

COAL, POWER, AND KYOTO PROTOCOL: REGULATING GREENHOUSE GAS
EMISSIONS IN POLAND AND KAZAKHSTAN

УГОЛЬ, ВЛАСТЬ И КИОТСКИЙ ПРОТОКОЛ: РЕГУЛИРОВАНИЕ ВЫБРОСОВ
ПАРНИКОВЫХ ГАЗОВ В ПОЛЬШЕ И КАЗАХСТАНЕ

КӨМІР, БИЛІК, ЖӘНЕ КИОТО ХАТТАМАСЫ: ПОЛЬША МЕН ҚАЗАҚСТАН
ПАРНИКТІК ГАЗДАР ШЫҒАРЫНДЫЛАРЫН РЕТТЕУ

by

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A Thesis Submitted to the School of Humanities and Social Sciences of Nazarbayev
University in Partial Fulfillment of the Requirements for the Degree of

MASTER OF POLITICAL SCIENCE AND INTERNATIONAL RELATIONS

ASTANA, KAZAKHSTAN

2016

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THESIS APPROVAL FORM
NAZARBAYEV UNIVERSITY
SCHOOL OF HUMANITIES AND SOCIAL SCIENCES

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Table of Contents

List of Tables.....	v
List of Figures	vi
Abstract	vii
Acknowledgements.....	ix
Preface.....	x
Chapter 1 Greenhouse Gas Emissions Problems and Environmental Policies	1
Chapter 2 Existing Literature on the Implementation of International Environmental Regimes.....	23
Chapter 3 Domestic Political Constraints Are Stronger in Kazakhstan than in Poland	34
Chapter 4 European Union Membership Helps Reduce Domestic Political Constraints.....	56
Conclusion.....	69
References	70

List of Tables

Table 1. Kyoto Protocol Timetable.....	4
Table 2. List of Countries under Annex I, Annex II, and Annex B (Non-Annex) Categories	5
Table 3. Coal Consumption and Production Rates	9
Table 4. Democracy Index for Kazakhstan and Poland.....	13
Table 5. List of Top Environment Officials of the Republic of Kazakhstan, 2004-Present.....	38

List of Figures

Figure 1. Global Greenhouse Gas Emissions by Different Gases.....	2
Figure 2. Sources of Greenhouse Gas Emissions Globally.....	3
Figure 3. Comparison of Total Coal Production	9
Figure 4. Comparison of Total Coal Consumption of Poland and Kazakhstan.....	10
Figure 5. Comparison of CO ₂ Emissions from Consuming Coal in Poland and Kazakhstan.....	11
Figure 6. Comparison of Total Energy Consumption	12
Figure 7. Comparison of Total Energy Production	13
Figure 8. EU Budget Spent in 2013.....	32
Figure 9. Total Tax Revenues of Kazakhstan.....	45
Figure 10. Different Types of Taxes in Kazakhstan	45
Figure 11. EU Total Expenditure in 2013.....	57
Figure 12. Comparison of Coal Imports of Poland and Kazakhstan.....	60
Figure 13. Comparison of Coal Exports of Poland and Kazakhstan.....	60
Figure 14. EU Budget Spent for Poland in 2013.....	61

Abstract

This thesis focuses on coal-using power generation companies' behavior under state policies and the outcomes of greenhouse gas emissions reduction efforts (as a result of the Kyoto Protocol and COP 21) of two countries, Poland and Kazakhstan. Why did these countries differ in the reduction of greenhouse gas emissions levels as both have followed the same Kyoto Protocol's obligations and both have similar coal production and consumption rates? Addressing this empirical question helps investigate broader theoretical questions of how and why some countries take implementation of international regimes seriously while others do not. Is the difference due to faulty international agreement or due to domestic politics, which shape the implementation of, or failure to implement, international environmental obligations? To understand this difference deeper I used two embedded case studies, analyzed government documents and company GRI reports, data from International Energy Statistics (IEA), 'United Nations Framework on Climate Change' (UNFCCC), 'Intergovernmental Panel on Climate Change' (IPCC), and environmental policies for sustainable development, and conducted interviews with 10 employees and managers from a coal-powered generation company in Kazakhstan. On the basis of my evidence, I have reached the following three conclusions. First, domestic political constraints as defined by financial, informational, and personnel constraints in Kazakhstan were stronger than in Poland, and Kyoto's approach to tackle the emissions issue was not effective. Second, European Union (EU) membership helped Poland to reduce its emissions as it both pressured Poland to implement environmental obligations and helped reduce domestic political constraints. Third, the difference between the political regimes of two nations (Poland being a

“flawed democracy”; and Kazakhstan being an “autocracy”) was not sufficient to explain for why international agreements work for Poland and do not work for Kazakhstan. Many scholarly works exist that examine environmental impact reduction in Poland and its performance under the international climate change agreements; however, there is a void in the existing literature for Kazakhstan due to its comparatively slow reform process.

Acknowledgements

I would like to thank my thesis supervisor Dr. Alexei Trochev for his enduring mentorship throughout my graduate school career. His time and effort devoted to my thesis starting from advising to making strong suggestions helped transform my abstract musings on environmental policies into a solid hypothesis backed by credible research.

Thank you very much Professor Trochev for always being supportive of my research and for your willingness to help any time.

I would also like to thank Professor Phillipe Foret for inspiring my research with the latest developments in the field of Climate Change policies. The resources you shared with me gave me the data I needed to make an assertive conclusion to my thesis. Finally, I would not have been able to survive the long hours in the library without the mental support and companionship of my twin sister Altannur Jykeyei and my roommate Raikhan Satymbekova. They provided me with the motivation and resilience I required to push through to the end.

Preface

My interest in the topic of the threats of climate change comes largely from my background and experiences while I was completing my undergraduate degree in Environmental Sustainability Studies. Prior to that, my knowledge on climate change and environmental risks was minimal and I had never noticed how I was treating Mother Earth. My perceptions on climate change threats started changing when I gained more and more knowledge about them and, thus, the way I behave towards environment also drastically improved; for example, I started recycling more and focusing on saving energy by using less electricity. Therefore, deriving from my experiences, I wanted to study how increasing greenhouse gas emissions have impacted Kazakhstani society and how governmental actors have engaged in decision-making processes to improve the situation. In addition, as generation companies' businesses contribute most of the emissions, I wanted to study how these companies interact with state environmental policies. Also, comparing Kazakhstan to Poland was a great contribution to my study due to the ability to identify the differences in the environmental performance and policy outcomes in the two nations. Thus, the relation between this research and me as a researcher lies within my passion for saving the environment and fixing the problem of climate change.

Chapter 1 Greenhouse Gas Emissions Problems and Environmental Policies

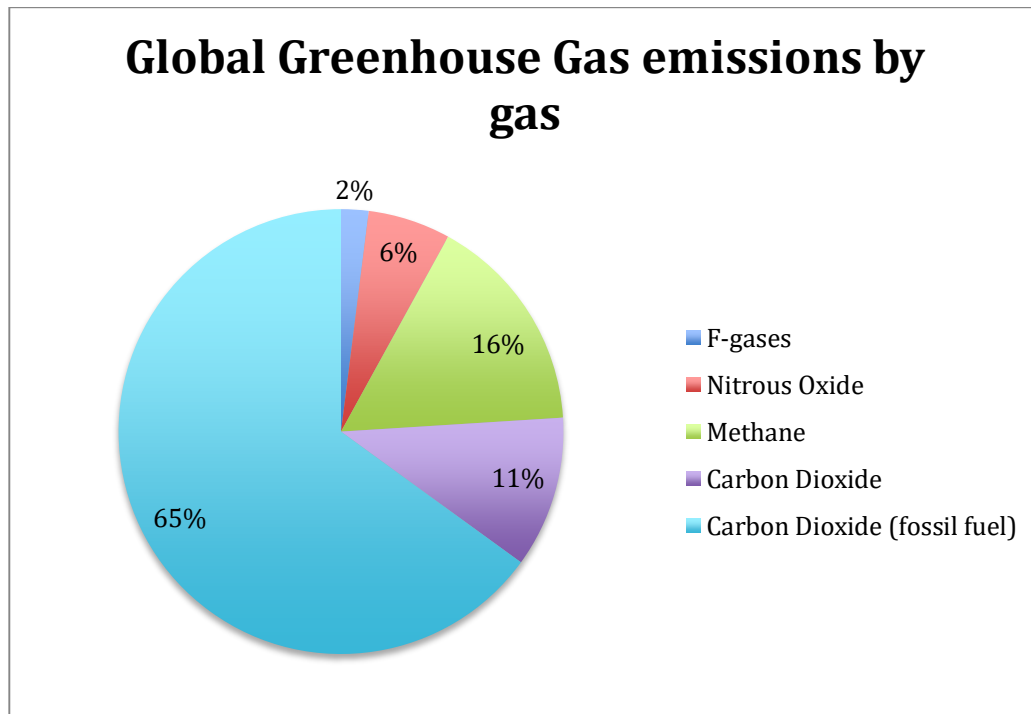
Introduction

Global Climate Change has become one of the most serious long-term threats the world is facing today. Scientific evidence collected by many authoritative bodies, including the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Framework Convention on Climate Change (UNFCCC), has shown that the main cause of climate change is the ever-increasing concentration of greenhouse gases, including carbon dioxide, methane, nitrous oxide and others that are responsible for causing the greenhouse effect in the atmosphere (UNFCCC 2015). Prior to this century, the earth has periodically undergone increases in global average temperature; however, these trends were part of the ecosystem's natural cycle and its negative impact upon the planet was not as severe as it is today because the rate of change in global temperature was comparatively gradual. The current period of climate change is different than all of these historical events primarily due to the unprecedentedly high rate of increase in average global temperature. We can no longer blame natural processes for global warming, because anthropogenic activities such as emissions from the combustion of hydrocarbon-based fuels, including coal for energy generation and petrochemicals for transportation, are the main cause of this phenomenon (Vasser 2009; Uno 2002; McLeman 2015).

The impacts of climate change are immense and it is of paramount importance for society to reduce greenhouse gas emissions into the atmosphere. Figure 1 shows us the

different types of toxics, and carbon dioxide is the most harmful greenhouse gas in the atmosphere.

Figure 1. Global Greenhouse Gas Emissions by Different Gases

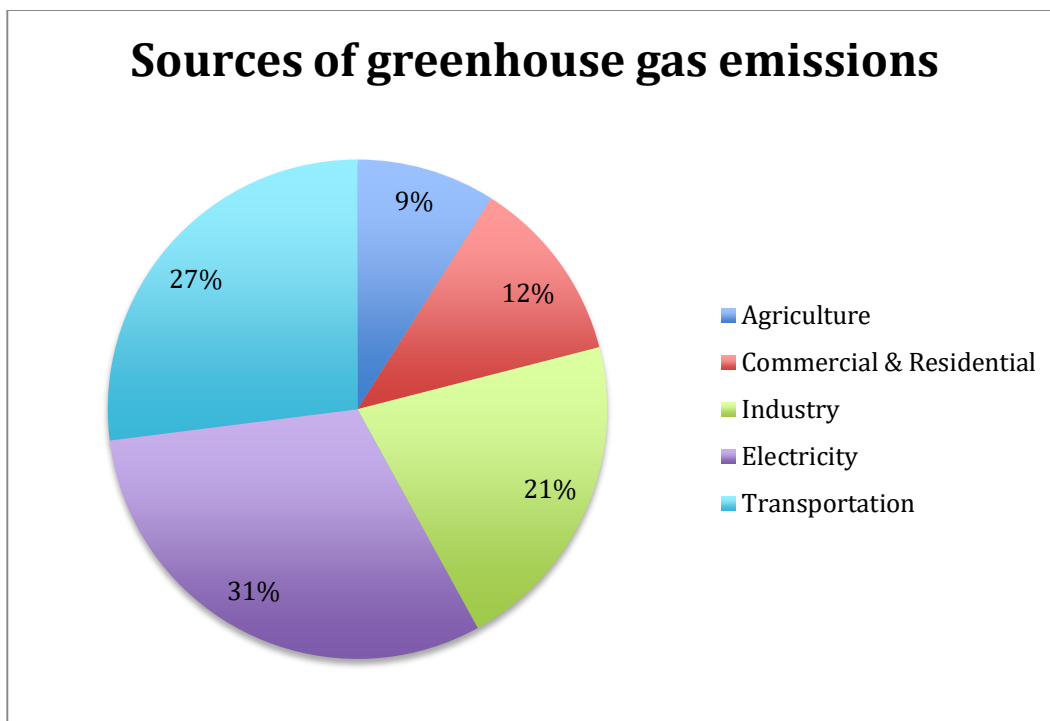


Source: UNFCCC

The Intergovernmental Panel on Climate Change (IPCC) was formed in 1988 with the aim of investigating the causal mechanisms for temperature increase and its effects on the well-being of humanity and the environment. At that time, the satisfactory gains in the global economy were being made at the cost of wanton disregard for environmental health. Natural resources were being depleted rapidly which has caused a 'loss of biodiversity', 'limited access to portable water', 'agricultural degradation', and 'increasing conflicts over a limited resources' (The World Factbook 2016). In 1990, the IPCC's subject matter experts presented these warnings and claimed that the available science proved the global temperature increase is due to anthropogenic activities rather than a natural cycle (IPCC 2013). In 2014, IPCC's Fifth Assessment Report was

published and has further illustrated the risks of the current, ongoing rise in temperatures. Global average temperature increase is estimated to be as much as 2 degrees Celsius in the near future, and 2.5-7.5 Celsius by 2100, which would greatly impact the business world in almost every area, including “agriculture, construction, industrial activity, oil, and transportation” (Moreno 2016) as shown in Figure 2.

Figure 2. Sources of Greenhouse Gas Emissions Globally



Source: UNFCCC

These environmental changes would lead to natural disasters, including an increase in flood events due to the sea level's rise. Ice melting would lead to the disappearance of many islands, most of which are contained within a vulnerable zone. Migration is costly and many cannot afford the consequences associated with it.

In order to tackle these issues, many international climate change agreements have been formed. One of these, the Kyoto Protocol, which was established in 1997 under United Nations Framework Convention on Climate Change (UNFCCC), had a

main aim of reducing atmospheric carbon dioxide concentrations and preventing further global warming through the implementation of policies and regulations that signatory states would agree to follow. Kyoto Protocol uses a national measure consisting of three main mechanisms to reduce the greenhouse gas emission: “International Emissions Trading”, “Clean Development Mechanism”, and “Joint Implementation” (Kyoto Protocol 1998).

Thirty-eight countries and the European Union (EU) undertook responsibilities to reduce their emissions within the target years of 2008-2012. Member countries are divided into three kinds of Parties according to the climate change convention including Annex I, Annex II, and Annex B (Non-Annex) parties. As Poland and Kazakhstan had different levels of development at the time of their inception into the Protocol, they belong to different Annex parties. For example, Poland signed the Kyoto Protocol in 1998 as shown in Table 1 and is considered an Annex I country.

Annex I Parties: Countries involved in this category are mostly industrialized or developed countries in terms of their GDP and economic growth. Also, in 1992, these countries were bound by the conditions of the “Organization for economic cooperation and development” (OECD). Annex I also includes the ‘economies in transition’ (EIT) group (see Table 2).

Table 1. Kyoto Protocol Timetable

Timetable of Kyoto Protocol Adoption						
YEAR						
1997	1998	1999	2002	2005	2009	2008/2012
Kyoto Protocol	Poland Signature	Kazakhstan Signature	Poland Ratification	Poland Entry	Kazakhstan Ratification & Entry	Kyoto Emissions Target

Source: UNFCCC

Any Annex I country that failed to meet its Kyoto Protocol target was to be penalized by having its greenhouse gas reduction targets decreased by 30% in the next period after 2012.

Table 2. List of Countries under Annex I, Annex II, and Annex B (Non-Annex)

Annex I	Annex II	Annex B
Australia	Australia	Armenia
Austria	Austria	Australia
Belarus * -8.0	Belgium	Azerbaijan
Belgium	Canada	Belarus
Bulgaria * -8.0	Denmark	China
Canada	European Union	Cuba
Croatia * -5.0	Finland	Czech Republic
Cyprus	France	Egypt
Czech Republic * -8.0	Germany	France
Denmark	Greece	Georgia
Estonia * -8.0	Iceland	India
European Union	Ireland	Iran
Finland	Italy	Israel
France	Japan	Kazakhstan
Germany	Luxembourg	Kyrgyzstan
Greece	Netherlands	Mauritius
Hungary * -6.0	New Zealand	Mexico
Iceland	Norway	Morocco
Ireland	Portugal	Norway
Italy	Spain	Peru
Japan	Sweden	Republic of Korea
Latvia * -8.0	Switzerland	Republic of Moldova
Liechtenstein	Turkey	Russian Federation
Lithuania * -8.0	United Kingdom	Serbia
Luxembourg	United States of America	South Africa
Malta		Syrian Arab Republic
Monaco		Turkmenistan
Netherlands		Ukraine
New Zealand		Uzbekistan
Norway		Vietnam
Poland * -6.0		
Portugal		
Romania * -8.0		
Russian Federation *		
Spain		
Sweden		
Switzerland		
Turkey		
Ukraine		
United Kingdom		
United States		

Source: United Nations Framework Convention on Climate Change (UNFCCC)

* : Countries that reduced their emissions level from 2008-2012 under Kyoto Protocol

Annex II Parties: Countries that are included in this category usually have higher capacity to aid developing countries in cutting their emissions levels. The purpose of these parties is to assist countries that need to mitigate high emissions and adapt to

climate change threats. This group is mostly responsible for spreading awareness and enhancing technological innovations to transform nations into environmentally-friendly countries. Then the question of who gets to be funded is decided by the 'Convention's financial mechanism' (UNFCCC). OECD countries are also included in this category. However, EIT parties are not.

Non-Annex Parties: This category is also called the Annex B parties, which mostly includes developing countries, including those facing vulnerable conditions. In other words, countries that are less resistant to natural disasters or have limited access to potable water fall under this designation. In addition, Annex B parties include countries whose economic stability is highly dependent on their natural resources, especially production and consumption of fossil fuels. For example, Kazakhstan signed the Protocol in 1999 and is included in this category. Non-Annex countries have no greenhouse gas emission reduction obligations but they are required to submit an annual greenhouse gas inventory United Nations Climate Change Secretariat.

Categories

The first phase of the Kyoto Protocol was not successful for many of the signatory parties within the target years, but it was successful for several EU members, including Poland. Before 1997, when the Kyoto Protocol was agreed upon, 70% of the emissions came from developed countries. However, 20 years later most of the emissions are produced by developing countries (Boden et al 1995). The developing countries are more reluctant to reduce greenhouse gas emissions since the majority of their economic growth depends on industrial activities. The Protocol was expanded to a second commitment period (2013-2020). Developing countries have lacked the commitment to the emissions

reductions requirements, thus new environmental policies were needed to make the Kyoto Protocol effective.

Even though, first phase of the Kyoto Protocol expired in 2012, its obligations of cutting the emissions level still matter for today's increasing greenhouse gases (CO₂, SO₂, NO₂). COP 21, which is the continuation of the Kyoto Protocol that was negotiated and established in Paris in December 2015, shares obligations that were parts of the protocol. Would COP 21 turn to be a failure like Kyoto? To address this question, it is crucial to examine the GHG of the two states (Poland and Kazakhstan) and behavior of both states' coal industries under the Kyoto Protocol.

However, the existence of international environmental regulation regimes is not necessarily always effective and they could be non-binding in terms of compliance by signatory states, specifically in the ambiguity of mechanisms that should be followed to achieve these goals or the consequences for failing to achieve them. On the other hand, many claim that 'governance without government' does not solve certain issues, and thus international environmental regimes play an important role in identifying the problem, creating possible solutions, and allowing nations to cooperate to make a difference (Manne and Gunter 1999).

Let's evaluate policies and practices in terms of coal in reducing greenhouse gas emissions through the comparison of two signatory states to the Kyoto Protocol - Kazakhstan and Poland. I will examine one of the biggest generation companies (Samruk Energy) in Kazakhstan and Jastrzębska Spółka Węglowa S.A in Poland, by using their annual and quarterly reports (as available), interview data, official documents, and economic data as my evidence in explaining how and why Kazakhstan increased the greenhouse gas emission levels while Poland reduced them.

My research questions are: What are the coal power generation companies' behaviors to state policies? How and why do some countries take implementation seriously while others do not? How does domestic politics shape the implementation of or failure to implement international environmental obligations? What explains the effectiveness of international regimes?

Hypothesis 1: Domestic political constraints have been stronger in Kazakhstan than in Poland, which resulted in diverging outcomes for both countries under Kyoto Protocol.

Hypothesis 2: EU membership, an option not available to Kazakhstan, helped Poland's environmental policies to comply with Kyoto targets by reducing the strength of domestic political constraints.

My general answer to my research questions is that deeper international integration may lower domestic barriers and enable international regimes to make a difference in the behavior of states and private actors.

Case Selection of Poland and Kazakhstan

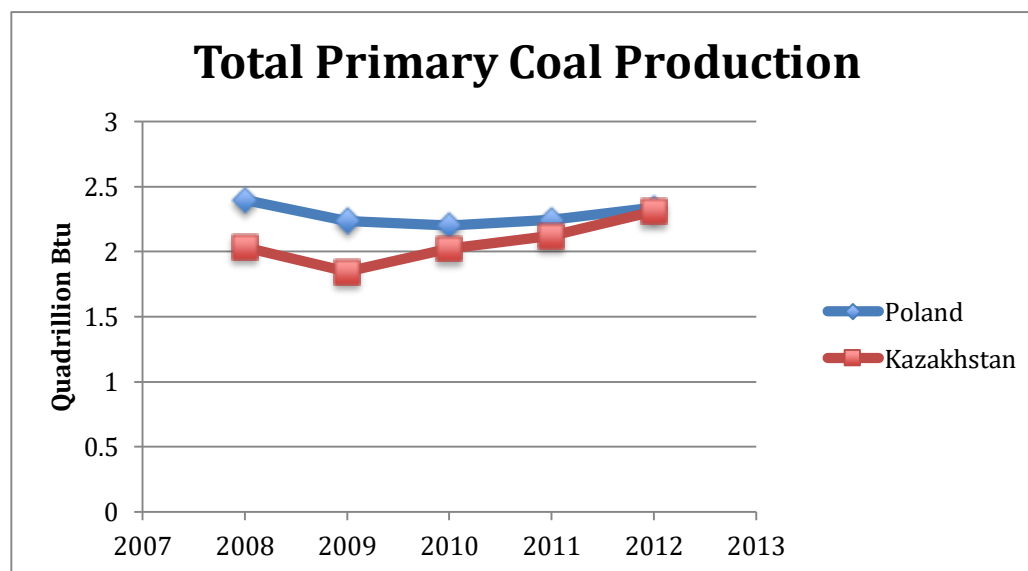
There are three primary reasons why I selected to use embedded case studies of Poland and Kazakhstan to explore my research question and why I find them a good combination for a comparison. First, Kazakhstan and Poland's national coal production and consumption rates and energy sector are similar as shown in Table 3, Figure 3, and Figure 4, which gives a fairly appropriate basis for comparison between the levels of greenhouse gas emissions of the two countries.

Table 3. Coal Consumption and Production Rates

Rates of Coal and CO ₂ Emissions								
Countries	YEAR							
	2005	2006	2007	2008	2009	2010	2011	2012
	Poland							
Total Coal Consumption	150,166	154,819	149,579	148,915	140,908	147,871	153,282	146,666
Total Coal Production	174,088	171,135	159,773	157,993	148,356	146,257	152,680	158,197
Total GHG emissions	200,697	210,257	203,941	200,942	191,784	203,715	206,888	191,372
Kazakhstan								
Total Coal Consumption	71,368	76,565	81,896	87,043	80,337	86,714	95,375	104,787
Total Coal Production	96,118	106,555	107,837	122,436	131,173	122,278	129,364	139,918
Total GHG emissions	109,953	117,740	124,795	133,724	123,330	132,454	145,702	161,044

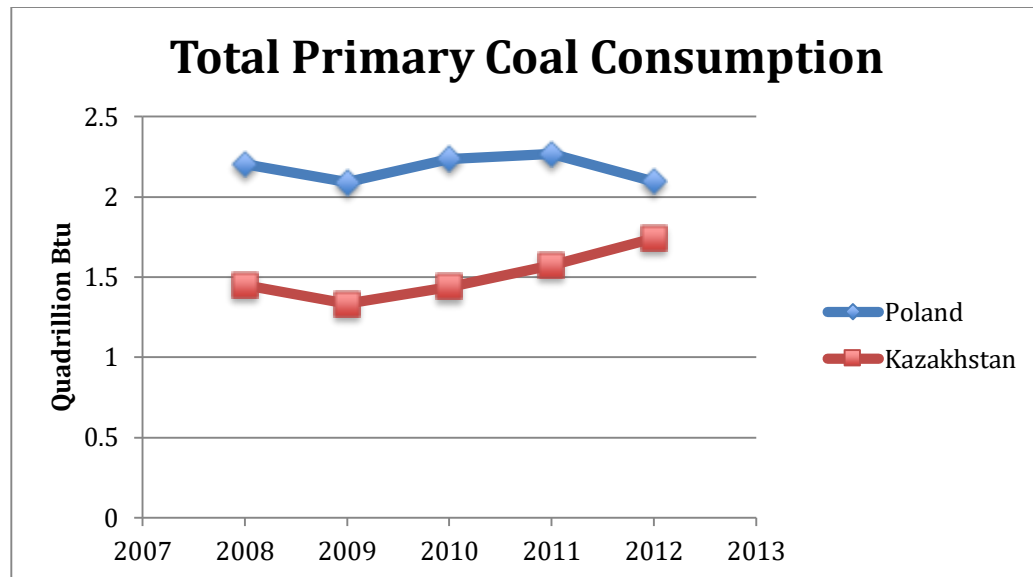
Consumption and Production: In Thousand Short Tons
Emissions: Million Metric Tons

Source: UNFCCC

Figure 3. Comparison of Total Coal Production

Source: Energy Information Administration (EIA.gov)

Figure 4. Comparison of Total Coal Consumption of Poland and Kazakhstan



Source: Energy Information Administration (EIA.gov)

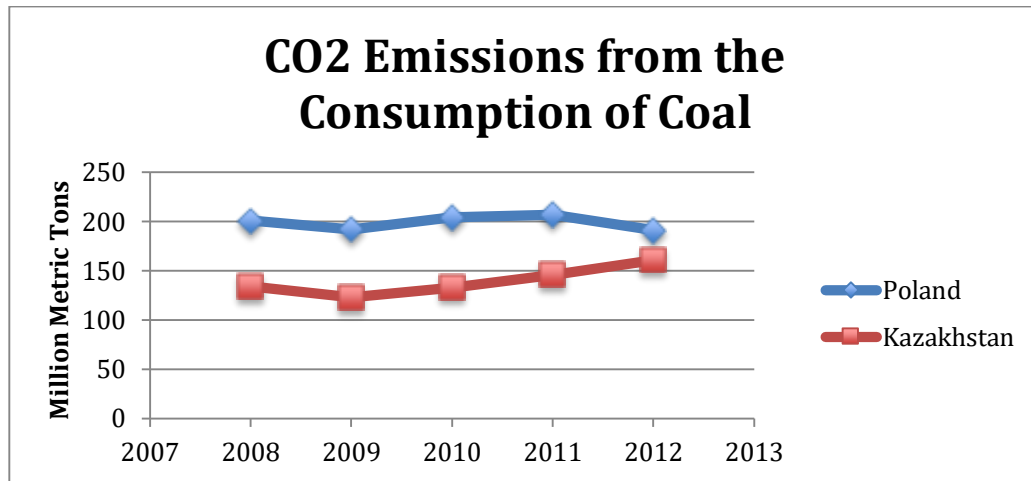
In this case, ‘Most Similar Systems Design’ (MSSD) research method will be used. MSSD is used when the two cases are similar, but vary on dependent variable. In my thesis, two independent variables are central for our understanding of the failure to reduce greenhouse gas emissions levels in Kazakhstan in light of the Kyoto Protocol standards: i) domestic political constraints ii) the extent of international integration, including the European Union.

Owing to the heavy influence of the Soviet Union on both states (Stoakes et al 2015) during the second half of the twentieth century, the energy sectors of both countries and the planned economies that governed commerce in both nations were very similar at the times that they both signed the Protocol (hierarchically organized coal industries with strong lobbying capacities, working class prestige, and large pools of employees).

Second, both of these countries are signatory members of the Kyoto Protocol. Despite both countries having agreed to the Protocol, there is a significant difference in

the actual reduction of greenhouse gas emissions. From 2011 to 2012, Poland's CO₂ emissions reduced from 207 to 191 million metric tons. However, Kazakhstan's emissions increased from 146 to 161 million metric tons (York 2015) as shown in Figure 5.

Figure 5. Comparison of CO₂ Emissions from consuming coal in Poland and Kazakhstan



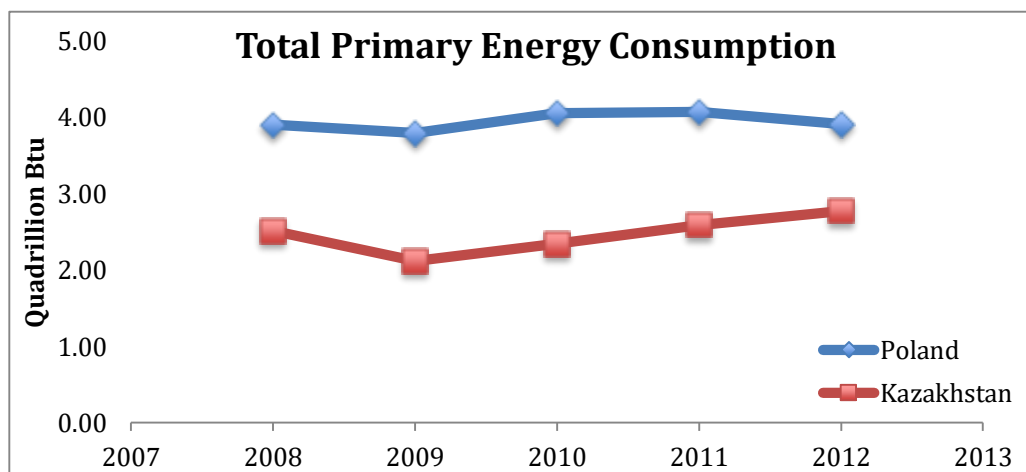
Source: Energy Information Administration (EIA.gov)

There are also differences between these two nations' government regulations as well as the environmental protection policies of coal generating companies. For instance, Poland government does not allow coal companies to use dirty coal with high ash content. While Kazakhstani government permits the usage of current coal, which contains 50% ash. Thus, I will be investigating factors that led to divergence in these two states' emissions reduction outcomes. As of 2012, Poland's efforts to reduce its greenhouse gas output resulted in a much greater change in policy, and change in the companies' behavior towards environmental protection than those of Kazakhstan. I document and explain these differences through examining several factors including political (environmental policies), economic (usage of natural resources), social (environmental

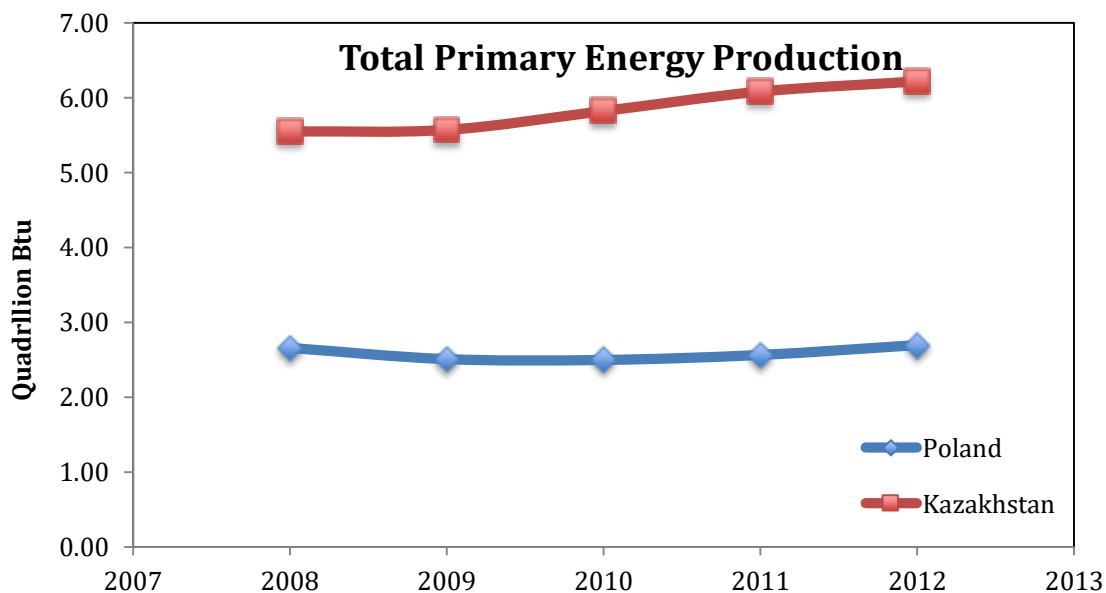
threats and impacts on society), and environmental practices of coal companies to explore the Kyoto Protocol compliance efforts in both countries.

Third, Poland and Kazakhstan have been chosen as case studies due to their “GDP composition by sector of origins” (2014). According to the CIA World Factbook, demand for energy and Kazakhstan’s industrial activity takes 29.5% of its GDP, and Poland’s industrial activity accounts for 32% of that nation’s GDP (2014). This allows me to explain why I haven’t chosen other countries in Central Asia as case studies to compare with Kazakhstan. Among five independent nations in Central Asia, Kazakhstan has the most abundant natural resources and thus cannot be compared with other four (Uzbekistan, Tajikistan, Turkmenistan, and Kyrgyzstan). They have comparably less abundant natural resources than Kazakhstan and their greenhouse gas emissions are lower. However, Poland and Kazakhstan have a similar GDP in terms of industry, Kazakhstan with 35.3%, and Poland with 41.1%, making the two countries a decent comparison (The World Factbook 2016).

Figure 6. Comparison of Total Energy Consumption



Source: EIA (U.S. Energy Information Administration)

Figure 7. Comparison of Total Energy Production

Source: EIA (U.S. Energy Information Administration)

Poland

The Republic of Poland is located in Central Europe. During 1945 to 1989, Poland was under Soviet rule being impacted by social unrest and economic depressions and was an autocratic state. In 1989, Poland began its transition from an autocratic state to a democratic regime. Table 4 illustrates the democracy index of the two countries.

Table 4. Democracy Index for Kazakhstan and Poland

		Units	2006	2008	2010	2011	2012	2013	2014
Казakhstan	Overall Score	score	3,620	3,450	3,300	3,240	2,950	3,060	3,170
	Electoral process and pluralism	score					0,500	0,500	0,500
	Functioning of government	score					2,140	2,140	2,140
	Political participation	score					3,330	3,890	4,440
	Political culture	score					4,380	4,380	4,380
	Civil liberties	score					4,410	4,410	4,410
Польша	Overall Score	score	7,300	7,300	7,050	7,120	7,120	7,120	7,470
	Electoral process and pluralism	score					9,580	9,580	9,580
	Functioning of government	score					6,430	6,430	5,710
	Political participation	score					6,110	6,110	6,670
	Political culture	score					4,380	4,380	6,250
	Civil liberties	score					9,120	9,120	9,120

Source: Knoema.ru

Since that period, Poland's economy has transformed from a "centrally planned to a market economy" (Budnikowski 1992). In 1995, Poland faced an impressive economic boom with a 6.9% annual economic growth, the highest GDP growth rate in that country's history since the end of Soviet rule. This economic boost mostly derived from economic restructuring including privatization of big industries and the electricity market. Since the 1990's, Poland made decent environmental progress despite the pressures of sustaining an economic boom. While other nations were producing more and releasing emissions into the atmosphere by putting market profits as the first priority, Poland was trying to balance economic growth and comply with international environmental obligations. Importantly, its environmental policies have started before the Kyoto Protocol (OECD 2015). Therefore, Kyoto Protocol became the motivation and driving force to participate in international environmental regime more actively. Poland's government made sincere plans to improve its environmental-friendly performance. The environmental issues included "pollution prevention, water treatment, waste management, biodiversity, landscape conservation, and climate protection" (OECD 2015). Identifying these issues as environmental threats to humanity is a big step, which later leads to taking actions towards solving existing problems. First, one of the biggest concerns for them is the expansion of infrastructure including effective water treatment. Second, economic and social decisions are driven by an integration of environmental issues into the decision-making process. Third, Poland supports international cooperation (Ministry of Science 2015) with states that are also concerned about environmental threats such as 'loss of biodiversity', 'health risks', 'natural disasters' etc.

The latter concern could be considered as one of the most effective factors that have influenced Poland's environmental performance. Over the last 10 years, Poland's

transition towards a market economy has brought key ‘institutional and economic changes’ (OECD 2016). Through the ratification of international agreements including UNFCCC, Kyoto Protocol, and the EU, Poland has improved its ‘international environmental commitments’ (OECD). Poland signed the Kyoto Protocol in 1998, ratified it in 2002, and entry to the Protocol took place in 2005. According to UNFCCC, Poland was one of the most successful states in reducing its emissions and, as of 2012; the Kyoto target of 6% reduction rate was accomplished (UNFCCC 2014).

Kazakhstan

Compared to Poland, Kazakhstan’s population is half of Poland, with 17 million people. Since gaining its independence in 1991, Kazakhstan’s annual GDP has increased from 2008 to 2011 by 3.4% to 7.5%, with the exception of the recent period of devaluation which resulted in a dramatic fall of 1.1% (World Bank 2015). Most of its economic growth comes from its abundant natural resources. According to the CIA World Factbook, Kazakhstan owns “major deposits of petroleum, natural gas, coal, iron ore, manganese, chrome ore, nickel, cobalt, copper, molybdenum, lead, zinc, bauxite, gold, and uranium” (2015). These natural resources are mostly used for “mineral, petroleum, hydropower, and other resources of commercial importance” (The World Factbook 2015).

Industrial companies in Kazakhstan include oil & gas extraction firms, petrochemical-burning power plants, and mining companies. In this research project, I investigate greenhouse gas-generating companies such as Samruk Energy, state-owned company in Kazakhstan, and works toward modernization in the energy generation capacities. Samruk Energy is a subsidiary company of Samruk-Kazyna and it consists of 19 companies and budget comes from the state.

Like Poland Kazakhstan was a member of UNFCCC and signed the Kyoto Protocol in 1999, but unlike Poland, the ratification took place only in 2009, seven years after Poland's ratification, by the Kazakhstani officials. The Kyoto Protocol's reduction target was to be reached between 2008 and 2012, and, unfortunately, Kazakhstan failed to reduce its emissions to the base level of 1990. On the contrary, the GHG emissions level increased from 15.1 (metric tons) in 2010 to 16 (metric tons) in 2014. Many experts that are working in the greenhouse gas-generating companies claim that the main cause of Kyoto's failure for Kazakhstan was mostly due to the top-down approach the Protocol took to reduce emissions. The Kyoto Protocol set the reduction targets for each country, which, not surprisingly, did not favor the coal generation companies' interests. In fact, the Protocol was obligating the companies to reduce their emissions by an amount that was outside of their ability to accomplish in a short period. However, this approach worked for Poland because there was domestic pressure and financial support from EU. It is understandable that the Kyoto Protocol did not work for Kazakhstan due to its top-down approach. If the Protocol followed the bottom-up approach by allowing the companies to set the emissions reduction targets based on their capacities, there would have been a higher chance of Kyoto's success for Kazakhstan.

RESEARCH METHODOLOGY

Let me now turn to the research design, population of the study, sample size, and the instruments I used for data collection procedures such as qualitative research methods, which are described below, to sustain the validity and reliability of the study.

Research Design

I chose to use two embedded country case studies to explore the differences between Poland and Kazakhstan at the country-level and company-level of analysis. At

the company level of analysis, I investigate how several mining coal companies interacted with governments in Poland and Kazakhstan. Looking at the companies separately, rather than the countries in general, allowed me to get a deeper understanding of why there was a divergence in the greenhouse gas emissions between the companies in two countries with similar starting points, Soviet legacies and macroeconomic indicators. Meanwhile, the country-level of analysis allowed me to make an in-depth and close-to-accurate assessment of each of these countries' performance in complying with their Kyoto Protocol commitments. I used process tracing to monitor key decisions of two countries and companies and trends of climate change over time. I chose to conduct process tracing of environmental policy because it is an ideal means of learning about causal mechanisms responsible for implementation or non-implementation of the Kyoto Protocol and state policies. In addition to analyzing government records and coal companies' reports, I interviewed 10 employers and managers at Samruk Energy. Phenomenology was useful in terms of understanding their perspective on increasing greenhouse gas emissions and its consequences. For Poland's case, published online interviews of climate change mitigation and adaptation actions from activists and publications about successes and failures of the Kyoto Protocol, and examination of state policies and regulatory frameworks were used to find evidence to check my hypotheses.

Finally, grounded theory was useful when the data were gathered while researching a broad topic because this research-before-theory approach helped me build my hypotheses.

Sampling

I used purposive sampling in my interviews with employees from environmental, renewable energy, energy efficiency, corporate governance, and corporate finance

departments at Samruk Energy were involved because I chose to learn about how industry viewed Kyoto and climate change in general. These people are responsible for the environmental protection reports, tax incentives, emissions level, international cooperation with stakeholders, and the processes on environmental policies in Kazakhstan. I have conducted 10 in-depth interviews in Astana in English and Russian with managers and employers from Samruk Energy. Participants ranged from 28-60 years old, and included 6 males and 4 females. They were all counted as experts in the fields that I am investigating. I gained knowledge that otherwise is not available from published sources.

Ethical considerations

I used ethically sound practices for the data collection and analysis in this MA thesis. First, participants were not harmed by any means. Second, privacy was guaranteed for participants who wanted their identity to remain anonymous. Information was taken into account not to be revealed in any online or offline medium. Third, confidentiality was given to each participant before they agreed to take part in the interview. Fourth, informed consent forms were provided to interviewees. No force or pressure was given if participants did not want to reveal information and they were free to leave the interviewing process at any time they wished. Therefore, based on the above-mentioned principles, ethical issues were at minimal due to the nature of the questions being asked.

Data Collection:

Data were collected through interviewing, documenting, and online audio-visual materials. Questions addressed below were used to guide the in-depth conversation with the Samruk Energy employees. Before conducting the interview, I obtained approval from the Institutional Research Ethics Committee (IREC) at Nazarbayev University. As a

means of data collection, tape-recording for all interviews was used to transcribe the coding.

In addition, data sources for my study included the publications of International Energy Statistics (EIA), ‘United Nations Framework on Climate Change’ (UNFCCC), ‘Intergovernmental Panel on Climate Change’ (IPCC), online interviews (audio-visual materials) from Polish organizations, and the annual reports from the generation companies of both nations including Samruk Energy and Jastrzębska Spółka Węglowa S.A. Fortunately for me, many of these resources are available in English. At least here, the Kyoto Protocol made a difference!

After the data collection on generation companies’ behavior to state policies, data analysis took place. First, I transcribed the interviews and coded the data by labeling each line. After that, I divided them into themes and subthemes, which helped me to interpret the findings. Generally, the purpose of open coding and axial coding is to get a general sense of what the interview has been about and try to go from broad to narrow themes. For instance, I engaged in in-depth interviews for about 45 minutes with each participant. It was useful to divide the text into groups by using the coding techniques.

Interview Guide

Interview Questions (H1 and H2 refer to my hypotheses mentioned above):

- 1) H1 Do you think decreasing greenhouse gas emissions should be included as a serious target in the state policy? Who should be responsible for climate change threats? Are there state policies in place that are taking this problem seriously?
- 2) H1 What are the repercussions of high level of greenhouse gas emissions (polluting air) in Ekibastuz? For example, loss of biodiversity?

- 3) H1 What do you think should be the instruments for mining companies to emit less?
- 4) H2 What are some of the strategies your company takes toward sustainable development? Do you think they work?
- 5) H2 Is the issue of reducing greenhouse gas emissions related to funding for your company?
- 6) H1/H2 Are the current policies being effective in reducing greenhouse gas emissions level?
- 7) H1 How energy sector/ market is liberalized in terms of decision-making?
- 8) H1 Are there any effects left from the Soviet legacy that influence the management today?
- 9) H2 We are certain that Kazakhstan's economy is highly dependent on natural resources. Especially the coal industry. Could you elaborate your opinion on this?
- 10) H1 Do you think mining companies play a significant role in determining policy?
- 11) H2 Are international agreements important for Kazakhstani mining companies to improve its environmental performance? What partners do you have?
- 12) H1/H2 What positive aspects do you observe after the expiration of Kyoto Protocol?
- 13) H1 What factor would you change for the implementation of the KP for it to be more effective?
- 14) H1/H2 Do you think COP 21 will provide any clear instruments/mechanisms on how to tackle climate change? How efficient will it be, in your opinion?

Data analysis

Data validation/ trustworthiness

I believe the data validity and trustworthiness of this study to be strong for couple reasons. The reason I stopped conducting the interview after 10 people is due to the saturation level, meaning no new information for my study was coming in. Even if I interviewed more people to make the study more reliable, the outcome would still be the same. In addition, participants were the experts in state policies towards generation companies and in environmental aspects. Information that I could not collect from online sources were provided in the interviews, which increased the validity of this study.

The sources of data, including the interviews and online publications from Poland and Kazakhstan were trustworthy due to the fact that they are official documents being submitted to international committees. For instance, the Ministry of Energy examines validity of online publications of Samruk-Energy before they get published in the international sphere.

Limitations

This study has some limitations. First of all, Samruk-Energy in Astana was the only coal generation company that was investigated and, thus, their information might not be generalizable to other coal companies in Kazakhstan. Second, the sample size (10 participants) might not be sufficient for this study. More participants from outside Samruk Energy or other coal companies, could have been used. However, the saturation level was already reached after 10 participants. Third, lack of data and lack of prior research on Kazakhstan's environmental performance under the Kyoto Protocol could be an issue. For instance, the data on the emissions of the most significant species of greenhouse gas, which is carbon dioxide, was not fully given in the Samruk Energy's annual report. This is not necessarily a violation of the Kyoto Protocol by the company, but it does reduce transparency of its operations and accuracy of measuring the

greenhouse emission level. I was able to collect some data on CO₂ through the interviews with experts from the company. Finally, language barrier was an issue for me as a researcher for this study. As a non-Russian speaker conducting interviews with Russian speakers in Kazakhstan and collecting data in Russian, completing these tasks was a bit complicated. However, I received plenty of assistance from my fellow researchers who are interning at Samruk Energy during spring of 2016. This greatly expedited data collection. In addition, much of the literature reviewed was in Polish; however, important information was also given in English from Poland's coal generation companies – another sign that Poland is fully integrated in international environmental regime.

Chapter 2 Existing Literature on the Implementation of International Environmental Regimes

Introduction

This chapter includes the existing literature on greenhouse gas emissions in Poland and Kazakhstan under the Kyoto Protocol and COP 21 Climate Change Convention. The aim of this chapter is to review the existing body of research on both nations' natural resources and environmental policies that are relevant to the current study. Climate change is a global issue that requires every state's contribution to reduce greenhouse gas emissions into the atmosphere. Global Climate Change Initiative measures the emissions level, which is an index that climate scientists use. Emissions intensity is "ratio calculated by dividing emissions in a given year by economic output for that year" (Stephenson 2003). The International Energy Agency (IEA) provides a means for calculating 'power generation from coal', and it also prescribes how CO₂ emissions are to be measured. The following equation is used for coal generation companies to estimate their greenhouse gas concentration and to include it in their annual reports; $M_{out} = 3.6632 \times (M_{in} + M_{FGD} - M_{ash}) \times (1 - X_{CCS})$, where M_{in} is "mass of carbon in the fuel input", and M_{ash} is "mass of unburned carbon retained in ash" (International Energy Agency 2016). Poland being under the membership of EU, follows the 'EU emissions trading scheme' (International Energy Agency 2016), which has three-part compliance; 1) "emitters must either comply with their allocated CO₂ cap using the allowances they hold 2) buy additional allowances to cover their requirement 3) pay a severe fine for exceeding their allocation" (International Energy Agency 2016). EU follows 'ISO 14064 standard that is used to report the CO₂ emissions' (ISO 2006). For Kazakhstan, coal generation companies have started using the same technique, and the transition has been smooth thus far.

For instance, if the rate of atmospheric emissions and economic rate increase, intensity stays the same. In order to tackle the emissions problem to prevent further global warming, international cooperation is essential. Depending on certain state's interests and benefits, nations participate in a decision-making process, which either leads to compliance or non-compliance with international climate change policy. Why do some nations comply with certain rules and obligations, while others do not or are not willing to comply with regulations to reduce the toxic substances? This question can be answered on both a national and international level. On the domestic level, there are many deniers in the governments around the world who think that climate change is a myth (Suikkanen 2015). However, it seems that many deniers in Kazakhstani government do not consider themselves deniers because, while they do believe climate change is real, they believe it would be irrational for the country to curb its own CO₂ emissions. Some of the climate activists in Kazakhstan are trying to take actions toward combatting climate change, but have very little influence on the government. However, lately the leaders seem to have agreed to tackle the climate change through international agreements for the sake of better international reputation (Climate Change Coordination Centre 2016). There are several influential international climate change agreements under UNFCCC such as the Kyoto Protocol, the key issue of this paper.

Kyoto Protocol

What is the Kyoto Protocol and what goals does it serve to accomplish?

According to the 'Carbon Trade Watch' organization, "The Protocol sets the target of reducing emissions by an average percent below 1990 greenhouse gas levels by the year 2012" (Cabello 2014). Under the 'United Nations Framework on Climate Change', the

Kyoto Protocol was implemented in 1997 and it still has an influence today (Kyoto Protocol 2014).

The Kyoto Protocol is an international agreement and consists of more than 190 signing parties with the notable exception of the largest fossil fuel emitter in the world, the United States (Stephenson 2003). Those countries are divided into different Annex parties depending on their economic statuses. However, there are some nations that have always rejected ratification of the Kyoto Protocol, including the United States. Despite being the world's leading CO₂-emitting nation, the Bush administration did not support the Kyoto because he viewed the agreement as 'fatally flawed' (Eyckmans 2001). In addition, the ceilings of the emissions targets were too inflexible to achieve. Many scholars have argued that Kyoto Protocol was not a success, because without the participation of the US and China, this international agreement is not meaningful. In addition, some scholars argue that IPCC's measurements are biased because there are so many uncertainties about science (Oberthur et al 2000). However, when looking at the national level, obviously there are some states that were able to reduce their greenhouse gas emissions under Kyoto Protocol, including Poland. Taking the case studies in this paper for an example, Poland was classified as an Annex I party, and Kazakhstan as an Annex B party.

Rübelke (2011) uses data from Clean Development Mechanism to investigate whether "transfer schemes under UNFCCC and Kyoto framework adequately serve the distributive and allocative objectives pursued in international climate policy" (Rübelke 2011). In particular, the author discusses two main supports that are called 'mitigation' and 'adaptation'. Mitigation is when people accept climate change and thus take action such as reducing greenhouse gas emissions to prevent further climate change threats. In

addition, mitigation is approached from a global perspective. Whereas, adaptation is mainly local and thus it is hard for vulnerable regions to get support or implement international climate change policies. Adaptation and mitigation policies are stronger in Poland and weaker in Kazakhstan due to their environmental obligations. For instance, Poland is currently working towards “Impacts, vulnerability and adaptation assessments” including the projects that expect the consequences of climate change and the economic changes to vulnerable regions, one of them being the “KLIMADA” (Poland-Climate-ADAPT 2016). For Kazakhstan, they also had projects including ‘National Plan Strategy’ which aimed at not exceeding the allowance of given emissions level. However, during the Kyoto Protocol reduction target year, this National Plan was not reached (Samruk Energy 2015).

Being signatory states, Kazakhstan and Poland shoulder the majority of the burden in reporting, monitoring and implementing the obligations pursuant to the Protocol. The Kyoto Protocol’s mission is to provide international climate change policies for nations to obey and to provide a means for implementing the rules to reach greenhouse gas emissions reduction targets (O’Neill 2002). This international agreement uses a set of measurements to evaluate a nation’s compliance.

Domestic political constraints as the first independent variable

Some authors claim “historical experience with democracy” matters for effective environmental policies (Fredriksson and Neumayer 2013). They argue that the longer the nation is democratized, the higher the chances are to implement policies that effectively tackle climate change. They did not find any significant correlation between current democracy levels and policies combating global warming, when analyzed 87 countries since 1800. This means that there should be no difference in environmental

policies between recently consolidated Polish democracy and the hybrid regime of post-Soviet Kazakhstan. But the difference is significant, which weakens the argument that political regimes by themselves matter for international regimes. Something inside, and I argue that three types of constraints may matter more.

Other scholars argue that the Kyoto Protocol has been successful in reducing greenhouse gas emissions rates, while others argue that it has failed to reach its goals; some even find no correlation between the Kyoto Protocol and environmental performance. For instance, McLean (2012) argues that the bargaining and ratification systems have no relationship to each other in the Kyoto Protocol. She uses a quantitative analysis and finds that “domestic political constraints influence ratification”, but not the actual implementation (McLean 2012). According to her definition, the actual implementation takes place after the ratification process, when the country confirms that they will obey the obligations. Certain financial crises, one of the domestic political constraints, were the determining factors in a state’s willingness to join the Protocol. She utilizes Poland and Russia as case studies. Domestic political constraint is the first independent variable of this study. The Kyoto Protocol was more effective for European Union countries since they had more sincere and detailed plans to adopt the regulations (Lowe 2013), which made the domestic political constraints comparatively weak in Poland. Lowe defines sincerity as when a nation takes environmental issues into serious account and the government creates an effective strategy in its policy-making. As for Kazakhstan, there are environmental regulations currently being adopted in accordance with ‘Kazakhstan 2050’, which is not a part of the Kyoto Protocol and the implementation of which did not commence until the Protocol had already expired. However, the extent of the progress is still blurry (Samruk-Energy 2015). Unlike Poland,

there is a lack of sincerity, and vague planning for Kazakhstan that has slowed the implementation of Kyoto Protocol obligations. McLean uses the examples of Poland and Russia as her case study to explain the ‘two level bargaining’ and how the accession to the EU affects the ratification process (McLean 2012). McLean indicates that higher domestic constraints in a certain country lead to a decrease in commitment to the international agreement. Weak pressure for integration is listed as one of the domestic constraints. She uses data and evidence from the EU, which increases Poland’s transparency, however, using the same information for Kazakhstan, is harder because publicly available information does not include data about carbon dioxide emissions, but includes other SO₂, or NO₂ emissions, which are less important than CO₂ to measure the GHG emission. The lack of information about CO₂ emission is a significant informational constraint for implementing environmental obligations. While I do agree with Sabitova (2013) that Kazakhstani greenhouse gas emissions is lower than it was during 1991 due to excessive industrial activities, her work overlooks the details of Kyoto Protocol commitment years (2008-2012). It seems that she fully understands the theoretical aspects of Kazakhstani government officials on how every time they claim the issue is important but she overlooks the fact that they barely take action in the practical world. There is a big difference in what Kazakhstani officials say and do in terms of environmental obligations. Thus, Sabitova does a fair job telling us about the ideas of joining the Kyoto Protocol in Kazakhstan, but does not explain why actually Kazakhstan did not reduce its emissions during the Kyoto Protocol commitment period. In addition, my paper mostly focuses on the Kyoto’s reduction target years (2008-2012), rather than the start of the Kyoto Protocol agreement, which Sabitova (2012) investigated.

The long-term cost of compliance with the Kyoto Protocol have had economic implications, which may also impact how certain nations perform in regards to environmental issues. Uno (2002) argues that economic and environmental protections are highly correlated with climate change by providing the 3E model, which includes 'environment', 'economy' and 'energy' (UNO 2002). For coal generation companies, profits come from industrialization and enhancements to that industrialization; Technological innovations are required to reduce the environmental harms. One of the main reasons a nation refuses to reduce its greenhouse gas emissions is that nation's unwillingness for such regulations to hinder its economic performance.

There is also the issue of the direct cost of compliance with the Kyoto Protocol, which includes technological innovations. For instance, if a nation has a shortage of financial resources, then it is unlikely to invest in upgrading existing power plants. This could be one of the primary problems for Kazakhstan.

It has sixty-eight, mostly over-polluting and old power plants from the Soviet period, which currently use cheap and dirty coal, among them only five clean hydroelectric power stations exist (Kadrzhanova 2015). Old power plants emit more greenhouse gas emissions into the atmosphere because they do not have access to the more modern, more efficient filtration, scrubbing and scavenging technologies found in newer plants These power plants have not been shut down since the Soviet period or upgraded due to the high economic costs associated with this action and that has led to a failure to successfully implement Kyoto Protocol obligations. Since Kazakhstani coal generation companies use cheap coal, the cost of upgrade goes even higher. The amount of CO₂ released into the air from the old power plants comes partly as a result of using coal that is more than 50% ash. After the filters are installed, CO₂ emissions or overall

greenhouse gas emissions can be reduced by 98% in that particular power plant. Some of the filters installed included electrostatic precipitators and scrubbers. One Samruk Energy manager explained to me in the interview that his company spent 60 million dollars to install filters in the old power plant in Ekibastuz. An upgrade that costs this much is especially economically costly for Kazakhstan, since it requires capital investment. In addition, upgrading old power plants can cost more than actually building a new power plant. However, since there are so many old power plants, it is difficult to replace all the old power plants because upgrades require less time than the construction of a new plant. They still function and provide for the needs and demands of the nation. It was understandable from evidence gained in my interview that it is necessary to utilize incentives and tax breaks to encourage companies to modernize their operations. In contrast, Poland receives funding from the EU to address environmental issues, which includes both the upgrading of existing and building of new power plants. Thus, the economic cost, being one of the domestic constraints, is weak in Poland, increasing the success story of meeting the Kyoto Protocol obligations.

In short, domestic political constraints responsible for the lack of implementation of the Kyoto Protocol obligations could be divided in three types:

- 1) financial – no funds for upgrading and no sacrifice of economic growth for the sake of environment;
- 2) informational – lack of knowledge in the amount of CO₂ emissions and the harm they bring to the atmosphere;
- 3) personnel – no environment protection experts or persons committed to clean environment are in the powerful positions while incumbent policy-makers are not sincere and precise in meeting international environmental obligations.

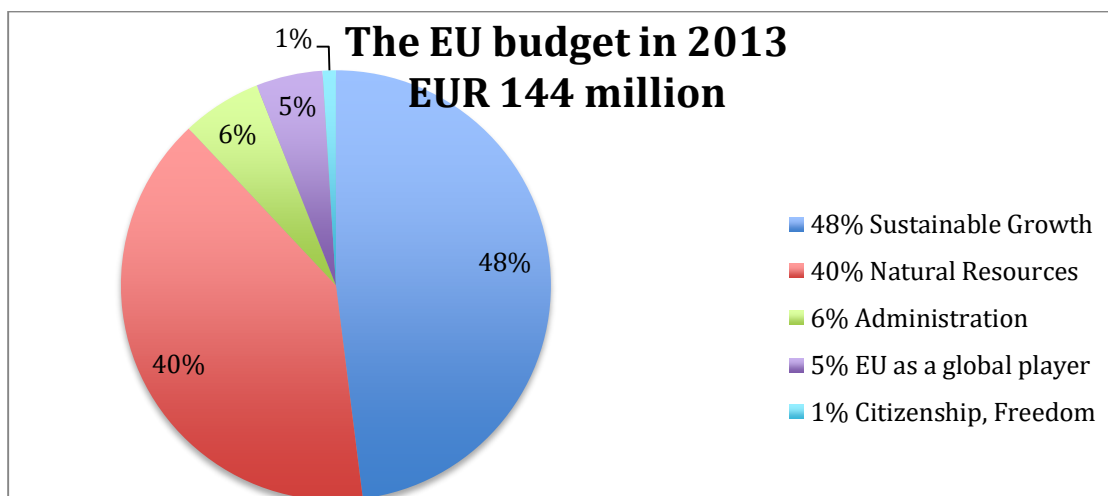
European Union Membership as the second independent variable

I argue that the European Membership reduces the impact of these constraints and, in addition, both pressures and enables EU member-states to comply with the Kyoto Protocol obligations. Scholars agree that Poland, as a member of the EU, had better environmental performance under the Kyoto Protocol than Russia (Rübelke 2011; McLean, 2012; Bernauer & Böhmelt 2013), which, like Kazakhstan, is not an EU member. This may mean that Poland would still have made meaningful GHG reductions without the Kyoto Protocol, which would clearly show that the EU membership has an impact of its own. How exactly does the EU membership make a difference? It seems that it reduces existing domestic constraints by providing funding for upgrading dirty power plants, thus, easing the burden of financial cost. EU membership also brings in foreign direct investment and, thus, ensures sustained economic growth and stable revenues to the government coffers that depends less on the dirty energy generation. EU membership may also reduce informational constraints by providing necessary expertise and technology for measuring CO₂ emissions. And joining EU may bring personnel changes in the officialdom by attracting environmentally conscious policy-makers to work in the governments. In addition, EU has tougher environmental protection standards, which it implements in practice, and many EU politicians have post-materialist values, which prioritize clean environment and a strong sense of responsibility towards the future generations (Inglehart 1981). The EU has 27 member countries, which “emit approximately 45% of the Europe’s carbon dioxide emissions” (Nagy & Varga 2009). Though these states were able to see a reduction in their emissions rates, they were not satisfied with the level of reduction under Kyoto and explained they needed more accurate emissions data; the trading program should have greater specificity in the

technology that was used in its execution, and economic penalties for failure to comply to the obligations of the Protocol should have been both stiffer and reliably enforced (P. Soubbotina 2004). The argument of whether or not the measurement of greenhouse gas emissions levels has always been a concern is possibly biased. Indeed, government leaders in both Poland and Kazakhstan recognize the need to take measures to address rising levels of greenhouse gases (Esekin et al 2000).

In order to reduce greenhouse gas emissions both at a national and international level, the EU has a separate source of funding that is devoted to environmental education and spreading climate change awareness among its citizens, as shown in Figure 8.

Figure 8. EU Budget Spent in 2013



Source: ec.europa.eu

Since society is a big part of successful environmental policy implementation, the community must be aware of the limits and costs of using natural resources. The authors highlight the term ‘pareto-optimal’, “where no one can be made better off by making someone worse off” (Manne and Gunter 1999). This shows EU’s spending on environmental education is one of the ways that EU integration made Poland a success story of Kyoto Protocol.

What is the gap in the literature?

While there is an abundance of scholarly research done on the relationship between the Kyoto Protocol and environmental performance (reduction of greenhouse gas emissions), few studies have been specifically performed in Kazakhstani case, and especially on how coal generating industry shapes environmental policies, and public policies more generally. This will be my contribution to the research on Kazakhstani environmental policies and on the effectiveness of international environmental regimes and government-business relations. In order to understand why Kazakhstan could not reduce its emissions in accordance with the Kyoto Protocol, while Poland did reduce, I will be comparing the policies and mechanism of implementation of the Kyoto Protocol in Poland to Kazakhstan. First, comparative analysis of Poland and Kazakhstani political economy in the domestic level will be explored, and second, international environmental regime with industries and polluters will be discussed.

Chapter 3 Domestic Political Constraints Are Stronger in Kazakhstan than in Poland

Importance of understanding why greenhouse gas emissions should be reduced

Even though it might seem obvious that reducing greenhouse gas emissions should be included as a serious target in the state policy due to its ongoing and future consequences to humans and environment, as I conducted interviews with experts it became very clear that informational and personnel constraints were strong in Kazakhstan. Kazakhstani leaders simply were not aware of how much CO₂ went into the atmosphere and why they had the responsibility to cut the GHG emissions. During the period of independence, Kazakhstani policy-makers mostly cared about enhancing economic growth and burning as much fossil fuel as possible to meet the growing demand for energy. Many experts at the coal generation companies claimed that reduction of emissions is considered as an obligatory state policy. The evidence gathered from interviews with these experts illustrated that the coal-consuming power companies were not willing to share information about their GHG emissions and even less willing to cut their emissions. For this reason, Kazakhstan lacked research and development in this sphere and simply did not have the opportunity to understand the reason behind it. “The Science of Global Warming and Climate Change” for Kazakhstan was blurry and not many people, including both ordinary citizens and officials, believed climate change was happening (Vasser 2009). In March 1999, when the Kyoto Protocol was ready for signing, Kazakhstani diplomats signed the Protocol for the international reputation of the nation rather than to comply with international agreements because those signing did not understand the urgency of increasing greenhouse gas emissions. As one Samruk Energy manager told me during interview, Kazakhstan was making several proposals to the

UNFCCC, but the aim was mostly to improve the country's international reputation rather than seriously commit to implementing the obligations. In addition, legally binding agreements, including the Kyoto Protocol, can be complicated for some nations including Kazakhstan, because there should be a clear mechanism for how developed and developing countries' input should be in those agreements. However, the mechanism was not clear for Kazakhstan – informational constraint, and thus it possibly led to failure to reduce its emissions.

Hypothesis 1: Domestic Political Constraints are stronger in Kazakhstan than in Poland.

Kazakhstan is considered to be one of the largest natural resource-abundant territories in the world. Since gaining its independence in 1991, Kazakhstan has gained a greater knowledge of its natural resource abundance, leading to a booming economy. However, the environmental performance of Kazakhstan has gotten worse each year while its annual GDP has increased from 2008 to 2011 by 3.4% to 7.5% (GDP Per Capita 2016). Thus, I hypothesize that Kazakhstan's domestic financial, informational and personnel constraints blocked implementation of its obligations under Kyoto. On the other hand, even though Poland's reliance on energy to support its economy is similar to Kazakhstan's, the former has been able to overcome these three kinds of constraints and comply with its obligations under Kyoto. For instance, Poland has adopted high transparency in its GHG emission policy, thus removing informational constraint. Meanwhile, Kazakhstan's transparency of environmental protection is still more characteristic of Soviet style secrecy. The starting point of both countries was the same. However, Poland managed to break with its Communist past. Below, I show how exactly domestic constraints impacted the trajectory of the GHG emission in both countries.

Meeting the Kyoto Protocol Obligations: Kazakhstan vs Poland

The Kyoto Protocol is divided into two phases: first phase, which is from 2008-2012, and the second phase, from 2013-2020 under Doha Amendment. In the first phase, there were 192 signatory parties. The reduction target set by Kyoto Protocol was different for every country. Reduction targets were based on emissions levels for each country, so countries that emitted more had to achieve a greater reduction. For most countries including Poland and Kazakhstan, the base year was 1990. For the second phase, as of February 2016, 60 parties have signed the Protocol. The decreasing number of parties participating in the Protocol indicates that the Kyoto Protocol was more unsuccessful story than a successful one. The Kyoto Protocol used the top-down approach, in which it set the reduction targets for the countries to reduce their greenhouse gas emission levels. Poland, being a member of the EU and classified as an Annex B party, committed to reduce the emissions level by 6% to the base year of 1990 (UNFCCC 2015). Kazakhstan proposed to join as an Annex B party (the 'economy in transition' group) with a 0% commitment reduction target under the Kyoto Protocol. However, this request was never adopted by the UNFCCC and Kazakhstan was committed to reduce its emissions by 5% compared to the base year, and was considered as a non-Annex party (UNFCCC 2015). Many countries, including the U.S., did not commit to ratify the protocol and reduce emissions level because they felt the targets were unrealistic and would cause too great a strain on their economies. Yet Kazakhstan motivated by the same considerations, which reflected domestic financial constraint, ratified Kyoto in 2009. Still, Kazakhstan failed to meet its obligation under Kyoto Protocol. On the contrary, the GHG emissions increased during the years of 2008-2010 (230,438 kt-248,729 kt) (Index Mundi 2016), as its economy grew rapidly. Reflecting the domestic informational constraint, Kazakhstan's

self-reporting starting from the transparency of the annual report to presenting the data to Ministry of Energy was very weak. Reflecting domestic personnel constraint, Kazakhstani leaders did not pay attention to the importance of meeting the reduction targets and facing no sanctions at home for doing so. Indeed, one of the interviewed Samruk Energy managers confirmed to me that Kazakhstani government officials including those at the Ministry of Energy and Environment have not been climate change deniers, that they did believe global warming had been happening, and that these officials have also not been climate change activists. This is part of a personnel constraint because there is a blurry picture of environmental actions in terms of climate change mitigation in Kazakhstan.

In addition, Table 5 provides the list of top government officials responsible for environmental protection in Kazakhstan from 2004-present, which also includes the Kyoto Protocol reduction target years (2008-2012). Table 5 provides each official's education, position, and reasons for leaving the office. This evidence supports my hypothesis 2 of domestic political constraints, specifically informational and personnel constraints. None of the officials completed their education in Environmental Protection, except few engineering majors including Peter Kolesov, Zhomart Aliyev, and Nurlan Iskakov (Ministry of Environmental Protection 2016). However, what is being studied in engineering is different than in environmental issues. Majority majors were 'economist', 'lawyers', 'doctor' and 'administrator', which are far off topic from environmental protection as shown in Table 5. This creates the informational constraint and impacts the emissions reduction level. Especially, during the Kyoto Protocol reduction target years, three Ministers of Environmental Protection in Kazakhstan including Nurlan Iskakov,

Table 5. List of Top Environment Officials of the Republic of Kazakhstan, 2004-Present

Name	Professions, Education, Year and University Attended	Position	Years in the Office/ Reason for Leaving
Kolesov Peter	Electrical Engineer	Chief of Staff, the Minister of Environmental Protection Advisor Protection of Kazakhstan	2004
Zhomart Aliyev Shiyapovich	Mining engineer; “Public administration in the mining industry”	Deputy Chairman of Committee of ecological regulation and control of the Ministry of Environment of the Republic of Kazakhstan	2005-2010
Nurlan Iskakov	Metallurgical engineer	Ex- Minister of Environmental Protection of the Republic of Kazakhstan	2006-2009/ - Economic and Corruption Crimes -sentenced to 4 years of imprisonment
Braliev Alzhan Hamidulaevich	Bachelor of Arts in Linguistics; Master of Public Administration	Ex- Vice Minister of Environmental Protection of the Republic of Kazakhstan	2006-2009/ Economic and Corruption Crimes
Sarsembayev Zeinulla Sakenovich	Tselinograd State Medical Institute (1975) Doctor	Former Vice-Minister of Environment of the Republic of Kazakhstan	2006-2009/Economic, Corruption, Budget Funds/ 522.8 million tenge
Ospanov Erlan Kuanyshbayevich	Kazakh National Technical University (1996) Systems Engineer;	Ex- Deputy Chairman of the Committee of ecological regulation and control of the	25.01.2008-03.2009

	Kazakh State Law University in the field (2002) Lawyer	Ministry of Environment of the Republic of Kazakhstan	
Rakhimbergenov Murat Magauovich	Lawyer	Ex-Chairman of the Committee of ecological regulation and control of the Ministry of Environment of the Republic of Kazakhstan	2008-2009
Bekeev Adletbek Tolendiyevich	Kentau mining and metallurgical technical college Tech-dressing; Turan University Lawyer	Ex- Deputy Chairman of the Committee of ecological regulation and control of the Ministry of Environment of the Republic of Kazakhstan	2009-2011
Turekeldiyev Suyundikov Myrzakeldievich	Kazakh State Academy of Management, Economist	Ex- Deputy Chairman of the Committee of Environmental Regulation and Control of the Ministry of Environment of the Republic of Kazakhstan	2009-2012
Dernovoi Anatoly	Karaganda State Medical Institute (1974) Sanitary doctor	Former executive secretary of the Ministry of Environment of the Republic of Kazakhstan	2009-2013
Mutashev Sagynbek Haydarovic	Kazakh Polytechnic Institute (1990) Mechanical engineer	Ex-Chairman of the Committee of ecological regulation and control of the Ministry of Environment of the Republic of Kazakhstan	2009-2012
Bultrikov Ruslan Iskanderovich	The teacher of history and law; International relations specialist	Former Vice-Minister of Environment of the Republic of Kazakhstan	2011-2012

Iskakov Marlen Nurahmetovich	Bachelor of Science (history, business administration)	Former Vice-Minister of Environment of the Republic of Kazakhstan	2012-2013
Kairzhanov Bolat Abaevich	Moscow Academy of Labour and Social Affairs (1998) Economist	Ex-Deputy Chairman of Committee of ecological regulation and control of the Ministry of Environment of the Republic of Kazakhstan	2012
Erenchinov Daniyar Kagazbekovich	Kazakh National Technical University (1994); Humanitarian University named after DA Kunaeva (2008)	Chairman of the Committee of ecological regulation and control of the Ministry of Environment and Water Resources of the Republic of Kazakhstan	2013- Present 2014-Present

Source: <http://online.zakon.kz/Infowho.aspx>.

Alzhan Braliev and Zeinulla Sarsembayev were detained and fired from their jobs due to economic, corruption and budget fund crimes of 522.8 million tenge.

Informational constraints are weaker in Poland because the population is more educated in terms of environmental threats. There is a free and fair election process where voters effectively choose the parliament and thus the government in Poland. For instance, if the population thinks the environmental threats are serious and has to be taken into account, it has the right to choose whom to vote for in free and fair elections.

Population would vote for a candidate who claims to take actions toward environment.

Although the Green Party has not shown strong results in national elections, it got its member elected in Sejm and several members won local elections, and it has strong links with European Greens (Sadura 2008). Thus, through non-violent civil and political means, environmentally-conscious people can force government to change its

environmental policies. This is the case with Poland today and that is probably why environmental projects work in the state policies. For this reason, if they don't implement such regulations for populations favor, the consequences of government authorities to lose their positions would be high. When the population is informed about environmental issues, its pressure on the government to address these issues becomes higher.

As for the personnel constraints, there were some pressures to change the conditions from the outside forces. For instance, Kazakhstan was still a member of international agreements such as the Kyoto Protocol without willing to cut its emissions. However, the issue seems that the government has participated in the Protocol to gain international image. Especially, president Nazarbayev is strongly pushing for Kazakhstan to become one of the top 30 nations in the world by 2050. Thus, increasing its reputation globally is a primary goal for Kazakhstan. The government tried to show that they follow international agreements to gain recognition, but they eventually did not take any actions in cutting the emissions under the Protocol.

Another informational constraint coupled with the personnel constraint has to do with permission to burn fossil fuel, the activity on which the level of greenhouse gas emission directly depends. It is possible to get companies to commit to certain emissions targets as an incentive to be granted an operating permit. Before commencing with operation, power generation companies must complete comprehensive studies and forecasts and then apply for permission to operate. The question is whether or not these companies commit to follow the requirements outlined in their operating permit. Many tend to overestimate their abilities or intentions to reduce emissions in order to expedite the approval process, then operate in excess of their permitted limits once they have permission. By ensuring regular auditing of the companies' environmental monitoring

practices and verifying the truthfulness of operation data, the government can instill a sense of obligation in the companies. If there is a real risk of fines or even losing the right to operate in response to a violation of permitted standards, more companies will be compliant.

Soviet Legacy

Early vs. late reform mattered for both nations' radical vs. gradual environmental policies. Because Poland broke away from Soviet dominance earlier than Kazakhstan did, it already went through the process of early reform, from evaluating the quantity of its natural reserves to the greater depletion of natural resources. Thus, Poland realized its waste of its limited natural resources, and created strategies to deplete less while meeting the demands and needs of the state.

For Kazakhstan, there was a slow reform process. It is considered to be a new nation that is in the process of quantifying and qualifying its natural resource deposits. Thus, Kazakhstan is currently depleting immense amounts of natural resources in order to transform from a rural to an urban society. This process requires burning a great deal of coal, resulting in high carbon dioxide emissions. Because Poland is no longer under Soviet influence, it is able to make effective decisions and reach productive results in reducing its environmental impact. Kazakhstan, however, is considered to be an autocratic state, which is similar to the influence of the Soviet system. During Soviet rule, Kazakhstan did not have any opportunity to modernize or upgrade the old power plants due to the lack of technological advancements and the financial situation. Thus, there are many power plants left from the Soviet era that greatly impact Kazakhstan's current environmental improvement efforts.

Over all, the continuity of late Soviet Union still exists in Kazakhstan and it impacts the environmental threats. On the other hand, the rejection of Soviet Rule in Poland allowed the nation to join the EU quicker and diminished the constraints.

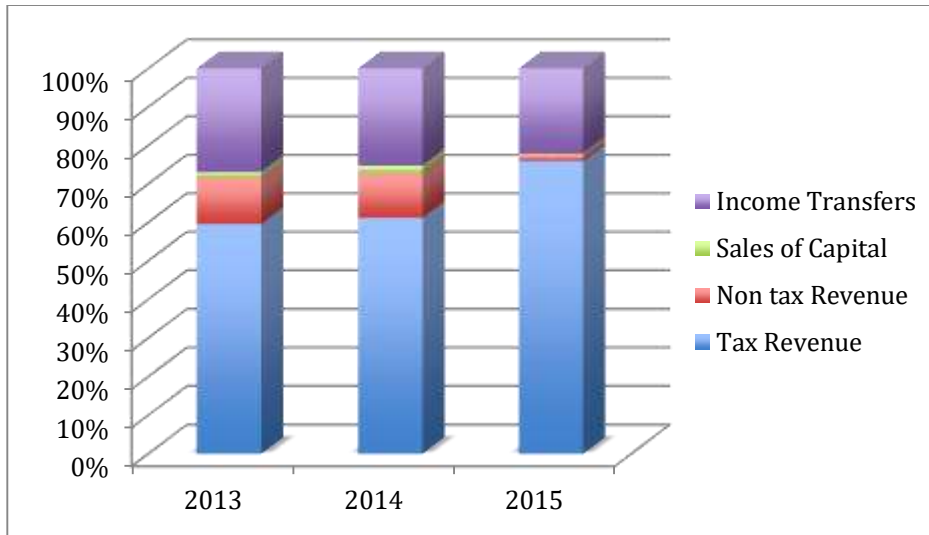
Indeed, experts at the Kazakhstani power generation companies claimed in their interviews with me that Kazakhstan had failed to implement Kyoto because nobody, not just country's leaders, cared about the GHG emissions in the past. A clear vision on the harm of emissions did not exist among the directors of the power generation companies. Basically, they did not understand why they had to reduce the emissions levels. Lack of research and development, and a lack of awareness, caused the power generation companies' failure to commit to reduce the emissions. In addition, the experts also claimed that Kazakhstani mining and power generation companies simply did not know the answers to many questions, such as 'so what if we did not reduce the emissions?' and 'do we get punished?' Some even said that they knew they would face no penalties for failing to reduce emissions. Their record-making profitability was of greater value to leaders and managers than their environmental performance during this period of Kyoto Protocol target. In short, my interview evidence clearly shows that the three kinds – financial, informational, and personnel – of constraints operating at the level of the policy-makers and company directors blocked Kazakhstan's potential to meet its obligations under Kyoto.

However, when the Kyoto Protocol limitations were ratified under the adoption to National Plan in 2009, all directors of the power stations in Kazakhstan claimed that they were not working for money; they were trying to provide electricity for schools, hospitals, etc., according to one interviewed Samruk Energy manager. If the legislation put limitations on power companies, they simply could not have been able to pay them

anyways due to not enough profits. They claimed if setting limitations were mandatory, they would stop the production for providing electricity to their residential and industrial customers. This strong resistance of industry-delayed government's move not to put limitations on the GHG emissions. However, as one interviewed Samruk Energy manager told me, the government decided, as a sign of compromise, to give free quotas (a proportional share) for power companies to produce electricity sufficiently during 2010. This did not work either because if there are strict limitations, the company just stops its production of electricity, which would cause problems for economy and society. To sum up these points, one of the reasons the coal generation companies are still emitting excessively is due to the weak governmental restrictions and the high demand for electricity for communities.

This resistance of the industry, which exists in every country, coupled with strong domestic constraints prevented Kazakhstani government from using policy instruments that governments traditionally use to induce cooperation from power generation companies. In this research, I focus mostly on power generation companies and the mining industry because they are the largest emissions sources in both countries. These companies will, without financial incentive, almost always choose to function in a manner that emits the most greenhouse gases because it is a result of their maximum production capacity. Environmentally friendly operation is less cost-effective from a purely financial perspective. By imposing taxes or other forms of financial penalties based on the amount of greenhouse gas emissions, the government can effectively bring these companies into cooperation with environmental protection goals as Figure 9 shows Kazakhstan's tax revenues from 2013 to 2015.

Figure 9. Total Tax Revenues of Kazakhstan

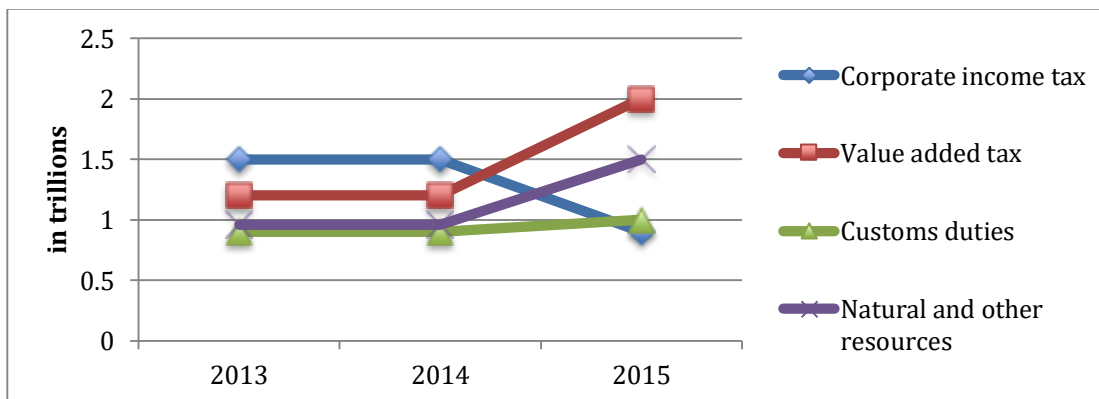


Source: Samruk Energy

There is an increasing trend in tax revenues because Kazakhstan's government is trying to set stricter regulations after Kyoto, and, consequently, taxation rates for generation companies, since the government finally learned that the country's environmental performance was not improving due to the excessive emissions level.

Those tax revenues include 'corporate income tax', 'value added tax', 'customs duties tax', and 'natural and other resources tax' (Samruk-energy.kz) and as shown in Figure 10, tax for natural resources accelerated the most.

Figure 10. Different Types of Taxes in Kazakhstan



Source: Samruk Energy

Kazakhstani government increased the tax incentives in 2014, two years after the expiration of Kyoto Protocol. This shows that environmental policies became tougher for coal industry in Kazakhstan. In contrast, during the Kyoto Protocol reduction target years, tax burden was very low that coal generation companies ignored it and paid no attention to the emissions level while maximizing production. In addition, Kazakhstani legislature has been trying to implement different tax system in order to reduce different types of taxes. The pie would remain the same, but the generation companies should try to investigate how much 'corporate income tax' (CIT) can be reduced for cutting the emissions. Once the companies determine what types of taxes can be reduced, they then regulate the carbon price. This way companies would be incentivized to emit less by switching to cleaner technologies and resources. If generation companies transform to renewables or upgrade, they get exempted from paying CIT and they can also pay less for carbon. This method was not effective in Kazakhstan in the past since there were no incentives for either companies or for government to change the way of generating electricity. However, as the legislation is becoming stronger, it seems that this approach is being implemented steadily for generation companies in Kazakhstan. Indeed, the government started to implement stronger policies such as increasing the tax incentives, meaning if the company emits more greenhouse gas emissions, it would pay higher taxes. However, it is also important to note that many energy companies emit not because they are the malevolent and actively want to damage the environment, but because the penalties were weak and their involvement in the emissions reduction process was insufficient. Before 2012, Kazakhstan's 'mineral extraction tax' totaled 13.5% including copper-5.7%; gold 5.0%; iron ore-2.8% and interestingly coal was 0% (PWC 2012). Thus, coal generation companies in Kazakhstan simply did not worry about the tax

burden. However, after 2012, when the government realized excessive CO₂ emissions were being emitted, it increased the tax rate by 2.1% for extracting coal for generation companies (PWC 2012). For instance, the issue of not being able to reduce the emissions also comes from tariff policies, which restricts trading. Sometimes, greenhouse gas-generating companies' tariffs tend to be low and they end up being in debt subsidized by the local government, which strengthens the domestic constraints. Another sign of informational constraint is that energy companies in Kazakhstan lack technical support and sometimes turn to foreign assistance in obtaining equipment and consultation. For Poland, international support from the EU has always been in existence, whereas in Kazakhstan there is always a scarcity of technological support.

Technical issues would include inability to change the types of coal currently in use at Kazakh power plants. Under Samruk Energy, the largest mining company, the most attractive coal offered is 'Bogatyr Komir' – a coal that is very cheap but has an ash content (dry) of nearly 50%, which has a very low heating value yet produces the same amount of GHG when burning. This coal reserve is the largest mining in Kazakhstan. Kazakhstani legislation still allows companies to burn that type of coal in order to fuel growing demand for energy – a clear sign of strong financial domestic constraint.

In a stark contrast, Poland met and surpassed its Kyoto targets: it reduced the GHG emissions level by 6% compared to the base year 1990. According to Arcipowska (2007), a climate change researcher at Polish Ecological Club, Poland was able to reduce its emissions “due to economic changes related to a political transformation from central planning to market economy” (Arcipowska 2007). Also, this success is, in part, due to the coal being used in Poland's power plants, including Jastrzębska Spółka Węglowa S.A., which is no more than 10% ash. If feedstock exceeds that amount, the Polish

government does not allow companies to use it. Thus, government regulations in both nations are different, but the Polish approach has been more effective because it also incentivized companies to change towards green technologies. For instance, in 2005, Jastrzębska Spółka Węglowa S.A. started the implementation of ISO 14001, which is a global environmental standard that specifically focuses on sustainable development. This standard includes requirements for the quality of coal used in power generation. More importantly, Jastrzębska Spółka Węglowa S.A. (JSW) is 'European Union's largest coal producer' (JSW 2016). Their annual report was awarded the 'Best Annual Report' by the Warsaw-based Institute of Accounting and Taxation in 2013 due to the high transparency and pursuing effective environmental regulations in the EU.

However, the requirement to change to a better, lower-ash coal feedstock is also problematic due to production constraints. For example, buying a coal with a lower ash content, domestic or imported (such as Australian coal) would reduce emissions at power plants but would result in a much higher unit cost of production. Therefore, many power producing companies in Kazakhstan seem to make feedstock decisions with their narrow economic interests given top priority, and often balk at legislative attempts to interfere with their operations, leading to ignorance of obligations. Due to these conditions, some of the instruments for the Protocol's implementation were ineffective in Kazakhstan and emissions were not sufficiently cut.

Greenhouse gas-generating companies pay certain taxes, but there is also the issue of transparency. For instance, I learned from one interviewed Samruk Energy manager that the tax burden policy for Samruk Energy was established a few years ago, but transparency remains doubtful. Under the legislative framework set forth in 2014 after the Kyoto Protocol, usage of Bogatyr Komir coal by Samruk was given a maximum limit

of 5,543,149 tons. However, according to their annual reports, greenhouse gas emissions level is excluded in the years of 2011, 2012, and 2013. In 2014, the company has improved its reporting standards, and has provided statistics on emitted gases including NO₂ and SO₂, but its CO₂ emissions level is still excluded. This reduces the transparency and creates doubt that the company was able to reduce its emissions even with the implementation of the tax-enforced limit on Bogatyr Komir. The information on allowed usage of Bogatyr Komir by Samruk was publicly available, but information regarding the outcome of this legislative measure is unavailable. During the interview, representatives of the company were hesitant to answer when asked about Bogatyr Komir usage or CO₂ emissions monitoring, or they simply proclaimed not to know the exact data. It is clear that the informational constraint remains strong.

Poland and Kazakhstan have different energy pricing approaches: Kazakhstan regulates very strictly by setting the final price for consumers. For instance, consumers always go for a cheaper price and, thus, when companies set the final price, they usually choose the option of making it convenient for the community. In general, power plants cannot increase their tariffs. One Samruk Energy manager confirmed during my interview that there was a case when Samruk Energy increased its tariff for a new power plant that was commissioned in 2012. The original tariff was not enough to cover the financial interests for the investors, thus the company applied for an increase in the tariff. However, to get a tariff increase from the government, the policy makers required some conditions. For example, the government sets a regulation that the final tariff for the consumer could not exceed a certain amount. This meant that the generation company could increase its tariff without increasing the energy balance. The Polish government strives to balance customer demands and environmental consequences. For instance,

Poland could use cheaper coal that is more than 10% ash and convenient for customers. However, they do not do it because it will have negative consequences for the environment. This is also more convenient because Poland is willing to increase its tariff through capital investment for modernization. On the contrary, it does not always work for Kazakhstan due to the inability to spend such money on capital investments.

Given so many domestic constraints, during the Kyoto Protocol's reduction target years (2008-2012), only few environmental projects were implemented in Kazakhstan. Company strategies are the key defining mechanisms in improving sustainable development. The more sustainable the company policy is, the less greenhouse gas it emits into the atmosphere. After the expiration of the Kyoto Protocol, greenhouse gas-generating companies in Kazakhstan seem to be working more earnestly towards energy efficiency. For example, Samruk Energy has built a wind-powered generation plant in 2015 with an output capacity of 45 megawatts in Yereimentau, which is 150 km from the capital city, Astana. In addition, it installed several 2 megawatt solar power plants that are planned to increase the energy efficiency of the company by 30%. The idea of renewable energy projects allows companies to bring innovation to their industry. For instance, the wind power plant in Yereimentau has a coal package that can function during winter months and under harsh conditions. Major producers of wind turbines provide a guarantee for operations in temperatures as low as -20 C. However, Samruk Energy guarantees generation capability in temperatures as low as -40 C. This strategy has helped generation companies in Kazakhstan deal with extreme conditions that European countries simply do not experience.

Kazakhstan's government has been trying to increase energy efficiency, mostly for coal power plants. One strategic way the companies have been investigating is to

close smaller power plants and increase the number of large power plants that have higher temperature boilers, because their efficiency tends to be higher. However, there are many power plants left from the Soviet period and it is an expensive capital investment, but enhancing energy efficiency through one big investment is better than paying for the costs of inefficiency year-by-year.

On the contrary, strategies for sustainable development work effectively for Poland through adaptation mechanisms. “Adaptation is building resilience and reducing vulnerability” (Lagos 2009). One of the online interviews of Poland initiatives by Asad Rahman, on November 2, 2010 in London conference claimed that the importance of sustainable development comes in place in order not to compromise future generations’ ability to meet their needs and demands. When depleting natural resources, Poland takes into account the amount of natural resources that are needed for future generations. As for Kazakhstan, it seems that the coal generation companies pursued short-term profits and refused to upgrade and invest in sustainability during the Kyoto Protocol reduction target years. In addition, it is important for nations to distinguish their priorities to act effectively, and National Adaptation Programmes of Action (NAPA) by the UNFCCC provides useful steps for nations to figure out what are more important to them to implement climate change actions. Institutions and effective regulations both at national and international level help regions mitigate and adapt to climate change. Importantly, Poland follows these adaptation programmes, which weaken informational and personnel constraints, actively (Climate Adapt 2016). This boosts its environmental performance.

According to one interviewed Samruk Energy manager, Kazakhstan has already invested 60 million US dollars on installing filters on clean technologies such as Carbon Capture Storage (CCS) in order to enhance the manufacturing of the old power plants.

These are an electric filters installed in the power plants to reduce the level of ashes by 98%, which leads to cutting the emissions rate. However, these filter installations are an immense investment for generation companies. Many experts claim at Samruk Energy that CCS is a new global trend that international organizations are implementing and thus it is costly at this moment. However, over time, when it no longer becomes the global trend, the cost eventually would drop by 2030 or 2050.

Kazakhstan's government is trying to implement regulations to transition to renewable energy, and it is understandable why power generation companies are hesitant to follow such legislative frameworks. For this reason, Kazakhstan's consumption of energy might not be compatible with replacement by renewable energy. Both traditional generation and renewable energy sources should be present to cut emissions, but Kazakhstan's government seems to have failed to implement such regulations due to strong domestic constraints.

From lesson learned, Kazakhstan is now trying to implement the "20-20-20" policy gradually, which focuses on reduction of emissions, and renewable energy. While zero emissions are eco-friendly and safe, it drops the energy security of the country. Generally, a coal deficit is predictable, but hydropower shortfalls are not. If a dramatic event occurs while the whole country is dependent on green energy, it would be a tragedy. Thus, renewable energy also carries its downsides. Since everything relies on energy, a nation should not just be dependent on renewable energy. It should have the capacity to deal with blackouts. Kazakhstan seems to understand this issue better as time passes.

As mentioned earlier in the paper, both Poland and Kazakhstan were subject to Soviet rule. A majority of the energy systems that Kazakhstan has today came from the Soviet

period, thus the problem is with old, low-efficiency power plants. Tariffs were not always enough, thus the Kazakh government implemented 'limited tariffs' in 2011. For instance, certain power plants have a tariff of 5 tenge and when they provide their needs for the next year, the generation companies include investment programs. Once they agree on the 5 tenge tariff, they ask for another 4 tenge tariff for installing the rehabilitation equipment for generating new energy. This policy has worked successfully since it was implemented, however, due to the devaluation; it became less effective and is currently fairly ineffectual. Since the old power plants are from the Soviet period, they need to be upgraded, which would demand capital investment. The main reason why smart grid technology doesn't work in Kazakhstan is due to the old power plants. In addition, the territory of Kazakhstan is huge, which makes it more problematic for government to implement such new projects. The nation is also hesitant to spend such large amounts of money on investments, since they already have other problems. According to one interviewed Samruk Energy manager, when one department tries to get more money than another, third parties cry foul with concerns about fairness. In short, financial constraint remains strong in Kazakhstan.

Determining the policy for coal power generation companies

When it comes to greenhouse gas-generating companies, it is always hard to implement policies that favor everyone or meet the interests of different lobbies. There is renewable energy that is subsidized by traditional generation in Kazakhstan. In this system, there are renewable energy power plants and there is a center that takes responsibility in counting the renewable energy and paying the money to the producers. Traditional generation pays taxes for the energy being consumed. Each month, for instance, this system sells electrical energy to power plants or to energy supply

companies, which was functioning at a good rate. However, after the devaluation, taxes and tariffs obviously increased because the majority of the sources for renewable energy are foreign. Simply, devaluation made it hard for companies to pay back their debts. This shows that financial constraint becomes stronger for companies. Thus, power generation companies can play a major role in determining policies starting from selling energy to increasing taxes in Kazakhstan. Every lobby has different interests and problems arise when there is no mutual agreement or some parties are dissatisfied with the policy.

The losses of energy matter for cutting the emissions

When taking into account Poland and Kazakhstan's energy sector, I found there is a divergence in energy losses that greatly impact the emissions level for both countries. For instance, Poland and Kazakhstan have different territories. Ekibastuz, which is located in Northern Kazakhstan and borders China, transmits energy to Almaty, the old capital city. Almaty is in an energy deficient region. From October to March, Almaty consumes immense amounts of energy, which come from Ekibastuz. The distance between Ekibastuz and Almaty is considerable, and energy gets lost in transmission. However, if a certain region in Poland sends X kilowatts of energy to other region, there would probably be a total energy loss of less than 5% in transit due to the comparatively short distances between power sources and destinations. In addition, both nations' quality of coal is very different. As mentioned before, Kazakhstan uses 'Bogatyr Komir' coal, which is cheap and high in ash content. It seems that Kazakhstan does not care about loss, which again shows that domestic informational, personnel, and financial constraints are higher in Kazakhstan than in Poland.

Scarcity in funding causes problems for reducing emissions for generation companies

Funding for Samruk Energy mostly comes from strategic assets. Partial funding comes from the government and the decision to whether or not to fund the company comes from prime minister and the president. There is a high possibility that Samruk Energy or other coal companies in Kazakhstan face funding issues that restrains them from reducing their emissions. For instance, as mentioned in the environmental policies, Samruk Energy has installed filters to the power plants, which collect ash up to 99.6%. However, it requires capital investment and the companies do not have enough funding to install all the filters to all the power plants. Therefore, Samruk Energy is trying to submit an application for international funding organizations instead of domestic funding in Kazakhstan. However, there are certain criteria that the companies have to meet in order to be eligible for funding. For instance, Green Climate Fund (GCF) is under the UNFCCC and it devotes funding for low emissions projects. One of their criteria is that the company asking for investment has to be accredited, which Samruk Energy is not. Therefore, it faces certain issues in funding that confines them for reducing its greenhouse gas emissions.

Overall, there was a divergence in the reduction in greenhouse gas emissions levels between Poland and Kazakhstan under the Kyoto Protocol due to the domestic political constraints. For Poland, domestic political constraints are also weaker because of the European Union funding for its environmental projects, tougher environmental standards, and general environment-friendly awareness, which will be the main focus of the next chapter. As I will show below, for Kazakhstan, these constraints are stronger because there is no international pressure or incentive to implement environmental obligations.

Chapter 4 European Union Membership Helps Reduce Domestic Political Constraints

The role of European Union Emissions Trading Scheme and several measures to implement climate change actions including “Action Plan for the EPPC”, “ratify Kyoto Protocol”, and “European Commission on emission trading scheme” have been vital in environmental policies (United Nations 2008). The current emissions in the atmosphere have been the highest in the last century, going beyond 500 part per million (ppm) and have been threatening the national security. Total EU 27 members emit approximately 45% of the global carbon dioxide emissions. By the end of 2012, EU members were able to reduce their emissions by 15%. Thus, Poland’s access to EU membership brought a whole new level of effective levers and capabilities of strengthening environmental protection, which helped Poland to cut its emissions.

Hypothesis 2: EU membership increases Poland’s environmental performance due to stricter obligations.

While Poland is more deeply integrated with international organizations, including the European Union (EU), which funds many of Poland’s environmental issues programs in exchange for stricter emission controls, as shown in Figure 11; Kazakhstan, however,

Figure 11. EU Total Expenditure in 2013



Source: ec.europa.eu

does not receive EU funding for environmental protection.

International agreements as such play a huge role in solving environmental issues, including climate change. In addition, Poland is part of the OECD, which, in summary, provides for deeper integration and better international cooperation with other member states. On the other hand, Kazakhstan has not been able to join OECD. In addition, by the time that Poland (an early reformer) had gone through the process of natural resource abundance determination, meaning Kazakhstan, which was still depleting its natural resource reserves, was just starting the process. This process could have affected information-sharing about GHG emissions, thus, weakening the informational constraint, and affecting the greenhouse gas reduction rates in both countries. The evidence used in this analysis will come from climate change policy sources such as the Kyoto Protocol, the international climate change agreement; IPCC (Intergovernmental Panel on Climate Change – the publication of which is a valid, commonly-cited scholarly resource), UNFCCC (United Nations Framework Convention on Climate Change – internationally accepted convention with more than 195 member parties), the International Standards and Policies by mining companies that deals with sustainable development reporting (ISO 26000); ISO 14001 that deals with environmental systems; Sustainability Reporting Guidelines (GRI 4); and domestic environmental regulations from government documents.

International organizations including EU that use the ISO 26000 standards have lower atmospheric emissions. It is similar to the Global Reporting Initiative (GRI) index, but differs in a way that it focuses more on “governance, consumer issues and labor practices” (ISO 2015). GRI based reports focus on sustainable development practices including social, economic, and environmental factors. This reporting is important and

has become common among mining companies because international officials including UNFCCC look at company's GRI reports to evaluate their environmental performances (Marimon et al 2012). Poland has been following GRI under EU since its membership, however Kazakhstan has recently implemented this reporting since 2014. Importantly, GRI weakens informational constraint and personnel constraint because companies have an incentive to hire environmental experts who have an interest in producing accurate information about the GHG emissions.

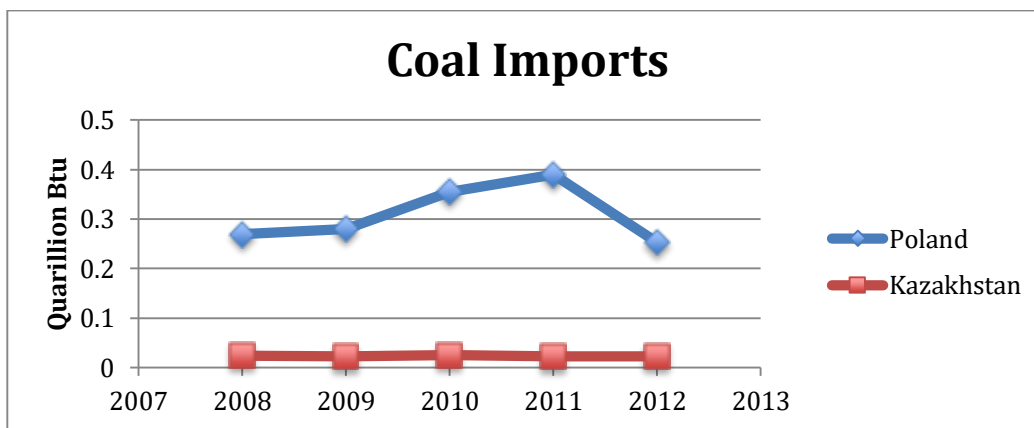
European Union

Poland became the member of the European Union in May 2004 after the Kyoto Protocol ratification. According to the EU 2014 statistics, Poland's economy consists of 'transportation, food services, education (27.1%), 'health, and social activities' (14.3%) and, more importantly, 'industry' (25.1%) (EU 2016). Poland's main exporter destinations in the EU include Germany, the United Kingdom, and the Czech Republic. Germany, Russia, and China are the main importers of goods to Poland. Concerning the fact that majority of the investment comes from industrial activities, it is also important to note how much harm those activities are inflicting on the environment. The World Trade Organization (WTO) investigates whether international trade has a positive or negative relationship with the amount of greenhouse gas emissions. It claims that these variables are negatively associated, because the higher the trade is, the higher the greenhouse gas emissions will be (OECD 2015). For instance, the reason for this negative associativity is that opening the trade and increasing the economic development mean greater energy use and increased shipping, which then requires more emissions in the atmosphere.

To weaken the financial constraint, EU assists Poland's mining companies to be more sustainable in terms of economic activities through strategic implementations such

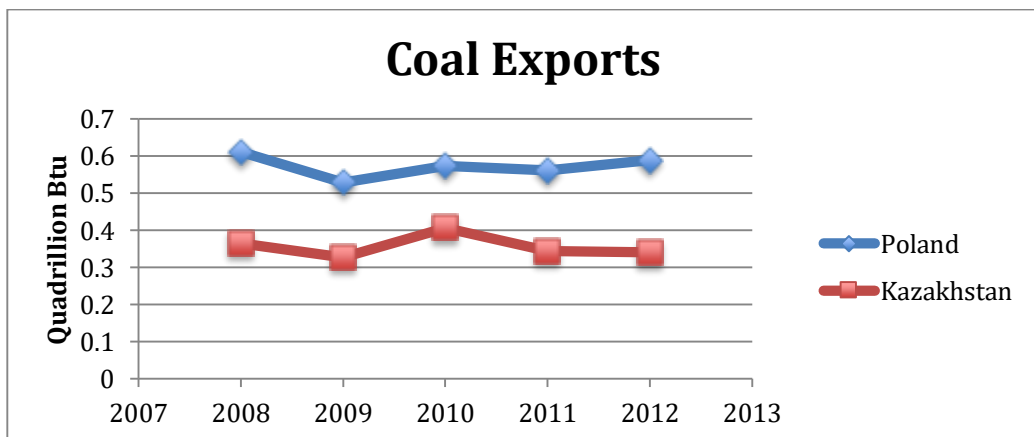
as enhancing biodiversity, increasing energy efficiency, and reducing consumption of fuel (World Trade Organization 2016). Therefore, as one of the most natural resource-abundant countries in the Union, Poland's accession to EU brought advantages in terms of its environmental performance.

Figure 12. Comparison of Coal Imports of Poland and Kazakhstan



Source: EIA (U.S. Energy Information Administration)

Figure 13. Comparison of Coal Exports of Poland and Kazakhstan

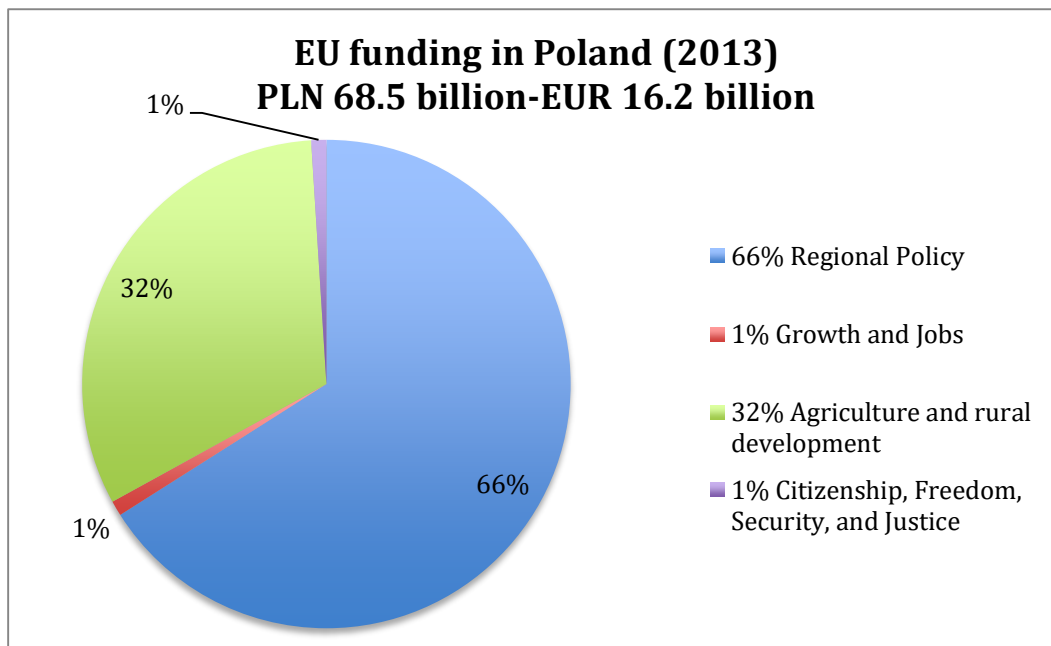


Source: EIA (U.S. Energy Information Administration)

94% of the EU's budget goes to the member states, with a committee deciding how to fairly distribute the funds among the member states. The larger the country is, the more funding it gets. In 2013, Poland got the highest funding among the EU members from EU, € 16.2 billion (EU 2016) as shown in Figure 11 above. In 2014, EU spending for Poland reached € 17.436 billion (EU 2016). Given that Poland's corruption levels are low, and the EU is monitoring its spending, I believe that EU funding does reach its goals and actually lowers financial constraints.

Spending of the EU-provided funds was largely distributed between sustainable growth (48%), and natural resources (40%), as shown in Figure 14. On an industrial level, Poland's government spent the EU funding on regional policies (66%), and agriculture and rural development (32%) in 2013, which was the Kyoto Protocol's reduction target year.

Figure 14. EU Budget Spent for Poland in 2013



Source: ec.europa.eu

Regional policies were devoted to maintaining biodiversity, water treatment, emissions reduction, land distribution etc., with the main goal of making Poland a more environmentally-friendly nation (EU 2016).

In addition to these target areas, the EU pays close attention to energy efficiency and environmental protection, thus it supported several projects including ‘upgraded sewerage system’, which deals with safe drinkable water. According to the EU, “The modernization will also reduce the number of pollutants entering the local ecosystem” (EU 2016). Another big project that EU invested in for Poland’s environmental protection was installing a new gas pipeline, which helped for the transformation from fossil fuel use to gas, leading to a reduction in the greenhouse gas emissions. In addition, due to natural disasters, including flooding in Poland, the EU provided an additional € 106 million in assistance for the recovery process in 2010 (Ec.europa.eu 2015). More importantly, JSW cooperates with European Union in terms of meeting its environmental obligations. With this evidence, it can be said that the EU does not just proclaim that they care about the environment, but takes actions toward increasing environmental protection. With the help of the EU, Poland had a strong commitment to reduce its emissions and from the first year of accession into the EU in 2004 until now, Poland saw a decrease in its carbon dioxide emissions level during the Kyoto Protocol reduction target years.

Through EU membership, many other countries were successful in reducing carbon dioxide levels in accordance with the ratification of Kyoto Protocol besides Poland. These EU members included Bulgaria (-8.0), Croatia (-5.0), Czech Republic (-8.0), Estonia (-8.0), Hungary (-6.0), Latvia (-8.0), Lithuania (-8.0), and Romania (-8.0)

(UNFCCC 2015). This multi-country reduction of GHG emissions clearly shows that joining EU in itself matters for environmental protection.

Weak International Integration of Kazakhstan Keeps Domestic Constraints Strong

For Kazakhstan, deeper integration with international agreements was lacking due to mutual conflicts and geographical constraints. One Samruk Energy manager informed me during the interview that even as a member of the international climate change agreements such as Kyoto Protocol or COP 21, cooperation with neighboring states helps or causes interruption in the environmental performance of a country. For instance, Kazakhstan's territory is located among many transnational rivers. According to one interviewed Samruk Energy manager, Kazakhstan's neighboring nations, including Uzbekistan and Kyrgyzstan, are in higher demand for water for agricultural use, especially in the summer. Kazakhstan has the Shardara hydro power plant, which is situated near the Shardara River, and, from May to September, it tries to provide for the water demands of these nations to enhance cooperation (Tengri News 2012). However, this cooperation is difficult due to regional conflicts. For instance, Kazakhstan's energy system needs more energy in the winter due to higher consumption levels. More water is needed in winter for Kazakhstan, but more water is needed in summer for Uzbekistan and Kyrgyzstan. These nations want to accumulate the water they need for summer in the winter, when Kazakhstan needs it. This sometimes leads to conflicts because the two sides have different interests.

Another example is that Chinese intergovernmental cooperation with Kazakhstan is affecting some power plants, as I learned from my interview with one Samruk Energy manager. The Ili River that runs from China to Kazakhstan has dropped in level from 342.73 m to 342.65 m, by 8 cm, because China uses much of the water to meet their high

consumption needs (Propastin 2013). The river's water level is expected to drop by 40% by 2050 (Kezer and Matsuyama 2006). Consequently, the Kazakh power plant at Kapshagay is struggling to operate with the decreased amount of water. However, Kazakhstan tries to maintain its cooperation with China because it has no choice not to cooperate.

Another problem with international cooperation, which prevents Kazakhstan from decreasing its greenhouse gas emissions, is the current domestic financial devaluation (Jardine 2015). For Poland, the European Union funds many of its projects and thus its environmental performance is better despite the poor economic climate. According to one interviewed Samruk Energy manager, there are many international financial institutions including the Green Climate Fund that would like to finance the new projects or provide investments in rehabilitation and modernization in Kazakhstan. However, the nation's national currency has dropped in value by 23% as of 2015, but the tariff level has stayed the same (Zhumatov 2015). It is simply hard to pay back these investments when the Kazakh currency is weak compared to other nations' currencies. Therefore, many energy projects that started last year to enhance sustainable development face a situation where they are not able to achieve their goals. In addition, the process of modernizing or upgrading the power plant always follows funding, which the generation companies have to pay back. For this reason, few companies are willing to take the investments to subsidize the building or modernizing of power plants.

COP 21 Future Scenarios

The Conference of Parties (COP 21), globally known as the '2015 Paris Climate Conference', is the first international climate agreement in 20 years aimed at trying to achieve the goal of maintaining the increase in global temperature below 2 C. COP 21's

approach is far different than the Kyoto Protocol's, but which is probably why many countries are ready to take the lead and take responsibility for reducing their emissions. It could be said that this agreement is the continuation of the Kyoto Protocol, but it uses different methods and approaches. While Kyoto Protocol used a top-down approach, COP 21 will use a bottom-up method for companies to decide on their emissions reduction level. How the country will reach its goal is up to them, but the outcome should be the same that they have to reduce their emissions by the percentages they provided. The COP 21 Conference was held in Paris from November to December 2015, and more than 190 countries, a higher number than those signed Kyoto Protocol, have joined the agreement so far. This agreement will come into effect in 2020 and every country will submit its Intended Nationally Determined Contribution (INDC) on reducing the emissions level based on their capacities (Sweeney, 2015).

Intended Nationally Determined Contribution (INDC)

Kazakhstani INDC

In terms of environmental policies, power generation companies in Kazakhstan who contribute to the CO₂ emissions of the nation are responsible for providing their INDC to the Ministry of Energy. This is similar to the bottom-up approach, where companies propose realistic target that they can achieve in a certain timeframe. Later, the report is submitted to the Ministry of Energy and they discuss it with the government authorities. If they believe the reduction target is too low, they send back the report to the generation companies to make adjustments. This is a new approach for Kazakhstan and many generation companies are trying to implement it accordingly.

As mentioned above, Kazakhstan's new INDC follows the bottom-up approach, in which local companies' committees take part in the decision-making including setting

the reduction target for greenhouse gas emissions themselves. The INDC is regulated at two levels including national and international binding agreements. At the national level, Kazakhstan implements the 'National Plan' for environmental protection. At the international level, it is committed to the 'United Nations Framework on Climate Change' (UNFCCC) cooperation mechanisms in order to obey the international climate change agreements. Kazakhstan includes in its INDC that it is aware of the main aim of global temperature increase not exceeding 2 C in the near future. This would mean that Kazakhstan has already agreed to cut its greenhouse gas emissions under the obligatory, unconditional and conditional targets. By 2030, Kazakhstan promises to reduce its greenhouse gas emissions by 15% compared to 1990, which is the unconditional target. A 25% reduction in the emissions rate by 2030 is Kazakhstan's conditional target. This commitment would take serious actions including the transition to renewable energy, enhancing low carbon technologies, and obtaining aid from climate change funds. As we know, greenhouse gas emissions into the atmosphere are caused by industrial activities and reducing emissions requires a reduction in these economic undertakings. Greenhouse gas emissions in Kazakhstan include "carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆)" (Greenpeace International, 2010). Under these targets, Kazakhstan implemented laws on energy efficiency and renewable energy, aimed at shifting to a green economy. Methods used for measuring emissions levels are taken from IPCC 2006 and 2013 guidelines.

Polish INDC

EU members, including Poland, are also committed to the UNFCCC cooperation on keeping the increase in global temperature below 2 C. EU parties promise to reduce its

emissions level by 40% compared to the 1990 base year level. It focuses on the environmental issues such as “energy, industrial processes, agriculture, waste, and land use” (UNFCCC, 2015).

When comparing the two states’ INDCs, it is clear that Poland is more experienced with international climate change agreements and how they function. For instance, Poland does not simply identify industrial processes that will participate in the plan; it gives detailed plans for the meeting of these targets such as “CO2 transport and storage, or manufacturing industries and construction” (UNFCCC 2015). On the other hand, Kazakhstan’s INDC is more general and does not provide detailed plans for each sector. Solely stating that energy, agriculture, or waste sectors will be covered is not sufficient and potentially limits the effectiveness of these efforts.

Contribution to the existing research

This paper aimed to answer several questions, including ‘What are the coal generation companies’ behavior to state policies? ‘How and why do some countries take implementation seriously while others do not?’, ‘How do domestic politics affect the success or failure to implement international environmental obligations?’, and ‘What explains the success of international agreements?’ Domestic politics determine the countries choice to join international agreements and go through the ratification successfully. My contribution to the existing research in this area is to provide a greater understanding of how public policies are implemented or non-implemented and to propose policies to Kazakhstani government and mining companies to improve their environmental performance. It became clear that the faulty Kyoto design is incomplete, which was significant to understand the domestic political constraints. Even though there is some scholarly research done on the performance of Poland under its Kyoto Protocol

obligations, there is no existing research comparing Kazakhstan to a European country under the Kyoto Protocol in terms of greenhouse gas emissions. Therefore, this research project will expand the implementation of strategies to meet international environmental obligations for Kazakhstani side and try to answer why international environmental obligations, such as the Kyoto Protocol, worked for Poland but were not successful for Kazakhstan. Some scholars only focus on domestic politics, while others focus only on deeper international integration such as EU. In my paper, I try to show that both sides of the debate overlook an important structure of domestic political constraints in which environmental policies are made. Therefore, data collection through interviewing officials of Samruk Energy in Kazakhstan and investigating online documents with their counterparts in Poland was very helpful in providing answers to the previously unexplored questions mentioned above and was an invaluable contribution to the existing literature.

Future research needs in this field

This research mainly focused on the divergence between Poland and Kazakhstan's greenhouse gas emissions levels and international environmental regimes under the Kyoto Protocol. From the evidence gained in my research, the implementation of the Kyoto Protocol was successful for Poland and not successful for Kazakhstan for several reasons, including domestic political constraints and effective international agreements. Future research needs in this area include exploring the environmental obligations under COP 21 and see if the same result following the Kyoto Protocol could be repeated or if this new international accord will achieve a different outcome. Since COP 21 plans to use a bottom-up approach, many countries are hoping to achieve successful results in reducing emissions. In addition, this study was more of a comparison

of case studies for two countries. A comparison between COP 21 and Kyoto Protocol to understand what environmental regimes work effectively should be completed. Also, to improve generalizability, future research should investigate more than one coal generation company.

Conclusion

Having analyzed several factors, including national economic performance, structure of domestic constraints, and the depth of international integration on the basis of review of academic literature, interviews with executives and personnel at power generating companies in Kazakhstan, and examination of the reports made by Polish and Kazakh power generating companies, several important findings were made concerning the two nations' performances under their Kyoto Protocol obligations (specifically related to Poland's success in reducing its emissions by 6% and Kazakhstan's failure to meet its obligations, despite both nations having comparable GDP's, coal production and consumption rates, and sociopolitical backgrounds). First, domestic political constraints were stronger in Kazakhstan than in Poland. I show the force of three types of constraints: financial, informational and personnel that impacted the emissions level. Kyoto Protocol's top-down approach to cut emissions simply did not work for Kazakhstan, as neither international regime nor Kazakhstani government imposed penalties to inhibit corporate entities from pursuing increased economic output at the expense of environmental pollution. Second, the European Union's impact through pressure on and aid to Poland, helped the country to exceed the Kyoto's obligations and provide clear expectations and mechanisms for implementation. These findings should help fill the gap in existing literature regarding the implementation of Kyoto Protocol and international environmental regimes more generally.

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