power – an extensive research of the global oil industry’s history from 1850 until 1990*.
- Between 2000 and 2008 corpus (160,659 words):
 - Asafu-Adjaye, J. (2000) *The relationship between energy consumption, energy prices and economic growth: time series evidence from Asian developing countries – present a review of recent studies on the causal relationship between energy consumption and income for developing countries*;
 - Krichene, N. (2002) *World crude oil and natural gas: a demand and supply model – explains the oil price formation as a result of geopolitical pressure and high demand*;
 - Correlje, A., and van der Linde, C. (2006) *Energy supply security and geopolitics: A European perspective – develops the prospect of mutual gains from trade*;
 - Doménech, J. L., Gil-Pérez, D., Gras-Martí, A., Guisasola, J., Martínez-Torregrosa, J., Salinas, J., Trumper, R., Valdés, P., and Vilches, A. (2007) *Teaching of Energy*

- Issues: A Debate Proposal for a Global Reorientation – promotes the idea that energy instruction must be organized around learning goals based on core science ideas and involve learners in relevant contexts;
- Russi, D. (2007) *Biofuels: Solution for Energy Crisis?* – a research about biofuels and their use as a possible solution for reducing the world dependency on fossil fuels;
 - Smil, V. (2003) *Energy at the Crossroads* – a broad book addressing many important problems, by offering a comprehensive and accessible guide to today’s complex energy issues.
- After 2008 corpus (94,108 words):
 - Nel, W. P., and van Zyl, G. (2010) *Defining limits: Energy constrained economic growth* – argue the current socio-economic paradigm as not being sustainable;
 - Zaman, G., and Goschin, Z. (2010) *Multidisciplinarity, interdisciplinarity and transdisciplinarity: Theoretical approaches and implications for the strategy of post-crisis sustainable development* – address the issue of sustainability as an overlap between a sustainable society, sustainable environment and sustainable economy;
 - Ciscar, J. C., and Dowling, P. (2014) *Integrated assessment of climate impacts and adaptation in the energy sector* – quantifies the impact of climate change on energy systems;
 - Olmstead, S. M. (2014) *Climate change adaptation and water resource management: A review of the literature* – debates the idea of sustainability through water use in agriculture;
 - Sorrell, S. (2014) *Reducing energy demand: An overview of issues, challenges and approaches* – argues that reducing energy demand will prove more difficult than is

commonly assumed and current approaches will be insufficient to deliver the transformation required;

- Epstein, A. (2014) *The Moral Case of Fossil Fuels* – argues that most of what we hear about fossil fuels is a myth.

To analyse the text within the three corpora, the AntConc concordancing programme designed by Lawrence Anthony will be used (Anthony, 2005). As a toolkit for concordance and text analysis, word and keyword frequency generator, for cluster and lexical bundle analysis, AntConc provided the framework to observe the evolution of energy related issues over time. In the following chapter of this paper, the results obtained by using this software will be presented.

Main findings and discussion

Using the AntConc tool to discover the most frequent words in each corpus, for the related time spans, by referring to keywords in the energy field, the results obtained demonstrate the fact that with the passing of the years the importance of the term “oil” can be seen in each corpus and the use of climate change and water issues related words have become more intense in the literature after 2000 (Table 1).

Table 1

Most frequent words used in each corpus

Rank based on frequency	Before 2000	Between 2000 and 2008	After 2008
1	Oil (5159)	Energy (1695)	Energy (1165)
2	Company/ies (1753)	Oil (821)	Fuel/s (569)
3	American (859)	World (494)	Climate (518)
4	War (841)	Gas (465)	Fossil (500)
5	States (827)	Electricity (458)	Water (484)

Source: Corpus-based analysis using AntConc

Therefore, the literature included in the 'before 2000' corpus consists in analysing the energy issues by referring predominantly to "oil" or "war" issues, as the corpus uses phrases such as "oil crisis", "oil prices" or "oil war". The use of the word "war" is not random as these papers bring to attention wars such as the World War II, the Civil War or the Cold War, and the realities and changes that followed these events:

"From the end of World War II until the early 1970s, in many economies average energy productivity grew at about 1/2% per year, reflecting in part advances in the state of knowledge." (Before 2000 corpus)

Between 2000 and 2008, a greater importance is given to "oil" and "gas" at a global level (before 2000, the United States of America are used often when the discussions are about energy issues), and also the term "energy" is the most frequent used one in the corpus. After the financial crisis, the interest for "energy" remains high, but other words are starting to be part of every research, such as "climate" or "water", these terms being also mentioned together:

*"The availability of **water** can also become an issue under future **climate** change"* (After 2008 corpus)

After 2008 the concept of "climate change" starts to emerge in the papers, as one of the biggest issues that come with fossil fuels nowadays: *"Catastrophic climate change is the most dire claim about fossil fuels today, and it is associated with many prominent scientific bodies, journals, and media outlets—although if we go through the writings of the 1970s and 1980s, we see those same bodies declare many things confidently about global cooling only to contradict themselves several years later. [...] Since then, those who believe in catastrophic climate change have overwhelmingly focused on global warming due to CO₂ emissions from fossil fuels."* (After 2008 corpus)

But, what is more interesting is that even if there is evidence in the literature for fossil fuels use as a main driver for energy related issues which threaten global security, there also can be found ideas that support the use of fossil fuels:

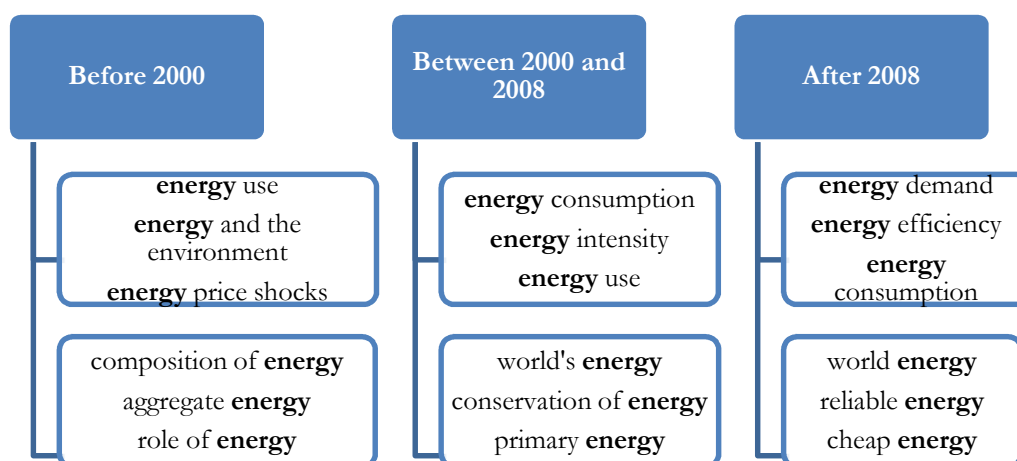
“As far back as the 1970s they predicted that if we did not dramatically reduce fossil fuel use then, and use renewables instead, we would be experiencing catastrophe today—catastrophic resource depletion, catastrophic pollution, and catastrophic climate change. Instead, the exact opposite happened. Instead of using a lot less fossil fuel energy, we used a lot more—but instead of long-term catastrophe, we have experienced dramatic, long-term improvement in every aspect of life, including environmental quality. The risks and side effects of using fossil fuels declined while the benefits—cheap, reliable energy and everything it brings—expanded to billions more people. [...] fossil fuels are easy to misunderstand and demonize, but they are absolutely good to use. And they absolutely need to be championed. . . . Mankind’s use of fossil fuels is supremely virtuous—because human life is the standard of value and because using fossil fuels transforms our environment to make it wonderful for human life.” (After 2008 corpus)

Moreover, by analysing the frequency of words used in each corpus, it can be observed that if before 2008, “oil”, “gas” and “coal” were mentioned separately in the literature (before 2000, “oil” is used 5159 times, “gas” 220 times and “coal” 210 times; between 2000 and 2008, “oil” occurs 821 times, “gas” 465 times and “coal” 334 times), after 2008, when referring to these resources, the researchers use mainly the term “fossil fuels” (occurs more than 500 times).

The AntConc software also permits a cluster analysis, and in connection with the energy field, the most frequent contexts in which the term occurs in the three corpora can be seen in Figure 1.

Figure 1

“Energy” Clusters



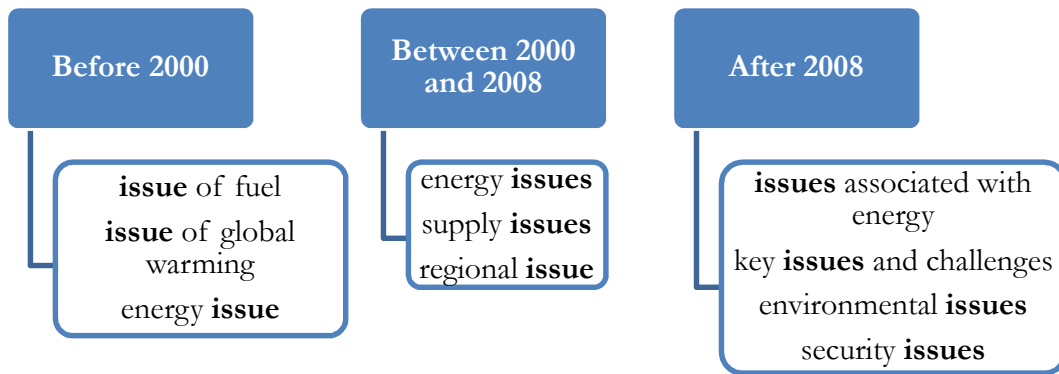
Source: Corpus-based analysis using AntConc

Based on these text analysis results, an evolution of the term “energy” can be observed: if in the first period of time analysed, the “role of energy” and the relation with prices is more outlined, between 2000 and 2008 the energy efficiency is brought into attention by using phrases like “energy intensity” and “conservation of energy”. The transition towards sustainability is more significantly underlined in the literature after 2008, as the “energy efficiency” construction occurs 63 times in the corpora. Furthermore, the overall objectives of the global energy strategy are brought into attention as the literature after 2008 is using frequently the “world” (the switch in perception from national to global level), “reliable” (satisfying current and medium and long term energy sector energy needs) and “cheap” (affordable prices) terms associated with “energy”. As the recent years have seen increasing attention being paid to the issue of energy security, using the secondary data analysis, the following

clusters for the term “issue/s” were retrieved from the three corpora (Figure 2).

Figure 2

“Issue/s” Clusters



Source: Corpus-based analysis using AntConc

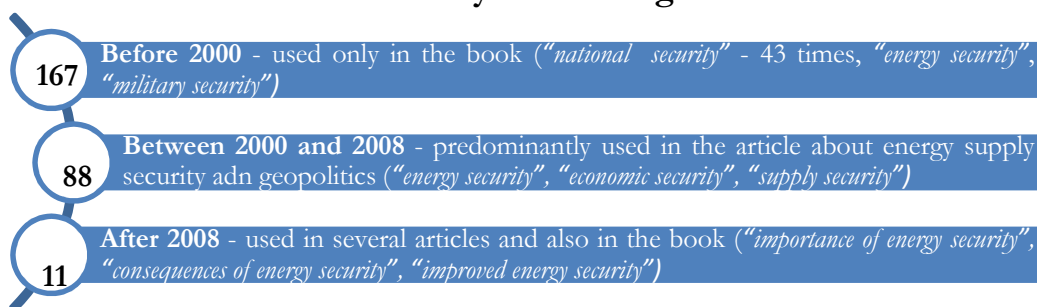
The term “energy” is associated with “issue” in every analysed time span. Moreover, the concerns in the energy field, such as “global warming”, appear even before 2000. The same interest is maintained throughout the whole period, as after 2008 the “environmental issues” arise. Furthermore, the transition from using fossil fuels to renewable energy is best described in the following paragraph that does not see the size of this process as being an issue in achieving sustainability:

“Inevitable and gradual transition from fossil fuels to nonfossil energies should not imperil the maintenance of what has been achieved and it should not make it more difficult to extend the benefits of higher energy use to those who will need it most. Magnitude of renewable energies is not an issue as there is an enormous flux of solar radiation reaching the Earth that can be tapped directly or after its natural conversion to flowing water, wind, waves, and biomass.” (Between 2000 and 2008 corpus)

As the global environment is in a continuous evolution and large countries are emerging on the world chessboard there is an increase in global energy security concerns. But, using the AntConc software and observing the usage of the “*security*” term in the three corpora, even if the frequency with which it was used in the three periods of time decreases until now, the explanation can be sought in a deeper understanding of the text analysis (Figure 3).

Figure 3

“Security” term usage



Source: Corpus-based analysis using AntConc

The articles analysed for the years before 2000 do not debate on the security issue, as only the book mentions “*security*” especially in relation to “*national*” or “*military*” security. Between 2000 and 2008 the literature is more generous with this term, as

“[...] the growing dependence on energy imports will politicize inter- or intra-empire energy markets, turning energy security into an integral part of foreign and security policy-making and requiring national, or EU, authorities to engage actively in security of supply measures.”(Between 2000 and 2008 corpus)

The importance of “*energy security*” is the highest in the ‘after 2008’ corpus, because energy efficiency is associated with the security of energy distribution system and the following citation expresses the best what should everyone do for a better future:

“At the dawn of the twenty-first century, the country that faced down the tyranny of fascism and communism is now called to challenge the tyranny of oil... For the sake of our security, our economy, our jobs and our planet, the age of oil must end in our time.” (After 2008 corpus)

Conclusions

The analysis conducted within this research project offers the possibility to draw some conclusions related to energy issues' evolution throughout time: the literature have become more aware of the consequences of the intensive use of fossil fuels and have started to pay more attention to climate change and water issues; if before 2008 the “oil”, “gas” and “coal” were analysed separately, nowadays they occupy the same place in the battle for energy security, as “fossil fuels”; the transition towards sustainability is more significantly underlined in the literature after 2008; also, energy efficiency is associated with energy security in the literature after 2008. Furthermore, the energy issues are diverse and the shift in perception can be observed with the passing of the years and with the discovery of the ways to produce energy or major events that take place in the world. The energy security is considered nowadays as a requirement for the medium and long-term survival and evolution of humankind, and the efficiency-related terms can be found more often in the current academic literature.

This paper is subject to a number of limitations, as the criteria used to select the papers and the books to build the three corpora might have disregarded other relevant works in the energy field, or the relatively small number of articles and books included in the corpus-based analysis. All these might have conducted to misrepresented and distorted results for the general perspective of analysed time spans. By expanding the number and diversity of papers and books included in the investigation, future research in this field could contribute to a better comprehension of the elements characterizing of every period of reference.

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References

- Anthony, L. (2005) 'AntConc: Design and Development of a Freeware Corpus Analysis Toolkit for the Technical Writing Classroom', 2005 IEEE International Professional Communication Conference Proceedings, Limerick, pp. 729-737.
- Asafu-Adjaye, J. (2000) 'The relationship between energy consumption, energy prices and economic growth: time series evidence from Asian developing countries', *Energy economics*, vol. 22, no. 6, pp. 615-625.
- Berndt, E. R. (1990) 'Energy use, technical progress and productivity growth: a survey of economic issues', *Journal of Productivity Analysis*, vol. 2, no. 1, pp. 67-83.
- Biber, D. and Barbieri, F. (2007) 'Lexical bundles in university spoken and written registers', *English for Specific Purposes*, vol. 26, no. 3, pp. 263–286.
- Biber, D., Conrad, S. and Cortes, V. (2004) 'If you look at.: Lexical Bundles in University Teaching and Textbooks', *Applied Linguistics*, vol. 25, no. 3, pp. 371-405.
- Chevalier, G. and Hudson, R. (2001) 'The use of intentional language in scientific articles in finance', *Journal of Economic Methodology*, vol. 8, no. 2, pp. 203-228.
- Chung, S.-F. (2011) 'A Corpus-based Analysis of “Create” and “Produce”', *Chang Gung Journal of Humanities and Social Sciences*, vol. 4, no. 2, October, pp. 399-425.

- Ciscar, J. C. and Dowling, P. (2014) 'Integrated assessment of climate impacts and adaptation in the energy sector', *Energy Economics*, vol. 46, pp. 531-538.
- Conrad, S. (1996) 'Investigating academic texts with corpus-based techniques: An example from biology', *Linguistics and Education*, vol. 8, no. 3, pp. 299-326.
- Correlje, A. and Van der Linde, C. (2006) 'Energy supply security and geopolitics: A European perspective', *Energy Policy*, vol. 34, no. 5, pp. 532-543.
- Cowie, A.P. (1992) 'Multi word lexical units and communicative language teaching', in Arnaud, P. and Bejoint, H. *Vocabulary and Applied Linguistics*, London: Macmillan.
- Doménech, J.L., Gil-Pérez, D., Gras-Martí, A., Guisasola, J., Martínez-Torregrosa, J., Salinas, J., Trumper, R., Valdés, P. and Vilches, A. (2007) 'Teaching of energy issues: A debate proposal for a global reorientation', *Science & Education*, vol. 16, no. 1, pp. 43-64.
- Douglas, B. and Conrad, S. (1999) 'Lexical bundles in conversation and academic prose', in Hasselgård, H. and Oksefjell, S. *Out of corpora: Studies in Honour of Stig Johansson*, Amsterdam-Atlanta: Rodopi.
- Epstein, A. (2014) *The Moral Case of Fossil Fuels*, New York: Portfolio.
- Fløttum, K., Gjesdal, A., Gjerstad, Ø., Koteyko, N. and Salway, A. (2014) 'Representations of the future in English language blogs on climate change', *Global Environmental Change*, vol. 29, November, pp. 213-222.
- Georgescu-Roegen, N. (1979) 'Energy Analysis and Economic Valuation', *Southern Economic Journal*, vol. 45, no. 4, April, pp. 1023-1058.
- Goldschmidt, N. and Szmrecsanyi, B. (2007) 'What do economists talk about? A linguistic analysis of published writing in economic journals', *American Journal of Economics and Sociology*, vol. 66, no. 2, pp. 335-378.

- Grundmann, R. and Krishnamurthy, R. (2010) 'The Discourse of Climate Change: A Corpus-based Approach', *Critical Approaches to Discourse Analysis across Disciplines*, vol. 4, no. 2, pp. 125-146.
- Hayek, F. (1952) *The Counter-Revolution in Science*, Chicago: University of Chicago Press.
- Hyland, K. (2008) 'As can be seen: Lexical bundles and disciplinary variation', *English for Specific Purposes*, vol. 27, no. 1, pp. 4-21.
- Jablonkai, R. (2009) 'In the light of: A corpus-based analysis of lexical bundles in two EU-related registers', *WoPaLP*, vol. 3, pp. 1-27.
- Kim, K. (2014) 'Examining US news media discourses about North Korea: A corpus-based critical discourse analysis', *Discourse & Society*, vol. 25, no. 2, March, pp. 221-244.
- Krichene, N. (2002) 'World crude oil and natural gas: a demand and supply model', *Energy economics*, vol. 24, no. 6, pp. 557-576.
- Lindeberg, A.-C. (1994) 'Rhetorical Conventions in Scholarly Articles in Economics and Business Sciences: A Study of Introductions with special Reference to Knowledge Claims', in Cmejrkova, S., Danes, F. and Havlova, E. *Writing vs. Speaking: Language, Text, Discourse, Communication*, Tubinger: Narr Francke Attempto Verlag GmbH & Co. KG.
- Lindeberg, A.-C. (1996) 'Argumentative structures and signals in three disciplines: Finance, management, and marketing', in Rijlaarsdam, G., Bergh, H.v.d. and Couzijn, M. *Theories, models and methodology in writing research*, Amsterdam: Amsterdam University Press.
- Markham, J. (2015) *A Financial History of the United States: From Enron-Era Scandals to the Subprime Crisis (2004-2006); From the Subprime Crisis to the Great Recession (2006-2009)*, New York: Routledge.
- Mead, W. J. (1979) 'The performance of government in energy regulations', *The American Economic Review*, vol. 69, no. 2, pp. 352-356.

- Moan, J. and Smith, Z. (2007) *Energy use worldwide: a reference handbook*, California: ABC-CLIO.
- Moon, R. (1997) 'Vocabulary connections: Multi-word items in English.', in Schmitt, N. and McCarthy, M. *Vocabulary description, acquisition and pedagogy*, Cambridge: Cambridge University Press.
- Moon, R. (1998) *Fixed expressions and idioms in English: A corpus-based approach*, 1st edition, Oxford: Oxford University Press.
- Nel, W. P. and van Zyl, G. (2010) 'Defining limits: Energy constrained economic growth', *Applied Energy*, vol. 87, no. 1, pp. 168-177.
- O'Keefe, P. and Soussan, J. (1991) 'Energy–power to some people', *Review of African Political Economy*, vol. 18, no. 51, pp. 107-114.
- Olmstead, S. M. (2014) 'Climate change adaptation and water resource management: A review of the literature', *Energy Economics*, vol. 46, pp. 500-509.
- Russi, D. (2007) 'Biofuels: Solution for Energy Crisis?', *Economic and Political Weekly*, vol. 42, no. 19, pp. 1664-1667
- Sadorsky, P. (1999) 'Oil price shocks and stock market activity', *Energy Economics*, vol. 2, no. , pp. 449-469.
- Smil, V. (2003) *Energy at the crossroads: global perspectives and uncertainties*, Cambridge: MIT Press.
- Solow, R. (1973) 'Is the End of the World at Hand?', *Challenge*, vol. 16, no. 1, March/April, pp. 39-50.
- Sorrell, S. (2014) 'Reducing energy demand: An overview of issues, challenges and approaches', *Renewable and Sustainable Energy Reviews*, vol. 47, pp. 74-82.
- Stewart, I. A. (1975) 'Issues in Energy Policy. Canadian Public Policy', *Analyse de Politiques*, vol. 1, no. 2, pp. 250-255.
- Su, S.-W. and Ku, P.-y. (2014) 'A Corpus-based Study on Speeches about Climate Change: Using TED Talks as a Case Study', Paper presented at 2014 International Conference and Workshop on TEFL & Applied Linguistics, March 8, 2014, Taoyuan.

- Swales, J. (1990) *Genre Analysis: English in Academic and Research Settings*, Cambridge: Cambridge University Press.
- The White House (2010) *Selected Speeches of President George W. Bush 2001-2008*, [Online], Available: <http://georgewbush-whitehouse.archives.gov/> [15 May 2015].
- Tinberg, J. (1988) 'The ph of a volatile genre', *English for Specific Purposes*, vol. 7, no. 3, pp. 205–212.
- Touileb, S. and Salway, A. (2014) 'Constructions: a new unit of analysis for corpus-based discourse analysis', Proceedings of the 28th Pacific Asia Conference on Language, Information and Computation, Thailand, 634-644.
- Yergin, D. (1991) *The Prize: The Epic Quest for Oil, Money and Power*. New York: Simon & Schuster.
- Zaman, G. and Goschin, Z. (2010) 'Multidisciplinarity, interdisciplinarity and transdisciplinarity: Theoretical approaches and implications for the strategy of post-crisis sustainable development', *Theoretical and Applied Economics*, vol. 12, no. 12, pp. 5-20.