

FUELING THE DRAGON'S FIRE: CHINA'S COAL POLICY

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Abstract

The last few decades in China have seen unprecedented economic growth. This growth, though good for the economy, has had extreme consequences on the health of Chinese citizens as well as the environment as a whole. A major factor of this increased pollution is the country's high consumption of coal, which has rarely comprised less than 70 percent of the country's energy during the past 50 years. Though the media portrays a China which is making enormous strides in the field of environmental protection, the energy and environmental policies of the country suggest that it will continue using large amounts of coal in the years to come. This thesis project attempts to discover the underlying reasons for China's coal policy and how it is affected by economic, environmental, and social factors within the country. It argues that although environmental and social factors are playing an increasingly significant role, these policies are still driven by economic concerns. Until the country places more stress on environmental concerns, coal will continue to play a large role in its energy policy.

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Fueling the Dragon's Fire: China's Coal Policy

Introduction:

The last few decades in China have seen unprecedented economic growth. The country's GDP has grown at an average of almost ten percent annually for the past 30 years, the fastest growth of any country in recorded history.¹ In the last ten years alone, its economy has tripled in size, becoming the second largest behind that of the United States.² This growth has understandably increased the energy demand, causing it to double from 2000 to 2011, from 1,108 Mtoe (million tons of oil equivalent) to 2,271 Mtoe.³ In order to meet this demand, China has increased its coal consumption, which historically has played an important role in sourcing the region's energy. Over the last 50 years, coal has rarely comprised less than 70 percent of the country's energy use.⁴ Today, China is the world's largest consumer of coal, responsible for almost half of the world's annual consumption.⁵ Over the span of ten years, from 2000 to 2010, coal use and emissions increased at an annual average rate of nine percent. To put this in perspective,

¹ Xiaodong Zhu, "Understanding China's Growth: Past, Present, and Future," *Journal of Economic Perspectives*, 26(4): 103-24, doi: 10.1257/jep.26.4.103.

² Jane A. Leggett, "China's Greenhouse Gas Emissions and Mitigation Policies," (paper presented to the 112th Congress, Washington, DC, July 18, 2011).

³ Dennis Best and Ellina Levina, "Facing China's Coal Future: Prospects and Challenges for Carbon Capture and Storage," (working paper, International Energy Agency, 2012).

⁴ Jianjun Tu, "Coal Mining Safety: China's Achille's Heel," *China Security* 3(2):36-53.

⁵ Joseph Ayoub, "China Produces and Consumes Almost as Much Coal as the Rest of the World Combined," *U.S. Energy Information Administration*, May 14, 2014, <http://www.eia.gov/todayinenergy/detail.cfm?id=16271>.

in the year 2010 alone, China's coal-fired power generation capacity increased by an amount equal to Germany's entire existing generating capacity.⁶

Unfortunately, this rapid development and extensive coal use have caused a number of severe environmental problems. Coal is the cause of approximately 90 percent of China's sulfur dioxide emissions and as much as half of its particle emissions, including PM2.5.⁷ China is the world's largest emitter of greenhouse gases, including carbon dioxide and sulfur dioxide, and home to 16 of the 20 most polluted cities in the world.⁸ Coal extraction, which demands around 0.5 tons of water for every 1-2 tons of coal extracted, is also a major contributor to desertification and water pollution in the country.⁹ In recent years, it seems that China has made a concerted effort to reduce pollution and decrease coal use, yet the material is still responsible for around 65 percent of the country's total energy consumption.¹⁰ This issue is not black and white, however, but rather multi-faceted; besides environmental concerns, there are many economic factors for the Chinese government to consider when constructing its energy policy. This paper aims to discover the different aspects effecting China's coal policy and discover why the PRC has chosen to persist in its heavy coal use.

⁶ Li Shuo and Lauri Myllyvirta, "The End of China's Coal Boom," *Greenpeace*, April 11, 2014, <http://www.greenpeace.org/international/Global/international/briefings/climate/2014/The-End-of-Chinas-Coal-Boom.pdf>.

⁷ Beina Xu, "China's Environmental Crisis," *Council on Foreign Relations*, April 25, 2014, <http://www.cfr.org/china/chinas-environmental-crisis/p12608>.

⁸ Keith Wagstaff, "China's Massive Pollution Problem." *The Week*, November 9, 2013, <http://theweek.com/articles/456979/chinas-massive-pollution-problem>.

⁹ Zheng Li et al. "Assessing Water Issues in China's Coal Industry," *CornerStone*, April 11, 2014, <http://cornerstonemag.net/assessing-water-issues-in-chinas-coal-industry/>.

¹⁰ Shuo and Myllyvirta, "The End of China's Coal Boom."

Research Question:

This study will analyze the PRC's competing and seemingly contradictory policy goals of economic growth and environmental preservation through a case study of China's coal policy. It seeks to discover the rationale behind China's coal policy, or lack thereof, and answer the question of how China's coal use is affected by economic, environmental, and social goals, as well as how these policy goals differ at national and provincial levels.

Why does Coal Matter?

It is of the utmost importance to study and understand the PRC's policy on coal because its coal use has enormous environmental, economic, and political implications, not only for China, but also the world. Air pollution caused through the burning of coal in China, does not stay within the country's borders, but rather moves through the atmosphere according to air currents. A study published in the *Proceedings of the National Academy of Sciences* in 2013 found that 12 to 24 percent of the sulfate pollution in the western United States originated from China.¹¹ This is a staggering amount, especially considering that the West Coast of the U.S. is more than 6,000 miles away from China's eastern coast. Countries closer to the region, such as Japan and South Korea, suffer from even higher levels of pollution originating in China.¹² China's carbon dioxide emissions, which increase at an average annual rate of 500 million tons, are counterproductive to the environmental efforts of the United States and Europe, which

¹¹ Jintai Lin et al., "China's International Trade and air Pollution in the United States," *Proceedings of the National Academy of Sciences* 111(2013), doi: 10.1073/pnas.1312860111.

¹² Julian Ryall and Audrey Yoo, "Japan, South Korea Concerned that China's Smog Will Affect Them," *South China Morning Post*, November 6, 2013. <http://www.scmp.com/news/china/article/1348605/japan-south-korea-concerned-chinas-smog-will-affect-them>

have worked to cut their own emissions by 60 million tons annually.¹³ According to a report by Greenpeace in 2014, China's coal consumption is the single most important determinant for the world's future climate.¹⁴ The consequences of such heavy pollution are more numerous and severe than global warming alone; the World Health Organization estimates that in 2012, one in every eight deaths worldwide was caused by exposure to air pollution.¹⁵ With worse air records now than just two or three years ago, it is imperative to analyze critically the causes of such pollution and the rationale behind China's energy policy.

China's coal policy also has a huge effect on the world economy. Cleaner energy, such as solar or nuclear power, is significantly more expensive than coal. Changing the nature of China's energy source would therefore cost billions of yuan and potentially have a large impact on the country's economy. Moreover, although the majority of China's coal is mined domestically, it is still the world's largest importer of coal, importing around 289 million tons in 2012 alone.¹⁶ Were China to stop using coal as its main energy source, it would no longer need to import such huge quantities of the material, which would have a hugely negative impact on the global coal trade. This

¹³ "The East is Grey," *The Economist*, August 10, 2013.

<http://www.economist.com/news/briefing/21583245-china-worlds-worst-polluter-largest-investor-green-energy-its-rise-will-have>.

¹⁴ Shuo and Myllyvirta, "The End of China's Coal Boom."

¹⁵ "7 Million Premature Deaths Annually Linked to Air Pollution," *World Health Organization*, March 25, 2014, <http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/>.

¹⁶ "Coal Statistics," *World Coal Association*, September, 2014, <http://www.worldcoal.org/resources/coal-statistics/>.

would also effect the economies of the countries exporting coal to China, especially those of Indonesia and Australia, who together provide 70 percent of the imported coal.¹⁷

Thirdly, understanding how China's coal policy is effected by economic and environmental concerns also gives one insight into how the PRC prioritizes and balances these differing policy goals. Although the PRC has traditionally focused all of its energy and funds into developing the economy, its economic success over the last two decades, as well as rising environmental concerns, are causing many of its citizens to question this method of development. Indeed, the general feeling towards pollution in the country as of late has been deep concern and even frustration.¹⁸ In such a sensitive political environment, the government must work to ensure that this concern does not turn into anger if it wishes to stay politically stable. Therefore, it is critical that the PRC finds the right balance between environmental and economic objectives.

Hypothesis:

Based on my previous knowledge of the PRC and my preliminary research, I hypothesize that although environmental concerns have increasingly more influence on China's coal policy and may indeed be contributing to cleaner coal use, the policy is still ultimately guided by economic goals. The reasoning behind my hypothesis is simply that it would appear that China continues heavy coal use despite the environmental degradation which it is causing. Moreover, with a slowing economy, I would assume that

¹⁷ Kevin Jianjun Tu and Sabine Johnson-Reiser, "Understanding China's Rising Coal Imports," Carnegie Endowment for International Peace, February 16, 2012, http://carnegieendowment.org/files/china_coal.pdf.

¹⁸ Yihui Zhao, "People's Responses to the Beijing haze Episode via Chinese Micro-Blogging Website" (master's thesis, University of East Anglia, 2013).

the Chinese government would work to prolong the economic boom which the country has enjoyed for the past decade.

Limitations

This paper has certain limitations. The most prominent of these is the difficulty finding accurate information. There exists a discrepancy between the official information published by the Chinese government and the information published by other organizations. Each source provides a different narrative of the situation, especially in regards to coal use and emissions, China's official numbers on both of these topics are always much smaller than those provided by international organizations. China has been known in the past to exaggerate their successes and downplay its losses, meaning that the information available to the public may not be entirely accurate.¹⁹ China has great incentive to do this, since coming across as environmentally proactive is extremely beneficial to its image, not only abroad but also within its own borders, as more and more of its citizens are demanding actions against the pollution problem. Even if the Chinese government reports the exact figures it is given, it is still likely that the statistics are skewed, as many business owners find loopholes in the legislation or simply break the law in order to continue using coal by the cheapest means possible. One common example of this is that although owners of power plants and factories install the desulphurization technology required of them by law, many do not actually turn it on so that they don't have to pay the cost. Thus, the government may in fact believe that more is being done to protect the environment than is actually taking place.²⁰ Although some facts and figures given in this paper may therefore be slightly off, they represent the most

¹⁹ Tu, "China's Problematic Coal Plan."

²⁰ "China Strives to Clean up Pollution."

accurate knowledge available to the international community and should still provide insight into the reality of the situation.

Another limitation of this paper is the rate of change and reform of China's coal policy. The country is currently undergoing a period of reform in which the environmental and energy policies are changing rapidly. There is a lag in the time it takes to publish information from the time it takes place, meaning that most of the information available on China's current coal policy is a few years old and therefore does not actually represent the country's current policy. Even the newest information and statistics on the topic are soon outdated. This paper embodies my best effort in writing an accurate research paper despite these limitations.

Literature Review:

The foundation for this study is "The Apparent 'Paradox' of China's Energy Policy," published in Asian Survey in 2012. In this paper, Lynette Ong discusses China's contradictory climate policy. China is enthusiastically expanding its renewable energy industry, yet, extremely reluctant to commit to international emissions reduction agreements. Ong argues that this contradiction is due to the country's goal of economic growth, as the renewable energy industry is largely untapped and can therefore be easily monopolized and bring in large amounts of revenue. Refusing to pledge to reduce greenhouse gas emissions allows the country to continue using cheap energy, namely coal, and therefore easily maintain and grow its economy.²¹

²¹ Lynette H. Ong, "The Apparent "Paradox" in China's Climate Policies: Weak International Commitment on Emissions Reduction and Aggressive Renewable Energy Policy," *Asian Survey* 52(2012): 1138-1160.

Another narrative of the situation is provided by Tim Wright, who argues in his book “The Political Economy of the Chinese Coal Industry,” that coal is a source of conflict between the central and local governments. Although the central government is working to decrease coal consumption and has created policies aimed at doing so, its plans are undermined by the local governments charged with implementing national policies. This frustration of policies is due to the contradiction of central and local government objectives. While the central government wants to reduce reliance on coal for reasons including environmental protection, sustainability, and social stability, local governments are more concerned with economic growth and development, and thus see benefits in continued coal use. For this reason, local governments are reluctant to, and in many cases do not, enforce policies which they find unbeneficial.²²

Methodology:

This paper will implement an explanatory mixed methods approach to analyze the coal policy of the PRC. Quantitative research in the form of governmental and scientific reports will serve as the basis for my study. A contextual analysis of qualitative sources will then be conducted in order to better understand this data. This analysis will search for clues of how economic and environmental policy goals effect China’s coal use. One of the most important pieces of literature on the subject is China’s 12th Five-Year Plan (2011-2015), which sets environmental and energy goals for the country and therefore provides a good indication of the direction in which these areas are headed. Using the goals laid out in this plan, as well as official statements made by Chinese officials to the press, I will first define China’s coal policy. Next, I will use my analytical findings to

²² Tim Wright, *The Political Economy of the Chinese Coal Industry: Black Gold and Blood-Stained Coal*, (New York: Routledge, 2012).

outline the causal relationship between my independent variables (economic and environmental policy goals) and dependent variable (PRC coal use).

This paper is organized into 5 chapters: China's coal policy, trends in coal use, economic policy goals, environmental policy goals, and effects of social pressure.

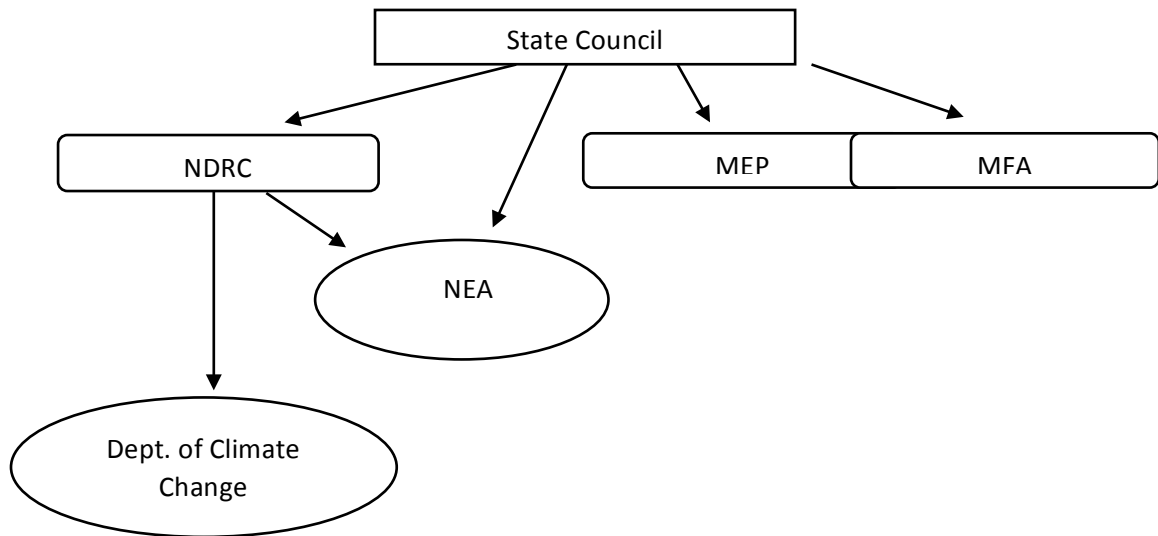
Chapter 1: China's Coal Policy

Before unpacking the motives behind China's coal policy, we must first define what their policy is and how it is created. Due to the nature of coal and its overlap into multiple sectors, China's energy and environmental policies must both be studied to gain a comprehensive understanding of China's coal policies.

Government Organizations and Mechanisms:

The formulation of China's coal policy is extremely decentralized. Three separate executive-level government agencies are responsible for coal policy: the National Development and Reform Commission (NDRC), Ministry of Environmental Protection (MEP), and Ministry of Foreign Affairs (MFA). Within these agencies are located multiple smaller organizations which all share in the responsibilities associated with developing the country's coal policy, both from the energy and environmental perspective. The most important of these organizations are outlined below:

Figure 1.1 Structure of Government Organizations and Mechanisms



SOURCE: Created by author from information attained from Christopher Burke, Johanna Jansson, and Wenran Jiang. “Formulation of Energy Policy in China: Key Actors and Recent Developments.” *Centre for Chinese Studies*. January, 2009 and “Department of Climate Change,” *National Development and Reform Commission People’s Republic of China*.

The National Development and Reform Commission (NDRC), or 中华人民共和国国家发展和改革委员会, is one of the largest administrative agencies under the State Council, managing more than 26 departments and bureaus. As an organization mostly concerned with state planning and macroeconomics, the responsibilities of the NDRC vary widely; its various departments are in charge of energy, environmental protection, employment, foreign enterprises, industry, natural resources, social development, transportation, and trade.²³ Due to the fact that the NDRC is the primary authority over both the energy and environmental protection sectors, it plays a disproportionately large role in China’s coal policy formulation in comparison to the MEP and MFA. Two

²³ Christopher Burke, Johanna Jansson, and Wenran Jiang. “Formulation of Energy Policy in China: Key Actors and Recent Developments.” *Centre for Chinese Studies*. January, 2009. <http://www.resourcegovernance.org/sites/default/files/Formulation%20of%20Energy%20Policy%20in%20China.pdf>.

NDRC departments in particular are vital for this process: the Climate Change Department and the National Energy Administration.

Department of Climate Change, or 应对气候变化司, is a department within the NDRC instituted in 2008 and is entrusted with researching and analyzing the effects of climate change on national development, creating national climate change strategies and policies, as well as international climate change conventions. Another primary role of this department is to carry out the tasks assigned to it by the Clean Development Mechanism (CDM) and the National Leading Group Dealing with Climate Change, Energy Conservation, and Emission Reduction (Climate Change LSG).²⁴ These smaller organizations, though essential for the research and development of national climate change strategies, do not have the authority to create policy and thus must work in conjunction with the Department of Climate Change.

The National Energy Administration (NEA), otherwise known as the National Energy Board or 能源局, was established in 2008 as the supreme agency responsible for creating and regulating China's energy policy, including regulations on coal, oil, natural gas, and renewable energy sources. The NEA is also in charge of energy conservation, as well as international and inter-departmental cooperation. Although the NEA has officially been independent from the NDRC since 2009, it shares a large proportion of its leadership and personnel with the NDRC and is therefore largely considered to be an extension of the NDRC.²⁵ In fact, many of the powers necessary to regulate the energy sector effectively, such as the ability to establish electricity prices, remain in the hands of

²⁴ "Department of Climate Change," *National Development and Reform Commission People's Republic of China*, http://en.ndrc.gov.cn/mfod/200812/t20081218_252201.html.

²⁵ Burke, Jansson, and Jiang. "Formulation of Energy Policy in China."

the NDRC, thus the authority of the NEA is limited and requires the cooperation of the NDRC. Moreover, as a vice ministry, the NEA hold a relatively low position in the government and actually operates below the ministries, commissions, and state-owned companies whom it is intended to oversee, making coordination problematic.

Under the authority of the NDRC, the Climate Change Department and NEA lack the autonomy and power to make independent decisions. This is extremely worrisome, especially considering the fact that the NDRC, the main ministry controlling coal policy, is primarily aimed at furthering economic development, and is consequently automatically biased on the question of coal use. From this organizational system, it is therefore reasonable to assume that China's coal policy is rooted in economic rather than environmental concerns.

The Ministry of Environmental Protection (MEP), or 中华人民共和国环境保护部, was founded in 2008 to replace the former State Environmental Protection Administration (SEPA). The official duties of the MEP are to regulate of water, air, soil, noise, radioactive, and solid waste pollution, as well as to formulate, implement, and enforce environmental protection policies and standards. MEP is also responsible for the coordination of environmental policies among the various provinces and funding and organizing research and development in this field. Due to its relatively new conception, the MEP is not yet well established and has a much smaller budget, administration, and clout in comparison to the NDRC.²⁶ Therefore, although the MEP is the primary

²⁶ Ong, "The Apparent "Paradox" in China's Climate Policies."

department focused on environmental protection, the NDRC creates the majority of environmental policies.

The Ministry of Foreign Affairs (MFA), or 中华人民共和国外交部, is the primary organization charged with constructing China's international coal policy. The MFA therefore is charged with representing China in international environmental negotiations and ensuring that the agreed upon regulations do not interfere with the country's national coal policy.²⁷

Three major problems exist in the organization of the government mechanisms intended to formulate China's coal policy. Firstly, as stated above, the NDRC, a ministry responsible for economic development, is the primary authority over both the energy and environmental sides of China's coal policy. Secondly, there is a large overlap of responsibilities between the ministries, thereby undermining the effectiveness of each agency and leaving it unclear which agency has the final authority. For example, both the Department of Climate Change and the MEP are responsible for formulating environmental policies, including policies on coal use and air pollution. Furthermore, every one of the organizations listed above is responsible for international cooperation. This disorganization has been visible in the international arena on several occasions, most notably at the 15th Conference of the Parties (COP15) held in Copenhagen in 2009. At this conference, the Chinese delegation seemed unclear on its own policies, holding up the meeting multiple times in order to call their superiors and ask questions.²⁸ Thirdly,

²⁷ Ibid.

²⁸ Mark Lynas, "How Do I Know China Wrecked the Copenhagen Deal? I Was in the Room," *The Guardian*, December 22, 2009. <http://www.theguardian.com/environment/2009/dec/22/copenhagen-climate-change-mark-lynas>.

although there do exist several small inter-departmental committees intended to promote cooperation between these groups, including the National Energy Commission and Climate Change LSG, true coordination is still lacking.²⁹

National Policy

On a national level, China's coal policy is fragmented and unorganized. Aside from the Coal Law of 1996 (reformed in 2011), which focuses on the standardization of the coal industry, including exploration, production, and distribution, China does not have clear-cut coal policies or laws.³⁰ Instead, these policies are buried within environment and energy policies. After extracting the specific coal-oriented policies, it becomes clear that the country has no national standard for coal use, instead, the provinces are each expected to produce their own coal policies based on the guidelines set by environment and energy "plans" promulgated by the central government every few years. At the provincial level, these policies are created by miniature versions of the national organizations outlined above.³¹ Although these plans are not technically laws, they are all reviewed and voted on by the State Council and can therefore be considered part of the country's legislation.³² The most important of these plans to the current coal policy are the 12th Five Year Plan and the Action Plan for Air Pollution Prevention and Control.

²⁹ Ong, "The Apparent 'Paradox' in China's Climate Policies."

³⁰ Xin Qiu and Honglin Li, "Energy regulation and legislation in China" *Environmental Law Reporter* 46(2012): 10677-10693.

³¹ Philip Andrews-Speed, *The Governance of Energy in China: Transition to a Low-Carbon Economy* (New York: Palgrave MacMillan, 2012).

³² Ye Qi and Tong Wu, "The Politics of Climate Change in China," *WIREs: Climate Change* 4(2013): 301-313.

China's 12th Five Year Plan (FYP) was issued in March of 2011 and marks the primary policy governing the period of 2011 through 2015. This FYP includes a specific section for the coal industry which aims to limit China's national production and consumption to 3.9 billion tons. This is not a dramatic target, as it still allows for an annual growth rate of 3.8, or an additional 860 million tons of new coal production capacity use.³³ Aside from the coal industry section of the FYP, the general plan includes three main objectives which relate to the coal sector. The first of these is an increase of non-fossil energy to 11.4 percent of total energy use, which would necessarily decrease the percentage of coal use, though the exact amount of decrease is uncertain and never estimated. The second of the objectives is a 17 percent reduction of carbon intensity, or the carbon emissions released per unit of GDP, by the end of the five years. The final objective is a reduction of carbon intensity by 40-45 percent compared to 2005 numbers by the year 2020.³⁴ This goal has been stated on multiple occasions by the Chinese government since 2009, but was never officially put into writing until this FYP.³⁵

The Action Plan for Air Pollution Prevention and Control or 《大气污染防治行动计划》, hereby referred to as the Action Plan, was released by China's State Council in September of 2013. This plan is unique in that it recognizes that coal consumption must be significantly reduced in order to control air pollution and subsequently is the first

³³ Kevin Jianjun Tu, "China's Problematic Coal Plan," *The Diplomat*, April 18, 2012, <http://thediplomat.com/2012/04/chinas-problematic-coal-plan/>. And "China's Coal Imports Set to Hold Steady in 2014," *Reuters*, April 10, 2014, <http://uk.reuters.com/article/2014/04/10/china-coal-idUKL3N0N20GO20140410>.

³⁴ "Guomin Jingji He Shehui Fazhan Di Shi'er Ge Wu Nian Guihua Gangyao [National Economic and Social Development Twelfth Five Year Plan]," *中央政府 (Central Government)*, March 16, 2011, http://www.gov.cn/2011lh/content_1825838_7.htm.

³⁵ Joanna Lewis, "Energy and Climate Goals of China's 12th Five-Year Plan," *Center for Climate and Energy Solutions*, March 2011, <http://www.c2es.org/international/key-country-policies/china/energy-climate-goals-twelfth-five-year-plan>.

plan to introduce coal caps for individual provinces.³⁶ Coal caps were introduced to nine provinces and municipalities. Beijing, Tianjin, Hebei, and Shandong are to reduce coal consumption by 83 million tons in 2017 compared with 2012 levels, a decrease of around 11% from 749 million tons in 2012 to 666 million tons.³⁷ Shanghai, Zhejiang, Jiangsu, and Guangdong are each to decrease coal consumption in 2017 from 2012 amounts, though it is unclear by exactly how much, and finally Liaoning is to ensure its coal consumption in the year 2017 does not exceed 200 million tons.³⁸ Although Inner Mongolia and Shanxi have the second and third highest consumption rates after Shandong province, they and the rest of the provinces have yet to be required to implement specific caps on coal. According to the government, the measures in these nine regions alone will reduce the total coal consumption by 426 million tons and carbon emissions by 605 million tons.³⁹ The Action Plan states that by 2017, coal will reduce to 65 percent of the country's total energy use, allowing non-fossil energy consumption to rise to 13 percent.⁴⁰ In the three key regions, Beijing-Tianjin-Hebei, the Yellow River Delta, and the Pearl River Delta, the government plans to replace coal with natural gas and non-fossil fuel energy in order to attain reduce coal consumption.⁴¹ In regards to air pollution more generally, this plan stipulates that the Beijing-Tianjin-Hebei region

³⁶ Shuo and Myllyvirta, "The End of China's Coal Boom."

³⁷ "Consumption of Coal in China in 2012, by Region (in Million Tons)," *Statista*, 2015.

³⁸ Qiang Liu, Chuan Tian, Zhuo Li, Hongxing Xie, Lijian Zhao, and Yuan Lin, *Analysis on the Carbon Emission Reduction Co-Benefits of Coal Cap Policy in China's Air Pollution Prevention and Control Action Plan (2013-2017)*, Beijing: Clean Air Alliance of China, 2014.

³⁹ "The State Council Issues Action Plan on Prevention and Control of Air Pollution Introducing Ten Measures to Improve Air Quality," *Ministry of Environmental Protection the People's Republic of China* September 12, 2013, http://english.mep.gov.cn/News_service/infocus/201309/t20130924_260707.htm

⁴⁰ "China to Tackle Air Pollution with a New Action Plan," *Clean Air Asia*, 2014, <http://cleanairinitiative.org/portal/node/12066>.

⁴¹ Barbara Finamore, "China pledges to tackle air pollution with new plan," *Natural Resources Defense Council*, September 13, 2013, http://switchboard.nrdc.org/blogs/bfinamore/china_pledges_to_tackle_air_po.html.

reduces its average PM2.5 concentration by 25 percent, the Yellow River Delta achieve up to a 20 percent reduction, and the Pearl River Delta by 15 percent, all by the year 2017. It also requires that all second and third tier cities reduce annual average PM10 concentrations by 10 percent from 2012 levels by 2017.⁴² In order to achieve these hefty goals, the Action Plan for Air Pollution Prevention and Control sets requirements for coal-fired burners, stipulating that no new coal-fired boilers are to be built which burn less than 20 tons of coal. Moreover, existing boilers burning less than 10 tons of coal are to be gotten rid of.⁴³

Although the above-mentioned plans represent the main coal policies distributed to the public, they are very broad and fail to mention many of the intricacies of the actual policy. Further information can be retrieved from subsections of other environmental and energy plans, as well as the official NEA, MEP, and Department of Climate Change websites and government news sources, all of which include updates and additional information on policies. This information is obviously fragmented, but can be used to fill some of the gaps left by the 12th FYP and Action Plan, including data on coal imports and carbon emissions reduction measures, such as use of coal-fired boilers, gasification, and implementation of desulphurization technology. For instance, article 23 of the Atmospheric Protection Law 《大气污染防治法》, enacted in 2000, states that the central government “promotes” the washing and upgrading of coal, reductions of the sulfur and ash content in coal, and restrictions on extracting coal with high sulfur and ash

⁴² “The State Council Issues Action Plan on Prevention and Control of Air Pollution Introducing Ten Measures to Improve Air Quality.”

⁴³ “Guowuyuan Guanyu Yinfu Daqi Wuran Fangzhi Xingdong Jihua De Tongzhi [State Council on the Issuance of Air Pollution Control Plan of Action],” 中华人民共和国中央人民政府 (*The Central People’s Government of the People’s Republic of China*), September 10, 2013, http://www.gov.cn/zwggk/2013-09/12/content_2486773.htm.

content. These actions would certainly lower emissions, however, the “promotion” of these activities in no way requires that they be undertaken, thus there remain no legal requirements to wash coal and no punishment for burning dirty, unwashed coal.⁴⁴

Similarly, article 1 of the 10 Atmospheric Protection Articles 《大气十条》 published in 2013 lists the overhaul of small-scale coal burners, acceleration of desulphurization, and reduction of nitrogen compounds and ash as major goals. However, because the wording of the document is “acceleration of desulphurization,” and not simply “desulphurization,” factory owners can legally continue to release high quantities of Sulphur dioxide into the atmosphere as long as they have a plan to desulphurize their coal in the future.⁴⁵

The plans laid out in the 12th FYP, Action Plan, and official government websites seem lofty but in reality are extremely vague, with no specific goals. They typically consist of elusive energy objectives, usually prescribing that the country decrease carbon emissions by a certain percentage compared to the emissions of a previous year. However, these objectives fail to clarify exactly how much of a decrease they wish to obtain or even the carbon emissions of the reference year, thus making it very difficult to decipher the country’s actual policy. One key example of this can be found in The Action Plan of 2013, whereby the government proclaimed that all second and third tier cities will lower their PM10 concentration by 10 percent from 2012 figures without revealing what these figure are. In actual fact, it is unlikely that even the Chinese government knows the PM10 concentrations from these cities, as many do not yet have

⁴⁴ Chai Jing, *Under the Dome- Investigating China’s Smog*, Documentary, Chai Jing (2015, Beijing: People’s Daily).

⁴⁵ Ibid.

the means to accurately measure this number even today, much less in 2012.⁴⁶ On this point it should be noted that one of the objectives of the Action Plan is to install proper mechanisms to measure PM10 and PM2.5 in all cities, thus the government should have this information in the future. Of course, whether or not they will choose to release it is uncertain. Another prime example of national plans leaving out reference numbers can be seen in the 12th Five Year Plan, which stated that the country plans to reduce the intensity of its carbon emissions by 40-45 percent by 2020 compared to 2005 emissions. This objective has been acclaimed throughout the international community for its high targets, however, the baseline emissions number has never been released by the Chinese government. In fact, the only emissions numbers the general public is privy to from 2005 are the estimates released by environmental organizations such as the Energy Information Agency and the Energy Research Institute, the majority of which are U.S.-based.⁴⁷ Although the numbers released by these organizations are likely relatively accurate, they are not necessarily the same as the official figures used by the Chinese government, therefore the public is unable to ascertain China's precise goal or assess its success. Furthermore, the projected targets in this plan, like the majority of emissions targets released by the Chinese government, are intensity-based targets as opposed to absolute targets. Intensity-based targets focus on greenhouse gas intensity, or the ratio of greenhouse gas emissions per unit of economic activity, not the absolute amount of emissions.⁴⁸ Essentially, this means that intensity-based emissions are decoupled from absolute emissions, hence, intensity-based emissions tell us very little about a country's

⁴⁶ "China to Tackle Air Pollution with a New Action Plan."

⁴⁷ Deborah Seligsohn and Kelly Levin, *China's Carbon Intensity Goal: a Guide for the Perplexed*, Washington DC: World Resources Institute, 2010.

⁴⁸ Dale Marshall, "Intensity-Based Targets: Not the Solution to Climate change," *David Suzuki Foundation*, February 26, 2007, <http://climateactionnetwork.ca/archive/e/publications/dsf-intensity-targets.pdf>.

absolute emissions. Therefore, while its intensity-based emissions are decreasing, China's total carbon emissions are actually still increasing due to the country's continued economic growth.⁴⁹

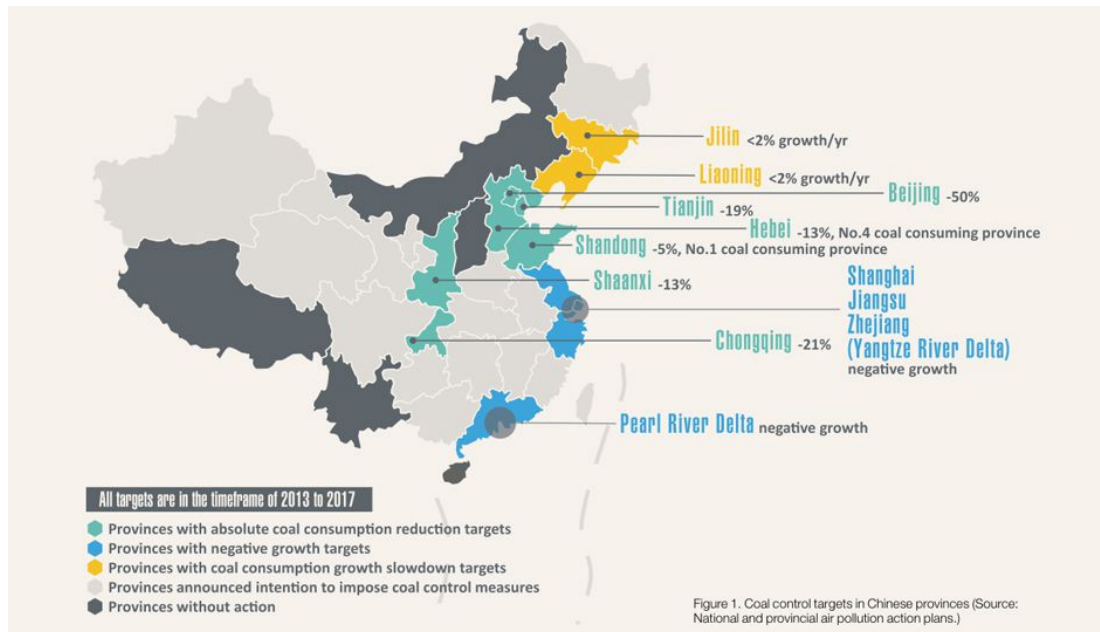
Although the central government asks provinces to reduce their emissions, they do not provide action plans for how they should do so, leaving policy formation to the discretion of each province. This lack of uniformity has led to sizable discrepancies between each province in their coal policies. We can get a sense of this discrepancy in the “Barometer of Completion of Energy-Saving Targets by Region from January to October of 2012” (个地区 2012 年 1~10 月节能目标完成情况晴雨表), released by the NDRC in 2012. This chart measures the extent to which each province's energy plan puts the province on track to meet the energy-saving targets set by the 12th FYP. According to the barometer, 19 provinces, including Beijing and Tianjin, complied with the 12th FYP, 3 provinces somewhat complied, and 8 provinces failed to comply, the worst offenders of which were Hainan and Xinjiang, which made no effort to comply over the ten months.⁵⁰ The international narrative of the situation paints an even bleaker picture in relation to coal. According to a Greenpeace study in 2014, only 12 of China's 34 administrative regions have agreed to implement coal control measures in any form and only half of these 12 provinces have included absolute coal consumption reduction goals in their provincial action plans.⁵¹

⁴⁹ Seligsohn and Levin, *China's Carbon Intensity Goal*.

⁵⁰ China Energy Research Society (中国能源研究会), *Zhongguo Nengyuan Fazhan Baogao (2013) [China Energy Development Report (2013)]*, Beijing: Beijing University, 2013.

⁵¹ Shuo and Myllyvirta, “The End of China's Coal Boom.”

Figure 1.2: Map of China's Coal Control Measures



SOURCE: Shuo, Li and Lauri Myllyvirta. “The End of China’s Coal Boom.” Greenpeace. April 11, 2014.

Another reason for the vast discrepancy of policies between provinces is that, much like the “Reform and Opening Up” policy (改革开放), China’s coal policy plans to start on the east coast and gradually move westward. For this reason, national policies are only strictly enforced in three regions: the Beijing-Tianjin-Hebei region, the Yangtze River Delta, comprised of Shanghai, Jiangsu, and Zhejiang, and the Pearl River Delta, located in Guangdong. Meanwhile, western regions have significantly more leeway in their actions. These three chosen regions are generally more populated, more highly polluted, and have higher GDPs than other parts of China, thus reducing pollution is a higher priority and more easily achieved. This shift in coal concentration can be seen through the trend of investments into the coal industry from 2006 to 2011. In the year 2006, half of all investments (50.3 percent) in the coal industry, meaning funds directed towards constructing coal mines and producing technology for use in the coal industry,

were directed to the central region of the country, while 13 percent went to the eastern region and 37 percent into the western region. In the years to follow, investments in the central and eastern regions decreased and the money moved instead to the western region. Within five years, the west took over as the primary destination for investments into coal mine technology and construction, while the investment to the east dropped to just over 7 percent of total investment.⁵² An example of this east-focused strategy in official policy is the NEA's policy announcement released in October of 2014, which provides a new policy for different regions of the country regarding the production of coal mines. According to the announcement, no more coal mining projects would be started in the eastern part of the country, in the middle region, including the northeast, will follow a “retire one, build one” (退一建一) policy, whereby coal production capacity is maintained, and the western region will continue to focus on building large coal bases and increasing production.⁵³ Unfortunately, focusing coal reduction efforts in these three regions allows for carbon leakage, a trend whereby heavy industry prohibited or limited in one region moves to one with fewer limitations.⁵⁴ Carbon leakage in China would mean that all of the coal and air pollution measures would ultimately have little to no effect, as the pollution would simply move to a different region. Indeed, this trend is already visible; coal-fired power plants in Xinjiang are set to double by 2019, while all

⁵² China Energy Research Society, *Zhongguo Nengyuan Fazhan Baogao (2013)*.

⁵³ “中国煤炭：国家能源局调控煤炭总量，东部地区不再新建煤矿项目，” *Reuters*, October 28, 2014, <http://cn.reuters.com/article/2014/10/28/idCNL4S0SN4JF20141028>.

⁵⁴ Qiang Liu, et al. *Analysis on the Carbon Emission Reduction Co-Benefits of Coal Cap Policy in China's Air Pollution Prevention and Control Action Plan (2013-2017)*.

coal-fired plants in the three key regions are being shut down or converted to accommodate other forms of power.⁵⁵

International Policy:

China's international coal and climate policies tell a similar story to its national policies; China has never signed an internationally-binding treaty to cut its greenhouse gas emissions or decrease coal use. This is not to say that China is not involved in multilateral environmental negotiations; indeed, China is an active participant, having signed more than 20 international environmental treaties since first joining international negotiations in 1972.⁵⁶ The most significant of these treaties is the United Nations Framework Convention on Climate Change (UNFCCC) and the accompanying Kyoto Protocol, which China ratified in 1992 and 2002 respectively.⁵⁷ The Framework aims to "prevent dangerous human interaction with the climate system" by requiring countries to decrease their carbon emissions by different specified amounts.⁵⁸ In signing the UNFCCC, China publicly announced that by the year 2020, it would "endeavor" to decrease its CO₂ emissions per unit of GDP by 40-45 percent as compared to 2005 levels, as well as increase the ratio of non-fossil fuels in its energy consumption by around 15

⁵⁵ Chloe Whiteaker and Alex Tribou, "China's Air Pollution Heads West," *Bloomberg*, March 7, 2014, <http://www.bloomberg.com/infographics/2014-03-07/china-air-pollution-heads-west.html>.

⁵⁶ Jimin Zhao, "Implementing International Environmental Treaties in Developing Countries: China's Compliance with the Montreal Protocol," *Global Environmental Politics* 5(2005): 58-81.

⁵⁷ Ong, "The Apparent 'Paradox' in China's Climate Policies."

⁵⁸ "First Steps to a Safer Future: Introducing the United Nations Framework Convention on Climate Change," *United Nations Framework Convention on Climate Change*, 2014, http://unfccc.int/essential_background/convention/items/6036.php.

percent.⁵⁹ However, the government made clear that these “endeavors” were voluntary and thus it could not be penalized for failing to meet them in their entirety.⁶⁰

On the surface, the ratification of the UNFCCC and other U.N. treaties on climate change seems to suggest that China is eager to limit its CO₂ emissions and cooperate with the international community on the subject of climate change. However, on closer inspection it is apparent that these treaties are more of a formality and do not necessarily translate into enforced change within the country. The main reason for the inadequacy of international climate treaties in relation to China is undoubtedly the country’s label as a non-Annex I developing nation. In these international treaties, countries are divided into two main groups: Annex I and non-Annex I countries. Annex I includes wealthy industrialized nations which were members of the OECD (Organization for Economic Co-operation and Development) as well as countries with economies in transition (known as EITs), such as the Russian Federation and Baltic States. Non-Annex I includes the remaining countries, all of which are considered developing nations. These two groups are held to very different standards. Under the UNFCCC and Kyoto Protocol, Annex I nations are required to meet mandatory targets on greenhouse gas emissions and continuously submit reports detailing their progress. The wealthiest of Annex I countries are also expected to provide money to developing countries to be used for the development of climate-friendly technology. Non-Annex I nations, on the other hand, are not required to make legally binding commitments and are only made to submit very

⁵⁹ “Pre-2020 Action by Countries,” *United Nations Framework Convention on Climate Change*, 2014, http://unfccc.int/focus/mitigation/pre_2020_ambition/items/8167.php.

⁶⁰ Ong, “The Apparent ‘Paradox’ in China’s Climate Policies.”

general reports of their efforts if and when they receive funding.⁶¹ Therefore, due to China's status as a developing country, it has no legal obligation to meet emission reduction targets, and is only "asked to voluntarily comply" with international standards.⁶² This status, then, explains the weak language on the part of the Chinese in the UNFCCC and all subsequent environmental treaties.

China's status as a developing nation has been strongly contested and eventually led to the refusal of the United States, Australia, and Canada to ratify the Kyoto Protocol (though Australia ultimately ratified the Protocol in 2007).⁶³ China holds that although it has the second largest GDP in the world, it is in fact only a developing country and should be regarded as such in all aspects of international relations. The country draws their reasoning from an economic standpoint, citing the fact that one-sixth of the Chinese population, around 250 million people, live on less than two dollars a day. Moreover, China has a per capita income of approximately 6,500 dollars, establishing it as an upper-middle-income economy and still a developing nation, according to the criterion laid out by the World Bank.⁶⁴ These facts of China's economic condition cannot be contested, however, many countries, most notably the United States, have argued that China should be considered a special case in regards to climate change, as well as a string of other issues, and no longer be regarded as a non-Annex I developing nation.⁶⁵ Much of their

⁶¹ "Guide to the Climate Change Negotiation Process," *United Nations Framework Convention on Climate Change*, 2014, http://unfccc.int/not_assigned/b/items/2555.php.

⁶² "The Global Climate Change Regime," *Council on Foreign Relations*, June 19, 2013, <http://www.cfr.org/climate-change/global-climate-change-regime/p21831>.

⁶³ "Kyoto Protocol," *CNN*, April 8, 2014. <http://www.cnn.com/2013/07/26/world/kyoto-protocol-fast-facts/>.

⁶⁴ "Country and Lending Groups," *World Bank*, 2014, <http://data.worldbank.org/about/country-and-lending-groups>.

⁶⁵ Isaac Stone Fish, "Is China Still a 'Developing' Country? A Look at Beijing's Favorite Rhetorical Trick.," *Foreign Policy*. 25 September, 2014.

argument refers to the fact that China produces more carbon dioxide emissions than the EU and US combined, at around 28 percent of total global emissions. Even when taking China's large size and population into account, the emissions of the country are still disproportionately high; China has higher per capita emissions than the entire European Union.⁶⁶ The United States contends that as a main culprit of climate change, China should be legally required by the international community to meet defined goals in reducing their greenhouse gas emissions.⁶⁷ During the 2014 U.N. Climate Change Summit, President Obama publicly criticized China for not doing more to prevent climate change, stating that China and the United States "have the responsibility to lead [in these issues], that's what big nations have to do" (Stone Fish, 2014). China countered this remark and others like it by stating that climate change was caused by the US and developed nations, therefore they should be the ones to take the lead in reversing it. This statement is on par with China's international climate change policy, which since the 1991 Beijing Ministerial Declaration on the Environment and Development has denounced external pressure aimed at limiting the country's development.⁶⁸

It should be noted that during the 17th Conference of Parties, held in 2011, participating parties agreed that the follow-up agreement to the Kyoto Protocol, which is due to expire in 2017, should require all nations, not merely Annex-I nations, to meet

http://www.foreignpolicy.com/articles/2014/09/25/is_china_still_a_developing_country_climate_change_xi_jinping.

⁶⁶ Matt McGrath, "China's Per Capita Carbon Emissions Overtake EU's," *BBC News*, September 21, 2014, <http://www.bbc.com/news/science-environment-29239194>.

⁶⁷ Wendy Koch, "U.S. Eyes 'Name and Shame' in Climate Talks," *USA Today*, August 27, 2014, <http://www.usatoday.com/story/money/business/2014/08/27/us-eyes-name-and-shame-climate-change/14686321/>.

⁶⁸ Ong, "The Apparent 'Paradox' in China's Climate Policies."

specific emission reduction targets.⁶⁹ During this conference, China remarked for the first time that it would be willing to discuss a legally binding carbon emissions agreement after 2020 if other nations met five conditions.⁷⁰ These conditions are that other parties: follow through with the Kyoto Protocol until 2017, review long-term goals, respect that fact that countries have different capacities to cut emissions and should therefore have different levels of responsibility, come to a consensus on multiple issues, including finance, transparency, and technology transfer, and finally that developed countries meet agreed financial commitments.⁷¹ This statement was largely considered to be an encouraging sign that China was now willing to become more involved in climate change control, however, much like the majority of the Chinese government's statements regarding climate change, the language is too ambiguous to translate into real action. For example, the demand that other nations agree that every country should have different amounts of responsibility based on their ability suggests that any legal agreement which might take place will be minimal.

Most recently, in November of 2014, China made a climate deal with the U.S. in what was praised by the media as a "landmark" and "historic" agreement. In the accord, both countries agreed to new carbon emission reduction targets. The United States pledged to reduce its emissions by around 27 percent by 2025 as compared to 2005 numbers, doubling the scheduled pace of reduction. China agreed to reach peak carbon emissions by 2030 or sooner with a plan to increase its clean energy use up to 20 percent

⁶⁹ "The Global Climate Change Regime."

⁷⁰ Faranaaz Parker, "COP17: China's Promise Leaves More Questions," *Mail & Guardian*, December 5, 2011, <http://mg.co.za/article/2011-12-05-cop17-chinas-promise-leaves-more-questions>.

⁷¹ Angel Hsu, "Propelling the Durban Climate Talks- China Announces Willingness to Consider Legal Binding Commitments Post-2020," *China FAQs*, December 6, 2011, <http://www.chinafaqs.org/blog-posts/propelling-durban-climate-talks-china-announces-willingness-consider-legally-binding-comm>.

of the country's total energy production.⁷² This agreement made by China is indeed momentous, as it marks the first time that China has specifically stated a year for its peak coal consumption and that it plans to increase clean energy usage to such an extent. Unfortunately, this treaty, if it can be so-called, is not legally binding, nor may it even be upheld by the American side, where a Republican-led Senate is fighting every piece of climate change legislation which comes its way. If not upheld by the US, the agreement would lose all sense of legitimacy and likely be thrown out by the Chinese. Luckily, though, the current Chinese coal policy is well on track to achieve this goal, or one close to it, if implemented properly by all the provinces.

⁷² Mark Landler, "U.S. and China Reach Climate Accord after Months of Talks," *The New York Times*, November 11, 2014, http://www.nytimes.com/2014/11/12/world/asia/china-us-xi-obama-apec.html?_r=1.

Chapter 2: Trends in Energy Use:

The previous chapter has discussed China's official coal policies and plans, but what does their actual consumption of coal look like? The trend over the last decade in China has been increased annual coal consumption at a decreasing rate. According to official figures, total coal used increased by more than 1 billion metric tons in the period from 2006 to 2013, from 2.5 to 3.7 billion tons.⁷³ This increase alone is equal to the total coal consumption of Europe in 2012.⁷⁴ However, because the rise took place at a decreasing rate, the majority of that upsurge took place before 2011. After this year, growth dropped to under 3 percent. This decrease could be due to a plethora of reasons, one being that the growth of the Chinese economy has slowed and thus needs less coal to sustain it. A more optimistic explanation for this development is the new coal and environmental regulations under the 12th FYP, which was released in March of 2011.

⁷³ Danlu Tang, "China's Coal Consumption Growth Slows," *Xinhua*, January 15, 2014, http://news.xinhuanet.com/english/china/2014-01/15/c_133048072.htm.

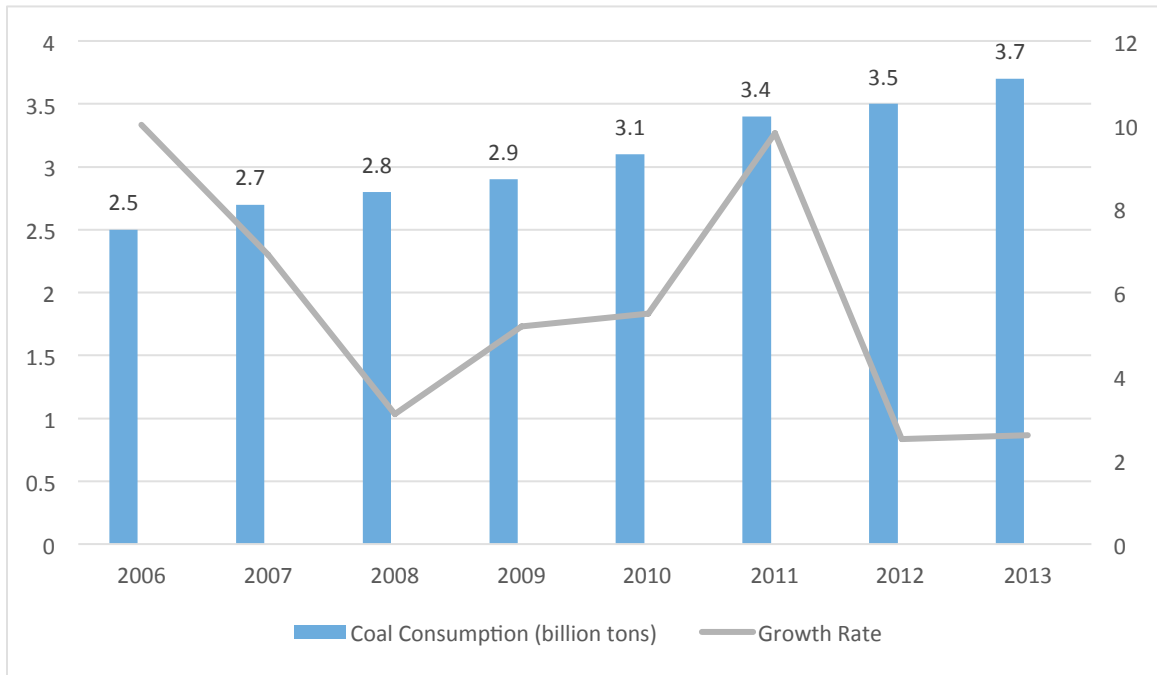
⁷⁴ Ayoub, "China Produces and Consumes Almost as Much Coal as the Rest of the World Combined."

At the time of this article's publication, the official data on 2014 coal consumption had not yet been released, as there exists a lag time; however, the estimates for 2014 are extremely promising. According to a Greenpeace energy report, coal use in the first three-quarters of 2014 was 1 to 2 percent lower than the previous year. This is significant for the country, which usually sees a 5 to 10 percent annual growth rate.⁷⁵ If this report is accurate, China will have decreased or at least maintained its coal consumption for the first time in over 15 years. Of course, this data has not yet been officially released and thus cannot be verified. Moreover, if indeed China's coal use remained stable during 2014, this does not necessarily translate into a trend of decreased reliance on coal, as coal use fluctuates yearly. More than likely, coal use in the country will continue to rise slowly for the foreseeable future.⁷⁶ Only time will tell if this is an anomaly or the beginning of real change for the country.

⁷⁵ Damian Carrington, "China's Coal Use Falls for First Time this Century, Analysis Suggests," *The Guardian*, October 22, 2014, <http://www.theguardian.com/environment/2014/oct/22/chinas-coal-use-falls-for-first-time-this-century-analysis-suggests>.

⁷⁶ "China Unlikely to Reduce Coal Use in the Next Decade," *China Dialogue*, February 12, 2014, <http://www.chinafile.com/china-unlikely-reduce-coal-use-next-decade>.

Figure 2.1: Coal Consumption in China



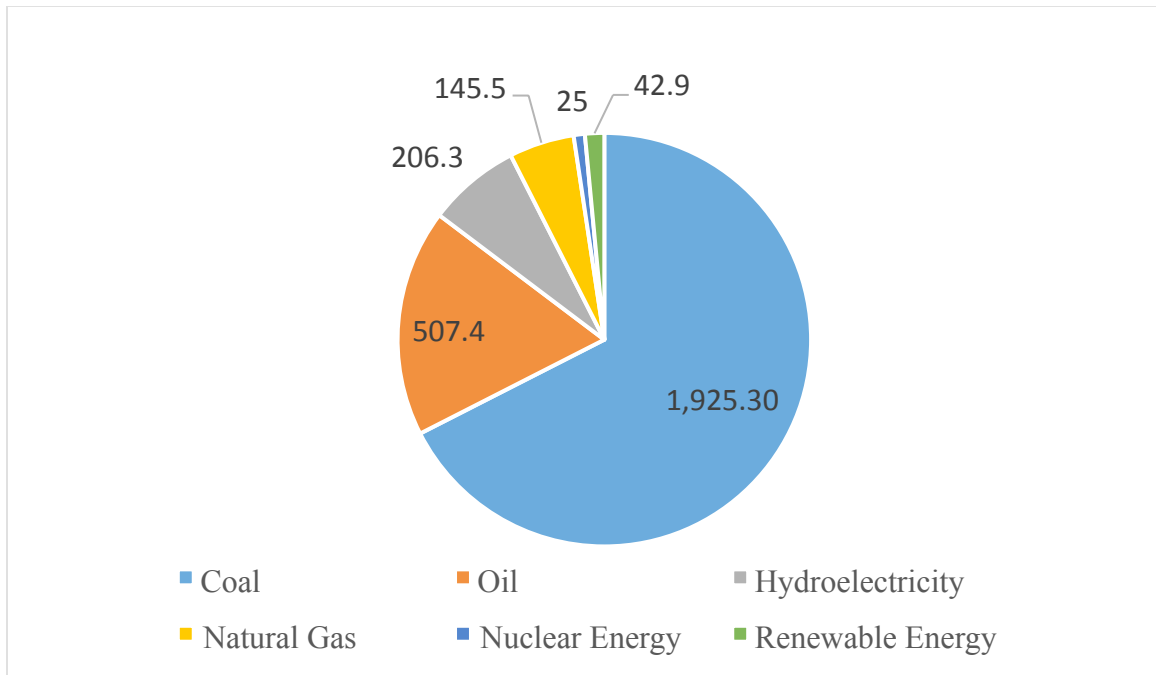
SOURCE: Chart made with information derived from China Energy Research Society (中国能源研究会). *Zhongguo Nengyuan Fazhan Baogao (2013)* [China Energy Development Report (2013)]. Beijing: Beijing University, 2013. and Tang, Danlu. “China’s Coal Consumption Growth Slows.” Xinhua. January 15, 2014.

It is important to place coal use in the context of total energy use. According to official data, China consumed a whopping 2,852.4 Mtoe of energy in 2013.⁷⁷ The vast majority of this energy, around 67 percent or 1,925.3 Mtoe, was derived from coal. The second largest source of energy was oil, which provided 18 percent, or 507.4 Mtoe of the energy. Hydroelectricity consumption accounted for 7 percent of total energy, at 206.3 Mtoe. Natural gas provided 145.5 Mtoe of energy, or 5 percent. Other sources of energy were relatively insignificant; renewable energy, including wind and solar, accounted for 2

⁷⁷ “Primary Energy Consumption in China in 2010 to 2013, by Fuel Type (in Million Ton of Oil Equivalent),” *Statista*, 2014. <http://www.statista.com/statistics/265612/primary-energy-consumption-in-china-by-fuel-type-in-oil-equivalent/>.

percent, or 42.9 Mtoe, and nuclear power comprised less than 1 percent of total energy, with a mere 25 Mtoe of energy.⁷⁸

Figure 2.2: China Energy Consumption by Type 2013 in Mtoe



SOURCE: Chart made with data derived from “Primary Energy Consumption in China in 2010 to 2013, by Fuel Type (in Million Ton of Oil Equivalent).” Statista. 2014.

Renewable Energy

Although China currently has a relatively small renewable energy sector, only accounting for 9 percent of the country’s total energy as of 2013, it is growing at a rapid pace. The vast majority of this renewable energy, around 85 percent, comes from hydropower, followed by thermal, wind, and solar.⁷⁹ In 2012, China’s clean energy investments totaled 67.76 billion US dollars, surpassing any other country and nearly 50

⁷⁸ “China,” *U.S. Energy Information Administration*, February 4, 2014, <http://www.eia.gov/countries/cab.cfm?fips=ch>.

⁷⁹ Dolf Gielen et al., *Renewable Energy Prospects: China* (Abu Dhabi: IRENA, 2014). http://irena.org/remap/IRENA_REmap_China_report_2014.pdf.

percent more than the next highest country, the United States.⁸⁰ Current investment in the sector equals one-fifth of total global investment in renewables, significantly more than any other nation.⁸¹ From 2006 to 2020, China plans to invest around 210 billion USD into hydropower and 900 billion yuan into wind power. It has also proposed a subsidy of 20,000 yuan/kilowatt (3,228 dollars/kilowatt) of solar energy.⁸² These investments have gone to good use; China doubled its solar capacity in 2013, installing 12 gigawatts of solar panels, more than has ever been installed by a single country in a single year.⁸³ Meanwhile, China's wind energy sector is the fastest growing in the world.⁸⁴ The country has also now installed more wind energy capacity than anywhere else; 20.7 gigawatts as compared to the 4.7 of the United States.⁸⁵ However, though China has more installed turbines, the technology has proved to be less efficient than that of other countries. Although the technology in the U.S. only represents a quarter of that in China, it produces 20 percent more energy.⁸⁶ Besides problems in efficiency, the country also has problems promoting the use of renewable energy. Grid companies are reluctant to adopt other energy sources besides coal, especially renewable sources, as they are much more expensive than the cheap substance. Because the electricity prices paid by the public are fixed by the government, grid companies must absorb the added

⁸⁰ James Isola, "New Investment in Clean Energy Fell 11% in 2012," *Bloomberg*, January 14, 2013, <http://about.bnef.com/press-releases/new-investment-in-clean-energy-fell-11-in-2012-2/>.

⁸¹ Catherine Brahic, "China Battles to be First 'Ecological Civilization,'" *New Scientist*, 222(2014): 12.

⁸² Hui-Ru Zhao, Sen Guo, and Li-Wen Fu, "Review on the Costs and Benefits of Renewable Energy Power Subsidy in China," *Renewable and Sustainable Energy Reviews* 37(2014): 538-549. doi: 10.1016/j.rser.2014.05.061

⁸³ Shuo and Myllyvirta, "The End of China's Coal Boom."

⁸⁴ Best and Levina, "Facing China's Coal Future: Prospects and Challenges for Carbon Capture and Storage."

⁸⁵ Brahic, "China Battles to be First 'Ecological Civilization.'"

⁸⁶ Joshua S. Hill, "China's Wind Energy Output Dropped in 2014," *Clean Technica*, January 28, 2015, <http://cleantechnica.com/2015/01/28/chinas-wind-energy-output-dropped-2014/>.

costs associated with renewables themselves.⁸⁷ In an attempt to counteract this, the national government has provides financial incentives for grid companies to connect to renewable energy sources and fines for those who do not.⁸⁸ For example, in 2014 power plants generating solar power were allotted feed-in tariffs between 0.9 and 1 yuan per kilo-watt hour (kWh) of energy produced, while those generating wind power were allotted around 0.5 yuan per kWh.^{89,90} Unfortunately, even with these feed-in tariffs and fines, it is still more cost effective for these companies to use fossil fuels, thus the renewable energy sector has yet to gain a significant hold in the market.

⁸⁷ Gielen et al., *Renewable Energy Prospects: China*.

⁸⁸ Best and Levina, "Facing China's Coal Future: Prospects and Challenges for Carbon Capture and Storage."

⁸⁹ "The State of the Chinese Solar Market," *Trefis*, April 29, 2014, <http://www.trefis.com/stock/tsl/articles/235585/the-state-of-the-chinese-solar-market/2014-04-29>.

⁹⁰ Brian Publicover, "China Wind Sector Braces for FIT Cuts," *Recharge*, September 17, 2014, <http://www.rechargenews.com/wind/1376945/China-wind-sector-braces-for-FIT-cuts>.

Chapter 3: Economic Objectives

So far, this paper has discussed China's policies regarding coal. The remainder of the text will serve to discuss the reasoning behind this policy. There are three main factors which influence and shape China's coal policy; these are economic, environmental, and social.

Price Comparison

Almost every source discussing coal in China cites its relatively low price as one of the main reasons for its continued use, but exactly how cheap is coal in relation to other energy sources? This section will discuss and compare the energy prices of coal, oil, natural gas, and various non-fossil fuel sources. The most recent prices available for the majority of the energy types are from the year 2012, thus these statistics will be used.

In China, coal is priced according to kilocalorie count. The three main units are 5500, 5000, and 4500 kilocalorie coal. Coal with around 5500 kilocalories is classified as thermal coal, otherwise known as steam coal. This type is primarily used for power generation, its primary function, accounting for roughly 50 percent of usage. In 2012, the cost of thermal coal ranged in price from 630 to 785 yuan per metric ton throughout the year, averaging out at 670 yuan.⁹¹ 5000 kilocalorie coal, classified by the government as metallurgical coal, ranged from 530 to 685 yuan per metric ton, having an average cost of

⁹¹ China Energy Research Society, *Zhongguo Nengyuan Fazhan Baogao (2013)*.

607 yuan.⁹² Coal with a kilocalorie count of 4500, otherwise known as coking coal, is mainly used in the production of iron and steel, an industry which is responsible for around 37 percent of total domestic coal usage. The price of this type of coal fluctuated though the year from 435 to 585 yuan per metric ton, averaging out at 508 yuan per metric ton.⁹³

Oil prices in China do not necessarily coincide with global market prices, but are rather regulated by the NDRC. Prices differ based not only on the type of oil, but also what industry it is to be used for. For example, the military and industries promoted by the government often get a discounted price while less strategic industries pay more⁹⁴. The only concrete numbers readily available by the NDRC for the year 2012 are those for military use, therefore, military prices will be used in this study. For that reason, it is important to note that the average oil prices across all sectors may be slightly higher. The prices are as follows: gasoline was 8580 yuan per metric ton, diesel was 7730 per metric ton, and kerosene was 7770 yuan per metric ton.⁹⁵

The price of natural gas in China varies based not only on its purpose, but also on the city in which it is sold, according to each city gate price. There are four categories for natural gas use which determine its cost: residential use, industry and commerce, electricity generation, and use by automobiles. Each local government decides the prices for each of these sectors based on their needs and policy goals, therefore one sector may

⁹² Ibid.

⁹³ Ibid.

⁹⁴ “国家发展改革委关于降低国内成品油价格的通知,” *National Development and Reform Commission* (中华人民共和国国家发展和改革委员会), 2012. http://jgs.ndrc.gov.cn/zcfg/201211/t20121115_514192.html.

⁹⁵ “成品油供应价格调整表.” *National Development and Reform Commission* (中华人民共和国国家发展和改革委员会). <http://www.ndrc.gov.cn/zcfb/zcfbtz/201202/W020120207750177962538.pdf>.

have the cheapest natural gas in one city and the most expensive natural gas in another. Using the median prices from Beijing, Nanjing, Guangzhou, Urumqi, and Chengdu, cities which span across the country, we can get a good indication of the average price of natural gas in each of the four sectors. Based on this theory, the average price of natural gas in 2012 was 2.24 yuan per cubic meter for residential use; 2.69 yuan per cubic meter for the industry and commerce sector; 2.14 yuan for the generation of electricity; and 3.85 yuan per cubic meter for automobile use.⁹⁶ As coal is not used to power automobiles, natural gas for this purpose cannot be equated to coal and thus will not be included in the final calculations.

Table 3.1: Natural Gas Prices in China

CITY	RESIDENTIAL USE	INDUSTRY AND COMMERCE	ELECTRICITY GENERATION	AUTOMOBILE USE
BEIJING	2.28 ¥/m ³	2.84 ¥/m ³	2.28 ¥/m ³	4.73 ¥/m ³
NANJING	2.2 ¥/m ³	2.95 ¥/m ³	2.099 ¥/m ³	4.6 ¥/m ³
GUANGZHOU	3.45 ¥/m ³	3.7 ¥/m ³	1.610 - 2.4 ¥/m ³	-----
URUMQI	1.37 ¥/m ³	1.76 ¥/m ³	2.11 ¥/m ³	2.08 ¥/m ³
CHENGDU	1.89 ¥/m ³	2.2 ¥/m ³	2.2 ¥/m ³	4 ¥/m ³

SOURCE: China Energy Research Society (中国能源研究会). *Zhongguo Nengyuan Fazhan Baogao* (2013) [China Energy Development Report (2013)]. Beijing: Beijing University, 2013.

There are five primary types of non-fossil fuel energy used in China: hydraulic, wind, nuclear, and solar. Although hydraulic power represents the largest renewable energy sector, accounting for 22 percent of China's power generation in 2012, exact prices are unavailable for the energy source. However, the prices of the other non-fossil fuels are available. In 2012, wind power cost 0.55 yuan per kilowatt hour (kWh), nuclear power was 0.50 yuan per kWh, and solar power was the most expensive at 1.09 yuan per kWh.⁹⁷ Though at first glance these energy sources seem much cheaper than fossil fuels,

⁹⁶ China Energy Research Society, *Zhongguo Nengyuan Fazhan Baogao* (2013).

⁹⁷ Ibid.

one must keep in mind that one kilowatt hour is relatively small and contains much less energy than the measurements used for fossil fuels, specifically the metric ton and cubic meter. In fact, as is usually the case, renewable and non-fossil fuel energy in China is considerably more expensive than other energy types.

The prices stated above cannot provide a clear indication of the true price of each energy type, as they fail to factor in how much of each source is needed to provide the same amount of energy. Each energy source is priced in a different way, making them difficult to compare. For example, coal and oil are usually priced per metric ton, natural gas per cubic meter, and electricity, including that derived from renewable resources, per kilowatt hour. Therefore, in order to get a good indication of the true cost of each energy source in relation to each other, each measurement must first be converted into a unit which can be more easily comparable. This study will use British thermal units (Btu) for this purpose. One Btu of energy is approximately equivalent to 1055 joules, or the amount of energy needed to heat one pound of water by one degree Fahrenheit.⁹⁸ One metric ton of coal includes anywhere from 24 to 28 million Btu depending on the hardness of the coal (hard coal being more energy-rich). Oil also ranges in Btu content based on type: one metric ton of gasoline is equal to around 38 million Btu, one ton of diesel has 43 million Btu, and one ton of kerosene includes 42 million Btu. One cubic meter of natural gas is approximately equal to 36 thousand Btu, while one kilowatt hour of renewable energy is only equal to around 3,400 Btu.⁹⁹

⁹⁸ Dennis Silverman, "Energy Units and Conversions," *U.C. Irvine, Physics and Astronomy*, <http://www.physics.uci.edu/~silverma/units.html>.

⁹⁹ "Solid Fuel Costs versus Others," *Alternate Heating*, <http://alternateheatingsystems.com/support/compare-fuels.html>.

Once the energy sources are all priced by the same measurement unit, they are readily comparable. Due to the fact that the original measurements all include high counts of Btu, prices are compared per million Btu. The results of these calculations can be viewed in the chart below. When viewing the chart, it is important to keep in mind that the final prices are estimates and may vary slightly depending on different conversion rates.

Table 3.2: Price Comparison of Energy Sources in China, 2012

ENERGY SOURCE		PRICE (RMB)	ENERGY (MILLION BTU)	RMB PER MILLION BTU
COAL	THERMAL	¥670 per metric ton	26 per metric ton	¥25.33
	METALLURGICAL	¥607 per metric ton	29 per metric ton	¥21.18
	COKING	¥508 per metric ton	31 per metric ton	¥16.46
OIL	GASOLINE	¥8580 per metric ton	38 per metric ton	¥222.87
	DIESEL	¥7730 per metric ton	43 per metric ton	¥180.96
	KEROSENE	¥7770 per metric ton	42 per metric ton	¥186.88
NATURAL GAS	INDUSTRY AND COMMERCE	¥2.69 per m ³	0.036 per m ³	¥74.72
	ELECTRICITY	¥2.14 per m ³	0.036 per m ³	¥59.44
	RESIDENTIAL	¥2.24 per m ³	0.036 per m ³	¥62.17
NON-FOSSIL	WIND	¥0.55 per kWh	0.0034 per kWh	¥161.20
	NUCLEAR	¥0.50 per kWh	0.0034 per kWh	¥146.54
	SOLAR	¥1.09 per kWh	0.0034 per kWh	¥319.46

SOURCE: Author's calculations based on numbers derived from China Energy Research Society (中国能源研究会). Zhongguo Nengyuan Fazhan Baogao (2013) [China Energy Development Report (2013)]. Beijing: Beijing University, 2013. And "Chengpin You Gongying Jiage Tiaozheng Biao [Price Adjustment of Supplied Refined Oil Table]." National Development and Reform Commission (中华人民共和国国家发展和改革委员会).

The calculations found that all three types of coal; thermal, metallurgical, and coking, averaged out to around 20.99 yuan per million Btu. The prices of the three oil types, gasoline, diesel, and kerosene, averaged 196.90 yuan per million Btu, though gasoline was considerably more expensive. The median price for natural gas for industry and commerce, electricity, and residential use was 65.44 yuan per million Btu. Finally, the average price of non-fossil fuels was 209.07 yuan per million Btu, solar power being the most expensive by a substantial amount. More detailed findings of exact prices can be viewed in the chart above. As evidenced by the chart, coal is by far the cheapest energy source, with the lowest price per Btu. On average, coal is around 3 times cheaper than natural gas, 9 times cheaper than oil, and 10 times cheaper than renewable energy sources. Due to these vast differences in price, it makes clear economic sense for China to continue in its heavy coal use.

Economic Reliance at the Provincial Level

It is not only the national economy which relies on coal, but also many provincial economies. Coal production encompass a large part of many local economies, especially that of Inner Mongolia, Shanxi, Shaanxi, Xinjiang, and Ningxia, which together hold 76 percent of China's coal reserves.¹⁰⁰ These provinces are particularly effected by plans to reduce coal use. Not only are they likely, and in many cases have already begun to suffer economic downturns from decreased demand of coal, but the estimated 5 million coal

¹⁰⁰ Yue Wu, "An Empirical Study of Shaanxi's Coal Resource-dependent Economic Development" (Master Thesis, Lund University, 2013).

workers located in these regions are at risk of losing their livelihood, adding to the economic burden of these provinces.¹⁰¹ For these reasons, it makes economic sense for these five regions to continue coal extraction and use. These provinces, worried for their stability, are pushing for continued coal use.

Worst effected by plans to reduce coal use is the province of Shanxi, which contains approximately one-third of China's high-quality coal deposits. The coal industry truly drives the local economy, which acquires approximately half of its GDP and 40 percent of its tax revenue from coal production.¹⁰² This revenue has already witnessed a substantial decline; in the first six months of 2013, when national coal consumption slowed, tax revenue in the province from the coal industry decreased by a massive 9.85 billion yuan, from 34.01 billion yuan in the first half of 2012 to 24.16 billion yuan.¹⁰³ Moreover, Shanxi employs the highest percentage of coal workers in the nation; 20 out of every 100 people are engaged in the industry, five times the national average (as compared to the country's average of 4 out of every 100).¹⁰⁴ If these people were to lose their jobs, the region would face potential social instability.

In an attempt to combat the effects of a slumping coal market, the Shanxi government introduced a stimulus package in 2013 in the form of 20 measures designed to revive the industry. These measures include requiring officials to endorse and promote

¹⁰¹ Philip Wen, "Faltering Economy Hits China's Coal Sector," *The Sydney Morning Herald*, October 14, 2014, <http://www.smh.com.au/business/china/faltering-economy-hits-chinas-coal-sector-20141013-115kzw.html#ixzz3TG4jOwoL>.

¹⁰² Luna Lin, "Shanxi Province: Saving the Coal Industry, but Sacrificing the Environment." *China Dialogue*, August 21, 2013, <https://www.chinadialogue.net/article/show/single/en/6300-Shanxi-province-saving-the-coal-industry-but-sacrificing-the-environment>.

¹⁰³ "Meitan Shichang Dimi Shanxi Shang Bannian Mei Shui Jian Shou Sancheng," *Ministry of Commerce of the People's Republic of China*, July 22, 2013. <http://www.mofcom.gov.cn/article/hyxx/fuwu/201307/20130700209243.shtml>.

¹⁰⁴ Wu, "An Empirical Study of Shaanxi's Coal Resource-dependent Economic Development" (Master Thesis).

the local coal industry to banks and financial institutions, as well as to the central government.¹⁰⁵ Since the introduction of this measure and the increased endorsement of the local industry, at least one of China's top five state-owned electricity utility enterprises has agreed to work with Shanxi's coal companies. The package also included a temporary suspension of environmental and coal mining taxes (discussed in more detail further on). Though this suspension only lasted a few months, it is estimated to have cut production costs by 15 RMB per ton and increase profits by 900 million RMB.¹⁰⁶ Although potentially life-saving for Shanxi's coal industry and its economy, the stimulus package could delay plans to reduce emissions and combat the pollution which is already plaguing the province. If the central government wishes to maintain a "harmonious society," as called for by Hu Jintao, who placed "building a harmonious society" at the top of government agenda in 2007,¹⁰⁷ it must factor in the needs of these coal-producing provinces and their determination to save the coal industry at all costs.

Coal Use at the Industrial Level

Another reason that coal is not easy to simply eliminate is the fact that it is required by industries such as iron and steel manufacturing. China currently produces 45 percent of the world's iron and steel, significantly more than any other country.¹⁰⁸

Though the iron and steel industries are important to the country's economy, accounting

¹⁰⁵ "Guanyu Yinfa Jinyibu Cujin Quan Sheng Meitan Jingji Zhuanbian Fazhan Fangshi Shixian Kechixu Zengzhang Cuoshi de Tongzhi Pu Zheng Fa (2013) 26 [On the Issuance of Further Promoting the Development of the Province's Coal Economy to Achieve Sustainable Growth, Poor Governance of the Measures Notified (2013) No. 26]," 山西省人民政府 (*Shanxi Provincial Government*), July 27, 2013. <http://www.sxcoal.com/gdcoal/3326486/articlenew.html>.

¹⁰⁶ Lin, "Shanxi Province: Saving the Coal Industry, but Sacrificing the Environment."

¹⁰⁷ "Harmonious Society," *China Daily*, September 29, 2007, <http://en.people.cn/90002/92169/92211/6274603.html>.

¹⁰⁸ "Iron & Steel Industry," *Harsco Metals and Minerals*, <http://harsco-m.com/208/Iron--Steel-Industry.aspx>.

for 7.42% and 8.19% of the country's GDP respectively and the second and third largest industries in 2010, they come with a heavy environmental cost.¹⁰⁹ Coking coal is used in the process of producing both iron and steel, as the carbon from coal is necessary to drive the production process. Although there are now promising new methods of creating iron using electricity and natural gas, these methods have not yet been perfected and thus cannot be implemented on a large-scale. As for steel, new production techniques have yet to be discovered, thus the process will likely continue to require large amounts of coking coal in the foreseeable future.¹¹⁰ One ton of steel requires 600 kilograms of coal and releases 1.53 kilograms of sulfur dioxide and 1 kilogram of smoke and soot into the atmosphere.¹¹¹ Due to the fact that these industries are so vital to the economy, bringing in trillions of RMB in revenue and creating 100,000 jobs in Hebei alone, they have traditionally been allowed more leeway in implementation of environmental measures. Environmental policies almost always distinguish the iron and steel industries, stating that they have more time to enact measures than other sectors.¹¹² Moreover, few of these measures and regulation are actually enforced. According to chief of the Ministry of Environmental Protection, Yuehui Xiong, over 60 percent of steel firms have not completed the approval process and are completely unlicensed. These firms know that they have little chance of getting government approval and so just go ahead with their operations, knowing that there will be little to no repercussions.¹¹³ Often, local

¹⁰⁹ Changfu Zhang, "The Role of the Iron & Steel Industry in China's Future Economic Development" (speech at the "LCA and Steel" Seminar, July 19, 2012).

¹¹⁰ "Can We Make Steel Without Coal?" *Coal Action Network*, April 24, 2013, <https://coalactionnetworkaotearoa.wordpress.com/2013/04/24/can-we-make-steel-without-coal/>.

¹¹¹ Jing, *Under the Dome*.

¹¹² "China Strives to Clean up Pollution," *Stratfor Analysis*, October 10, 2013, <https://www.stratfor.com/sample/analysis/china-strives-clean-pollution>.

¹¹³ Jing, *Under the Dome*.

governments do no more than send warning letters; though they have the authority to shut down these businesses, they do not have the will or the power to do so.¹¹⁴

Though the iron and steel industries are dirty and corrupt, there is hope that the Chinese economy will be moving away from this and other high-polluting industries and towards more clean industries. In its 12th Five Year Plan, the country outlined seven “strategic emerging industries” which it plans to focus on in the coming years. These are: energy efficient and environmental technologies, next generation information technology, biotechnology, high-end equipment manufacturing, new energy, new materials, and new-energy vehicles.¹¹⁵ This restructuring of the economy, if implemented, would undoubtedly ease China’s reliance on coal.

¹¹⁴ Ibid.

¹¹⁵ “China’s Strategic Emerging Industries: Policy, Implementation, Challenges, & Recommendations,” *The US-China Business Council*, March, 2013, <https://www.uschina.org/sites/default/files/sei-report.pdf>.

Chapter 4: Environmental Objectives

Coal Tax

In order to curtail reliance on coal, the central government implemented an environmental tax on the coal industry beginning in January of 2015. This tax on coal production varies in amount among different provinces. The majority of provinces have a tax rate between 2 and 3 percent per ton produced, however, Inner Mongolia, Shanxi, Ningxia, and Shaanxi, the country's top producing provinces, have higher rates of 8, 9, 6.5, and 6.1 percent respectively.¹¹⁶ Across the country, these rates translate into around 30-50 RMB per metric ton. The tax for consumption of coal is much lower, a mere 5 RMB per ton for discharging pollutants, less than one US dollar. Though these taxes are a step in the right direction, neither of them fully reflect the hidden external costs of production and consumption, including damages on the environment and human health. According to the study, "The True Cost of Coal" (煤炭的真实成本), by researchers at Tsinghua University, the true cost of coal is approximately 260 RMB per ton of coal. These costs include land, air, and water pollution, damage to wildlife as well as human health, and greenhouse gas emissions contributing to global warming. The coal extraction and cleaning process alone discharges an average of around 737 million tons

¹¹⁶ "China's New Coal Tax Will Affect Regions Differently," *Stratfor Analysis*, January 15, 2015, <https://www.stratfor.com/sample/image/chinas-new-coal-tax-will-affect-regions-differently>.

of polluted water each year.¹¹⁷ 64 percent of this estimated cost, or 166 RMB per ton, originates from the consumption, not production, of coal, meaning that the current consumption tax only represents 3 percent of the action costs of consumption.¹¹⁸ Burning just 1 ton of coal emits 1.53 kg of sulfur dioxide (SO₂), 2 kg of carbon monoxide (CO), 3-9 kg of nitrogen dioxide (NO₂), and 9-11 kg of soot into the atmosphere.¹¹⁹ Besides these toxins, coal combustion also releases other pollutants including nitric oxide (NO), ozone (O₃), and suspended particulates. In fact, combustion of the energy accounts for 75 percent of SO₂ emissions, 85 percent of NO₂ emissions, 60 percent of NO emissions, and 70 percent of suspended particulate emissions in the country.¹²⁰ Though the production tax is much higher, the highest tax rates throughout the country still only account for around half of the costs of production, which is estimated to be around 94 RMB per ton of coal.¹²¹ Assuming that these figures are correct, the current environmental tax is only around 20 percent of the actual damage associated with producing and burning coal. These tax rates grossly underestimate the true cost of coal and must be increased significantly in order to balance out the environmental costs. Though these tax rates are low and only very recently introduced, there is hope that they will contribute to the reduction of both coal extraction and use.

¹¹⁷ “Di Er Ci Quanguo Jingji Pucha Zhuyao Shuju Gongbao (Di San Hao) [The Second National Economic Census Main Data Bulletin (No. 3)],” *中华人民共和国国家统计局 (National Bureau of Statistics of the People’s Republic of China)*, December 25, 2009.

http://www.stats.gov.cn/tjsj/tjgb/jjpcgb/qgjgb/201407/t20140731_590161.html.

¹¹⁸ Fei Teng, “Meitan De Zhenshi Chengben [The True Cost of Coal],” Tsinghua University, 2014.

<http://www.nrdc.cn/coalcap/console/Public/Uploads/2014/11/06/%E6%8A%A5%E5%91%8A%EF%BC%9A2012%E7%85%A4%E7%82%AD%E7%9A%84%E7%9C%9F%E5%AE%9E%E6%88%90%E6%9C%AC.pdf>.

¹¹⁹ Jing, *Under the Dome*.

¹²⁰ Yushi Mao, Sheng Hong, and Fuqiang Yang, “The True Cost of Coal,” (Investigation initiated by Greenpeace, the Energy Foundation, and WWF) January 21, 2010 pg 6.

¹²¹ Teng, “Meitan De Zhenshi Chengben.”

Political Incentives

Politically, public officials have little incentive to push for environmental protection over economic growth. This is in large part due to the system used to promote leading officials, known as the cadre evaluation system (干部考核制度) (CES). Under the CES, top officials evaluate the person directly below them in a one-level down system. The main criteria for this evaluation is how well the administrator has worked towards the goals laid out by the Five Year Plan as well as the Government Work Report (GWR), a document published annually by the central and local governments which lays out the five core goals for that year.¹²² Though all GWRs should follow the example of the central government, each province is responsible for their own document, thus the goals and achievements of each province are slightly different. Officials must do well in this evaluation in order to receive raises or promotions. It is therefore in their best interest to follow the GWR to the best of their ability.

Traditionally, the cadre evaluation system has been geared towards economic growth. Officials were assessed solely on their ability to boost the economy and raise GDP and only those that did so were promoted. This system, though good for the economy, permitted and in a sense encouraged the degradation of the environment, as economic growth can most quickly be achieved by using cheap fuel sources such as coal and leaving waste and pollution untreated. This began to shift in 2006 with the implementation of the 11th FYP, which set four “binding” environmental targets, meaning

¹²² Zhen Wang, “Who Gets Promoted and Why? Understanding Power and Persuasion in China’s Cadre Evaluation System,” Paper presented at the Annual Meeting of the American Association for Chinese Studies, New Brunswick, New Jersey, October 11-13, 2013.

that they had the “effect of law” and would be included in CES evaluations.¹²³ Although the 11th Five Year Plan placed a higher emphasis on the environment than those before it, the GWR of that time continued to minimize environmental issues, allowing officials to more easily overlook environmental goals. It was not until 2014, under the leadership of Xi Jinping, that the focus of the GWR began to shift away from economic growth and towards social stability. Administrators are now judged by their achievements in a more diverse set of areas, one being environmental protection.¹²⁴

By examining the central Government Work Report more closely, we can clearly see a slow transition away from an economic focus. In 2011, the five national goals laid out by the central government in the GWR by order of importance were: fiscal and monetary policy; economic restructuring; social services and development; improving people’s well-being and social justice; and deepening reform and opening up.¹²⁵ The first three of these goals are related to economic development and only under the fourth category, “improving people’s well-being and social justice,” was environmental protection discussed. From this document, it is evident that the government was more concerned with boosting the economy than preserving the environment. The first GWR after Xi Jinping’s reform shows that the government’s goals have shifted somewhat. The five priorities outlined under the 2014 GWR are: deepening reform and opening up and stimulate market activity; innovate ideas and methods of macro-control to ensure that the economy is in a reasonable range; economic restructuring; protect and improve people’s

¹²³ Bingqiang Ren and Huisheng Shou, *Chinese Environmental Governance: Dynamics, Challenges, and Prospects in a Changing Society* (New York: Palgrave MacMillan, 2013), 46.

¹²⁴ Henry Sanderson, “Chinese Cadres Told Going Green Rivals GDP to Rise in Party,” *Bloomberg Business*, March 12, 2014, <http://www.bloomberg.com/news/articles/2014-03-12/chinese-cadres-told-going-green-rivals-gdp-to-get-ahead-in-party>.

¹²⁵ Wang, “Who Gets Promoted and Why?”

livelihood and promote social equity and justice; and finally to maintain social harmony and stability. Much like the report from 2011, the 2014 report emphasizes the economy in its first three goals, indicating that the economy is still the primary focus. However, unlike the preceding GWRs, other factors, including environmental, are discussed under both the fourth and fifth goals of “improving people’s livelihood” and “maintaining social harmony.”¹²⁶ This increased mention indeed represents a gradual shift towards social and environmental goals, however, its main focus still seems to be economic growth.

Although at a national level, the GWR indicates increased emphasis on environmental protection, provincial GWRs vary substantially from province to province. For this reason, provincial leaders have different levels of incentives for pushing green policies. For example, some provinces, such as Eastern Shandong and Hebei, have incorporated air quality into their criteria for evaluation.¹²⁷ Most provincial GWRs and FYPs continue to emphasize high economic growth. The 12th FYP for 26 out of the 31 provinces set economic growth rate targets around 12-17 percent, much higher than the national target of 7 percent.¹²⁸ Considering the fact that ability to meet FYP targets is a factor in evaluation, it is apparent that provincial governments set many of their own priorities for promotion and are able to undermine national policies.

¹²⁶ “2014 Nian Zhengfu Gongzuo Baogao [Government Work Report: 2014],” *People’s Net*, March 5, 2014. <http://lianghui.people.com.cn/2014npc/n/2014/0305/c376646-24535026-2.html>.

¹²⁷ Sanderson, “Chinese Cadres Told Going Green Rivals GDP to Rise in Party.”

¹²⁸ Genia Kostka, “Barriers to the Implementation of Environmental Policies at the Local Level in China.” Policy Research Working Paper 7016, World Bank Group, August 2014, http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/08/26/000158349_20140826101929/Rendered/PDF/WPS7016.pdf.

This system still has a ways to go to promote environmental protection. Until environmental protection becomes a main goal of both the central and provincial governments and public officials are judged based on their ability to comply with this goal, they will have little incentive to promote environmental safety over economic growth. However, on this point it should be noted that if a policy or project is good for both the environment and economy it is more likely to be approved.

Although public officials have had little political incentive to protect the environment, one must keep in mind that they still have the same incentive as the common people to do so. They are just as, if not more, aware as the public of the health risks associated with air and other forms of pollution. Though Chinese government workers may be better off financially than the general populace and thus more able to avoid pollution through the use of air-filtering systems and face masks, they are not immune to it. Pollution influences the lives of the officials in the same way that it does the common people, affecting their health and general wellbeing. For this reason, there is hope that Chinese officials will be able to look past promotional opportunity and implement policies which prioritize environmental protection.

Chapter 5: Social Pressure

Another key factor influencing China's coal policy is social pressure. A major reason that China has been able to sustain heavy coal use is that its people have been content with such a policy. For the last century or so, citizens have mostly accepted an opportunity cost of environmental degradation because industrialization was seen as the best means of modernizing and creating national strength.¹²⁹ In the 1980s, there were around 3,700 factories in Beijing, none of which had any environmental regulations which might hinder economic growth. Far from causing public discontent, the people viewed the smokestacks as a sign of progress.¹³⁰ During the reform era, as long as their socioeconomic status kept improving, they were satisfied with accepting harm to the environment as an inevitable side effect of the economic growth which they so craved. As people's standard of living rises, however, their priorities have begun to shift away from economic gain and towards their broader wellbeing, something which is threatened by pollution and its associated health risks. This is a universal trend which can be seen in other countries in their developmental stages, such as England in the 1950's¹³¹ and Japan in the 1970's.¹³²

¹²⁹ Shuo and Myllyvirta, "The End of China's Coal Boom."

¹³⁰ Jing, *Under the Dome*.

¹³¹ Jing, *Under the Dome*.

¹³² Someno Kenji, "Breathing the Same Air: Outlook for Environmental Change in China," *The Tokyo Foundation*, February 5, 2014, <http://www.tokyofoundation.org/en/articles/2014/breathing-same-air>.

Aside from economic reasons, the Chinese public rarely complained about the pollution surrounding them simply because they were unaware that it was there or causing any serious effects. Although similar levels of PM2.5 have existed in the country for decades and have actually decreased slightly since the 1990s, the public believed that what they were seeing was simply bad weather and not pollution. This is because, before about seven years ago, the media referred to haze as “fog” in all published articles.¹³³ The first mention of 雾霾, the Chinese word for haze, in *The China Daily* was in August 2008, in an article entitled, “Good air quality in Beijing Olympic Games progressing smoothly.”¹³⁴ The word for air pollution, 空气污染, was first mentioned by the newspaper just a year earlier in August of 2007.¹³⁵ For this reason, though citizens saw days of low visibility before this time, they were not aware that there was anything to be worried about. In fact, before the Measures on Open Environmental Information were first enacted in May of 2008,¹³⁶ any information on pollution, especially in regards to its harm to human health, was considered “internal information” and not released to the public.¹³⁷ Therefore, the public had little to no idea that they had any reason to demand environmental protection.

¹³³ Jing, *Under the Dome*.

¹³⁴ “Guoji Xianqu Luntan Bao’: Beijing Kongqi Zhiliang Lianghao Aoyun Saishi Jinzhan Shunli [‘International Herald Tribune’: Good Air Quality in Beijing Olympic Games is Progressing Smoothly],” *中国日报网站 (China Daily)*, August 18, 2008, http://www.chinadaily.com.cn/hqgj/2008-08/18/content_6946267.htm.

¹³⁵ “Songben Jianyi: Wu Chong Dao Riben Fuzhe Zhongguo Ying Jiaqiang Huanjing Baohu [Kenichi Matsumoto: Do Not Repeat the Mistakes of Japan, China Should Strengthen Environmental Protection],” *China Daily*, August 29, 2007.

¹³⁶ Jamie P. Horsley, “China Adopts First Nationwide Open Government Information Regulations,” *Yale Law School*, http://www.law.yale.edu/documents/pdf/Intellectual_Life/CL-OGI-China_Adopts_JPH-English.pdf.

¹³⁷ Jing, *Under the Dome*.

Much like Britain and the Great Smog in 1952.¹³⁸ China has also experienced phases of great pollution which have shocked the people and helped awaken their feelings of environmental protection. Two main incidences in China have undoubtedly been vital to influencing public opinion concerning air pollution. The first of these took place in October of 2011, when an episode of especially bad air pollution continued for weeks on end. The vast discrepancy between the PM2.5 measurements recorded by the US Embassy in Beijing and the official air quality index of the Chinese government caused web users to openly question official air quality data for the first time. Social pressure prompted the government to agree to publish official measurements of PM2.5 and enact air pollution reduction targets for all major cities.¹³⁹ The second incident occurred two years later in January of 2013, when noxious haze enveloped around 1.4 million square kilometers, or one-seventh, of the country. Though Beijing was worst effected, the haze was also visible over parts of 25 other provinces, including Hebei, Henan, Shandong, Jiangsu, Anhui, Shaanxi, and Sichuan. Two days after the smog first appeared on January 10th, official PM2.5 levels surpassed 700 microns per cubic meter, while PM10 levels reached 993 microns per cubic meter, the highest concentration ever recorded and over 40 times what is considered safe by the World Health Organization.¹⁴⁰ This incident, dubbed the “airpocalypse,” lasted for almost two months and affected around 600 million people, approximately double the entire population of the United States.¹⁴¹ During that January, 27 cities around the country showed an increase in emergency room visits of 10-150 percent, mostly among small children and the elderly,

¹³⁸ Kenji, “Breathing the Same Air.”

¹³⁹ Shuo and Myllyvirta, “The End of China’s Coal Boom.”

¹⁴⁰ Kenji, “Breathing the Same Air.”

¹⁴¹ Jing, *Under the Dome*.

the age groups most susceptible to the effects of pollution.¹⁴² The result was an outcry by both the media and public to limit coal use and implement green policies. In September of 2013, these cries were answered with the publication of the Action Plan on Prevention and Control of Air Pollution by the State Council in which provinces were instructed to introduce further measures to curb air pollution.¹⁴³

Although the shift in public attitudes towards environmental degradation was slow to start, it is now moving at a rapid pace. According to a study published by the Pew Research Center in 2013, 36 percent of the Chinese population viewed air pollution as a “very big problem” in 2012. Just one year later, this number rose to 47 percent.¹⁴⁴ This contrasts starkly with a similar poll published by the World Values Survey in 2007, in which the majority of participants (1315 people or 66.1 percent) stated that poor air quality was “not very serious” or “not serious at all” only 13.2% of participants felt that poor quality was “very serious.”¹⁴⁵ This comparison of years before and after the Measures on Open Environmental Information were implemented suggests that the open dialogue surrounding air pollution had a significant effect on public views on the topic.

¹⁴² Ibid.

¹⁴³ Shuo and Myllyvirta, “The End of China’s Coal Boom.”

¹⁴⁴ Andrew Kohut and Richard Wike, “Environmental Concerns on the Rise in China: Many Also Worried about Inflation, Inequality, Corruption,” *Pew Research Center*, September 19, 2013, <http://www.pewglobal.org/files/2013/09/Pew-Global-Attitudes-Project-China-Report-FINAL-9-19-132.pdf>.

¹⁴⁵ “Environmental Problems in Your Community: Poor Air Quality,” *World Values Survey*.

Table 5.1: Environmental Problems in Your Community: Poor Air Quality (2007)

	Number of cases	%/Total
Very serious	262	13.2%
Somewhat serious	344	17.3%
Not very serious	635	31.9%
Not serious at all	680	34.2%
No answer	2	0.1%
Don't know	67	3.4%
(N)	(1,991)	100%

SOURCE: "Environmental Problems in Your Community: Poor Air Quality," *World Values Survey*.

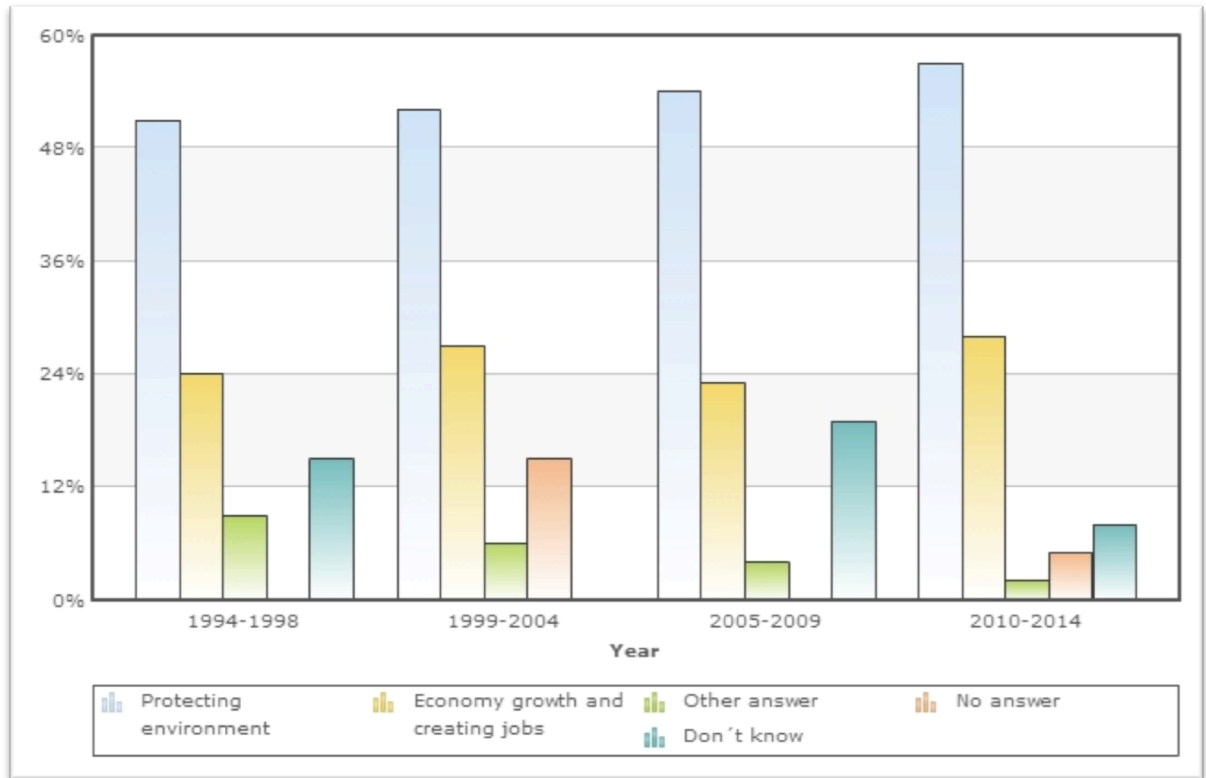
Though this study clearly shows that environmental concerns are on the rise, the question still remains: what is more important to the Chinese- economic growth or environmental protection? A survey conducted by the World Values Survey has asked the Chinese public this very question every four years for the past 16 years. According to this survey, the public has valued environmental protection above the economy at least as far back as 1994, far before the topic was widely discussed in the media. Though this is the case, there has been a steady rise in the percentage of people choosing the environment over the economy, from 51 percent in the 1994-1998 period to 57 percent in 2010-2014.¹⁴⁶ This is to be expected due to the worsening of the situation as well as the increase in availability of information. Surprisingly, the percentage of people valuing the economy over environmental protection has also increased during this time, from 24 percent to 28 percent.¹⁴⁷ Though unexpected, this trend may be explained by the decrease in people choosing "other answer," "no answer," or "don't know," which has a

¹⁴⁶ "Protecting Environment vs. Economic Growth," *World Values Survey*, <http://www.worldvaluessurvey.org/WVSONline.jsp>.

¹⁴⁷ *Ibid.*

whole decreased from 24 percent to 15 percent in the last 16 years.¹⁴⁸ The fact that these categories have reduced over time suggests that as the people have become more educated about environmental issues, they have developed stronger opinions on the topic.

Figure 5.1: Protecting Environment vs. Economic Growth



SOURCE: “Protecting Environment vs. Economic Growth,” World Values Survey

Aside from pollution in their home country, research shows that the Chinese are also becoming more concerned about global warming and the greenhouse gas effect around the world, two factors which are directly related to coal use. According to a 2007 poll by World Values Survey, the majority of the survey population (690 people or 34.7 percent) did not know whether or not global warming or the greenhouse effect were

¹⁴⁸ Ibid.

serious problems.¹⁴⁹ However, it should be noted that the second highest percentage, 29.7 percent, felt that global warming or the greenhouse gas effect were somewhat serious.¹⁵⁰ A survey released by the Pew Research Center six years later in 2013 shows that 39 percent of participants now felt that global warming is a “major threat” and only 11 percent did not know or refused to answer the question. Due to the fact that the questions asked in the two surveys are worded differently, I am unable to make one comparable graph to display the two responses. Nevertheless, it is apparent from these numbers that more people in China are now educated on the topic of global warming and concerned by its effects around the globe. Assuming that the results from the three questions discussed above are correct, it is safe to assume that the Chinese public are not only concerned about environmental protection, but also with China’s coal use, which is the cause of a large percentage of the country’s, and the world’s, air pollution.

The Chinese public has also become more active in voicing its newfound opinions on these topics. Unlike many other subjects in the strictly-regulated society, environmental concerns are not considered a political issue and thus can be openly discussed and even protested by the public without fear of retribution.¹⁵¹ For this reason, Chinese people are more likely to speak out, or attempt to speak out, against environment issues. The number of letters and formal complaints submitted to the government about environmental concerns is on the rise. In 1997, 100,000 such letters were submitted to the Ministry of Environmental Protection (at that time the State Environmental Protection

¹⁴⁹ “Environmental Problems in the World: Global Warming or the Greenhouse Effect,” *World Values Survey*.

¹⁵⁰ *Ibid.*

¹⁵¹ Jianqiang Liu, “China’s New ‘Middle Class’ Environmental Protests,” *China Dialogue*, January 2, 2013, <https://www.chinadialogue.net/article/show/single/en/5561-China-s-new-middle-class-environmental-protests>.

Administration), in 2006 the number had risen to more than 600,000.¹⁵² In 2014, the Beijing Municipal Bureau of Environmental Protection received 12,599 formal smog complaints between January and May alone, 124 percent more than the previous year.¹⁵³ The only interruption in this upward trend occurred in 2007, when almost no formal complaints were submitted. This dip is likely due to the immense environmental efforts by both the central and local governments in that year in preparation for the 2008 Olympic Games, including the first national plan addressing climate change.¹⁵⁴

As visible from the chart below, almost no public protests or complaints occurred between the years 2000 and 2008, when China's economy boomed. It can be discerned that the reason for the sudden change after 2008 occurred not only because of more accessible information after that time, but also because of the slowed economy growth rate from 14.2% the previous year to 9.6%.¹⁵⁵ Whatever the case, after 2008, the number of complaints skyrocketed. Environmental protests have also increased drastically, by a rate of around 30 percent annually since 1996.¹⁵⁶ Though not all environmental grievances are about coal use, around 70 percent of environment-related complaints in Beijing are associated with air pollution, 90 percent of which is directly linked to coal.¹⁵⁷ Thus, it is reasonable to assume that a decrease in coal use or an increase in responsible coal use would lead to a significant decrease in environmental protests.

¹⁵² Elizabeth J. Perry and Mark Seldon, *Chinese Society: Change, Conflict, and Resistance*, 3rd ed. (New York: Routledge, 2010) pg. 197.

¹⁵³ "Rising Anger as Complaints about Beijing's Air Pollution Double," *South China Morning Post*, June 15, 2014, <http://www.scmp.com/news/china/article/1532982/complaints-about-beijings-air-pollution-more-double-year>.

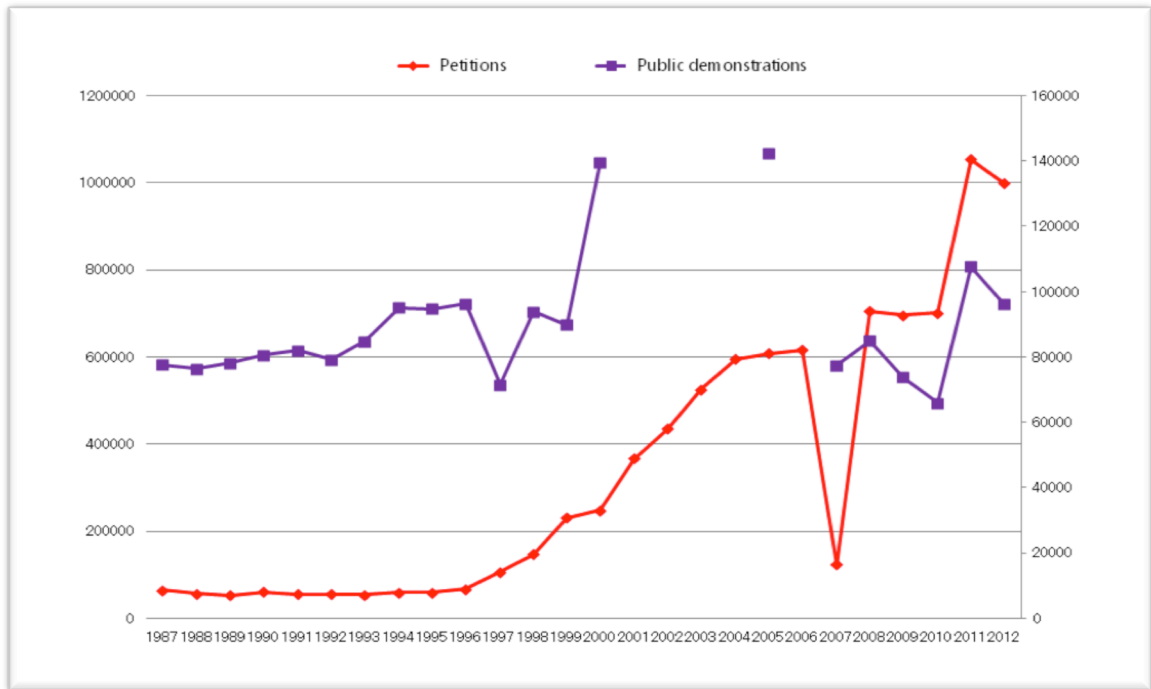
¹⁵⁴ Xiumei Guo and Dora Marinova, "Environmental Awareness in China: Facilitating the Greening of the Economy." (paper presented at the 19th International Congress on Modelling and Simulation, Perth, Australia, December 12-16, 2011).

¹⁵⁵ "Data: China," *The World Bank*, 2015. <http://data.worldbank.org/country/china>.

¹⁵⁶ Liu, "China's New 'Middle Class' Environmental Protests."

¹⁵⁷ "Rising Anger as Complaints about Beijing's Air Pollution Double."

Figure 5.2: Environmental Petitions and Public Demonstrations China (1987-2012)



SOURCE: Kenji, Someno. "Breathing the Same Air: Outlook for Environmental Change in China." The Tokyo Foundation. February 5, 2014.

Although the government allows the public to openly express environmental concerns, large-scale protests are considered a threat to the social harmony which the country strives to maintain. In line with its typical policy of 维稳, or maintaining social stability at all costs, the central government has generally refused to acknowledge these protests or petitions.¹⁵⁸ Rather, it has worked quietly behind the scenes to limit and quiet public demonstrations and avert attention away from the incidents that do occur. For example, in 2012 when the citizens of Chengdu organized a protest against a new paraxylene (PX) plant, the government mandated that the Saturday of the proposed protest be a work day. Those who did not show up for work had their pay docked. To

¹⁵⁸ Harold Thibault, "Environmental Activism Gains a Foothold in China," *The Guardian*, August 21, 2012, <http://www.theguardian.com/environment/2012/aug/21/environment-activists-china-pollution-protest>.

ensure that no one challenged their orders, the local military occupied the square where the demonstration was to be held, insisting that they were performing a scheduled drill. Any mention of the factory or PX and its effects on the environment or human body was blocked on the internet. Unsurprisingly, far from distracting the public, the government's silence towards the situation and others like it has incited public outrage.¹⁵⁹

Though the government has a history of ignoring environmental protests, that is not to say that they are unsuccessful. Many such protests have led to increased fines for polluters and, in some cases, the complete removal and relocation of factories. One such famous incident was the Dalian Protests in 2011 against the construction of a chemical plant which would have produced PX. After days of large scale protests, the government stopped construction and relocated the factory to a new location far outside of the city limits.¹⁶⁰ These same protest tactics were successful in blocking two subsequent PX projects in Ningbo and Kunming.

The increased number of environmental complaints and protests has had a visible effect on governmental policy. As of 2014, social harmony and stability now constitute two of the five primary goals of the country, as stated by the Central Government Work Report.¹⁶¹ It is only by association to social stability that environmental protection is included in these Government Work Reports which are so vital for the formulation of national policies, as it is listed as a sub-topic under social issues. Based on this

¹⁵⁹ Jeffrey Wasserstrom, "The Pollution Crisis and Environmental Activism in China: A Q&A with Ralph Litzinger," *Dissent Magazine*, May 15, 2013, http://www.dissentmagazine.org/online_articles/the-pollution-crisis-and-environmental-activism-in-china-a-qa-with-anthropologist-ralph-litzinger.

¹⁶⁰ "Kunming to Release Environmental Report after Protests over Petrochemical Plant," *South China Morning Post*, March 26, 2015, <http://www.scmp.com/news/china/article/1252276/kunming-refinery-report-be-made-public>.

¹⁶¹ "2014 Nian Zhengfu Gongzuo Baogao."

observation, it is apparent that social pressure plays a fundamental role in ensuring environmental protection and, by association, trends in coal use. Though officials have long stated that public contentedness and social stability are key goals of the government, it has only recently begun to acknowledge that heavy coal use and environmental degradation are causes of dissatisfaction. One of the earliest documented mentions of this took place in 2014 when the Finance Secretary of the NDRC stated in an interview that the public longed for environmental protection and that current environmental problems are causing public incidents.¹⁶² Although this sentence would be common, and even tame, in American politics, it marks a noticeable change in the Chinese political dialogue.

¹⁶² “Fagaiwei: ‘Shisanwu’ Guihua Bu Keneng Zai Jieneng Jianpai ‘Fangshui’ [NDRC: Thirteenth Five Year Plan Will not Turn off Water in Energy-Saving],” *快讯 (Kuai Xun)*, April 23, 2014, <http://kuaixun.stcn.com/2014/0423/11362273.shtml>.

Chapter 6: Conclusion

China is currently undergoing a period of transition away from its old ideals and goals towards a future largely unknown. This transition is visible in the country's coal use and policies. Though official figures and the media seem to suggest that China is moving away from coal use in order to make way for other energy sources such as renewables, the country's energy policy is vague and unclear. The current coal policy provides only very broad objectives for the future, lacking definite figures and goals. Though these policies emphasize renewable resources, they do not have an equal emphasis on decreased coal consumption. The country still lacks effective incentives for coal reduction, as evidenced by its low coal tax and current Cadre Evaluation System, which continues to prioritize economic growth over environmental protection.

The purpose of this study was to pinpoint the rationale behind China's current coal policy, however, in this aspect it was largely unsuccessful. This is simply because, without taking part in the policy-making process, it is near impossible to tell what the decision-makers were thinking when they constructed the policies. That being said, this paper does define several factors which likely play a large role in shaping China's coal policy; including economic, environmental, and social. The original hypothesis of this paper was that economic factors hold the largest clout in the formation and implementation of the country's coal policy. Again, for the reasons stated above, it is difficult to say if this hypothesis is correct. However, after reviewing the situation from

multiple angles, it is clear that economic reasons do play an important role in this process. The low price of coal as compared to other energy sources is a major reason for this, and understandably so, as coal is at least three times cheaper than any other available energy source. Further evidence can be seen in the policies themselves, which are unspecific and inconsistent, as well as the international negotiations of the country, which have thus far failed to result in binding agreements. Whether or not China's coal policy is still dominated by economic concerns, it appears to be in a stage of transition which is moving the country away from coal consumption and towards more environmentally safe options. Research attributes this shift to rising environmental costs as well as social discontent and subsequent pressure on the government to amend the situation.

Though this paper separates the reasons behind China's coal policy into three main categories; economic, environmental, and social, they are all very much interrelated. Heavy coal use, which makes sense for the country economically, is the cause of vast environmental degradation, which causes both social unrest and billions of yuan in damages (around 2 percent of the country's GDP in fact¹⁶³), thereby undermining economic growth. Decreased coal use leads to loss of jobs, especially in coal-producing provinces such as Shanxi and Shaanxi, which leads to social discontent. Due to the many corresponding facets of the Chinese coal policy, it is important to view each of these categories in the context of each other and the bigger picture rather than in isolation.

¹⁶³ "China is Set to Lose 2% of GDP Cleaning Up Pollution," *Bloomberg Business*, 17 September, 2010. <http://www.bloomberg.com/news/articles/2010-09-16/china-set-to-lose-2-of-gdp-fighting-pollution-as-doing-nothing-costs-more>.

Implications

The direction that China takes with its coal regulatory policy will have broad implications into the future quality of life for the Chinese people. Environmental pollution has already permeated all aspects of life within the country and will continue to do so until the situation is resolved. If current social trends continue, the public will become more and more discontented with environmental degradation and demand change in larger numbers. The failure of the Chinese Central Party to respond to its pollution problem is therefore likely to serve as a major catalyst to social unrest. The government has ample reason to persist in heavy coal use, including convenience, low costs, and energy security; it is therefore up to the people and increased social pressure to challenge the government and force them to make drastic changes.

Chapter 7: The Future of Coal: Looking Ahead

Evidence of recent policy changes in China can already be seen. Environmental groups within the country have recently been granted more leverage and powers with new environmental laws passed in January of 2015, which now allow them to file lawsuits against polluters.¹⁶⁴ A further point of optimism for China's environment is the country's new environmental minister, Chen Lijing, who has recently been cited saying that "a new law can't become a paper tiger, we want to let it become a weapon with steel teeth."¹⁶⁵ From this statement it is apparent that China knows what needs to be done and is well on its way to achieving it. With the world watching China's ascent to a global superpower, China must implement systemic changes to regulate coal pollution and create a harmonious living environment for generations to come.

13th Five Year Plan

China's 13th Five Year Plan is scheduled to be released in March of 2016 and will set the country's guidelines for the period between 2016 and 2020.¹⁶⁶ Based on the 12th FYP, as well as other government policies, it is logical to assume that this new plan will include an increased emphasis on social stability and reduced carbon and greenhouse gas

¹⁶⁴ Agence France-Presse, "China Encourages Environmental Groups to Sue Polluters," *The Guardian*, 7 January, 2015. <http://www.theguardian.com/environment/2015/jan/07/china-encourages-environmental-groups-to-sue-polluters>.

¹⁶⁵ Jack Chang, "Revamped Environmental Law Raises Hope for Cleanup in China," *The Associated Press*. 14 March,, 2015. http://hosted2.ap.org/APDefault/*/Article_2015-03-14-AS--China-New%20Environmental%20Law/id-1341f76dd61b44b2bc468c34564baa41.

¹⁶⁶ Chen Jia, "Preparation Starts on 13th Five-Year Plan," *China Daily*, 20 August, 2013. http://usa.chinadaily.com.cn/business/2013-08/20/content_16909138.htm.

emissions. However, if China continues in its policy trends, it seems likely that the plan will focus more on increasing the use of renewable resources instead of specifically limiting coal use. This is likely to be the case because the renewable energy sector was named in the last FYP to be one of the seven “strategic emerging industries”.¹⁶⁷ This new industry is expected to create 39 million jobs and a revenue of 3.7 trillion RMB, according to the Vice-Chairman of the NDRC.¹⁶⁸ It can be assumed that the policy on coal use will be limited to a few sentences on increased use of underground coal gasification and desulphurization technology and not mention further caps on coal, as the issue can be sensitive within the country, especially among businesses and major coal-producing provinces, all of whom rely on coal. Although this section is likely to be lacking, increased use of renewable resources will inevitably result in the consequent reduction of coal use, therefore, the 13th FYP is an important step in moving the country forward.

¹⁶⁷ Ong, “The Apparent ‘Paradox’ in China’s Climate Policies.”

¹⁶⁸ Jing, Under the Dome.

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