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Priorities of China's Climate Policy: An Analysis of the Policy Formulation

Master thesis

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Declaration of Authorship

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2. I hereby declares that all the sources and literature used have been properly cited.

3. I hereby declares that the thesis has not been used to obtain a different or the same degree.

Prague …… Yiyi Du …….

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Abstract

This thesis investigates the factors that can sufficiently explain China's policy on climate change issue. We utilize interest-based theory in environmental politics and constructivism to explore the drivers behind China's climate change policy formulation. The theories are tested by process tracing the historical development of China's policy on climate change. The analysis is further complemented by other explanatory factors based on empirical findings, including domestic policy process and the impact of non-state actors. The study finds out that China's climate change policy has experienced positive changes with growing policy stringency. The result shows that China's climate change policy cannot be sufficiently explained by the interest-based theory, the factor regarding ecological vulnerability can be only partially confirmed. Instead, international norms can provide plausible incentives for policy change through the process of socialization. The final policy outcomes are also connected to the interest of the most influential domestic political actor. The study results help us to better understand the environmental politics in China and provides guidelines to predict China's role in international climate change negotiation after the Conference of Parties in Paris.

Keywords

China's climate change policy, process tracing, interest-based theory, constructivism, norms, responsible power, environmental politics, policy formulation

Title

Priorities of China's Climate Policy: An Analysis of the Policy Formulation

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List of Abbreviations and Acronyms

APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BASIC	Brazil, South Africa, India and China
CAS	Chinese Academy of Sciences
CDM	Clean Development Mechanism
COP	Conference of Parties (to the UNFCCC)
CO2	Carbon Dioxide
ENGO	Environmental Non-Governmental Organization
ETS	National Emissions Trading System
FDI	Foreign Direct Investment
FYP	Five-Year Plan
G77	Group of 77
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GONGO	Government Organized Non-Governmental Organization
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
MEE	Ministry of Ecology and Environment
MEP	Ministry of Environmental Protection
MOE	Ministry of Energy
MOFA	Ministry of Foreign Affairs
MOST	Ministry of Science and Technology
NCCCC	National Coordination Committee on Climate Change
NCCCG	National Climate Change Coordination Group
NCCLG	National Climate Change Leading Group
NDRC	National Development and Reform Commission
NEPA	National Environmental Protection Agency
NGO	Non-Governmental Organization
SDPC	State Development and Planning Commission
SEPA	State Environmental Protection Agency
SETC	State Economic and Trade Commission
SMA	State Meteorological Administration
SOE	State-Owned Enterprise
SPC	State Planning Commission
SSTC	State Science and Technology Commission
UNEP	United Nations Environmental Program
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organization

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1. Introduction

How to tackle the issue of climate change has been one of the major challenges for the international community. China is the key country in the global effort on climate change for two major reasons. First, it is a crucial actor in emission reduction tasks regarding its status as the world's largest GHG emitter with the amount of approximately 27% of the total global emissions (Climate Action Tracker 2019). Second, its leading role among developing countries and the new joint identity in the BASIC group gives it eminence status in international climate change negotiations.

China has contributed its efforts in emission reduction through its policy on climate change which are determined by domestic and international considerations. Throughout the years, China's climate policy has experienced both continuity and changes, yet it remains unclear that how China has formulated and processed its climate change mitigation policies. Which factor can best explain the policy change in the area of climate change? This thesis is to analyze China's policy formulation and transition on climate change. China's stance in the international climate regime can be also influenced by ideational factors such as international image, identity concern and the wish to be regarded as a respected member of the international community. Both domestic and international explanatory factors will equally be considered in regards of China's response to climate change, so that multiple pathways that led to the formation of China's climate policy can be addressed properly.

With Process-Tracing as the main research method, the evolution of China's climate policy will be presented as the research context in order to examine the factors that matters the most behind China's domestic decision-making on the topic of climate change and could explain the policy change. As the world is in the new round of climate change negotiations since Paris Agreement in 2015, it is crucial to understand the key actors and drivers behind China's climate change policy.

This thesis is divided into six chapters and will start with the introduction to the thesis topic followed by literature review in order to gain the whole picture of how existing research has evolved in the study of China's policy and its political decision

making and to expand the aim and significance of this thesis to a boarder context. The theoretical chapter ought to be the foundation of this thesis and the inspiration of our hypotheses in which both interest-based theory and constructivist literature are used to explain how a country's behavior is shaped towards environmental problems. This is then followed by the methodology section, which presents how our hypotheses can be tested by process tracing. Chapter four is the historical mapping of China's climate policy, so that we could investigate the changes and continuities of China's climate change policy during different political period. In chapter five, we analyze the explanatory factors in regards of policy change and the main actors in the policy formation process. In the final chapter, we will discuss the results based on our analysis and conclude the study.

2. Literature Review and Research Goals

2.1 Policy Formation and China's Climate Change Policy

In regards of domestic policy making, individual nations tend to inevitably choose their own sets of criteria to implement to policy (Stavins 1997). It is also foreseeable that individual nations will adopt certain climate change policies only in the case that positive net or side benefits can be perceived (Carraro and Siniscalco 1993). "*It is single nations, not the United Nations, that determine energy and environmental policy, so any grand design to slow global warming must be translated into national measures."*(Nordhaus and Yang 1996, p 742).

Although the definition of climate change is comprehensively addressed by IPCC and it has been proved that there are policy instruments that can reduce the GHG emissions while minimizing the economic costs, governments are still hesitated to take actions even though strong actions are urgently needed to tackle the environmental issue. According to Compston, the principle obstacles to a stronger action on climate change lies in political nature (Compston 2009). Compston thus diagnoses effective political strategies on national level and uses multi-theroetical approach to analyze the nature of climate politics.

Regarding policy-making techniques, Pidgeon and Butler introduce risk management to analyze particular climate policies (Pidgeon and Butler 2009). Scrase and Smith propose a transitions management in order to achieve the low carbon goal with the focus on socio-technical transitions (Scrase and Smith 2009). In regards of the approaches for analyzing the policy formation, one of the widely used approach is the *policy network theory* which focuses on the interdependencies among political actors (Compston 2009; L. Liu 2011; Ylä-Anttila et al. 2018). The other approach is the *rational choice approach* which is also focusing on the interactions among political actors (Grundig 2009). The basic assumption of the rational choice approach is that political actors are self-interested and they tend to maximize the utility by choosing their own preferences. On the perspective of policy communications, Gavin emphasis the role of the media and illustrates how it can form and influence public opinion (Gavin 2009). Pralle employs *agenda-setting theories* to make sure that climate change issue raise significant awareness in the public and the environmental problem will maintain high priority in the policy agenda both in governmental and non-governmental organizations (Pralle 2009).

We can find Chinese literature, most of which are focused on the overall development of China's environmental policy. Li proposes that the climate policy system and the policy provisions should be in line with the coupling of "Inducing, Constraints and Coordination" (K. Li 2000). Based on historical background and policy performance achievement, Zhang and Zhao explore the changes in China's climate change policy from 1953 to 2003 (Zhang and Zhao 2007). However, those frameworks are rather explanatory and little attention is paid either on the factors that trigger out the change or the policy formation process itself. Meanwhile, there are literature in regards of Chinas environmental policy which is written from a local perspective such as the transition of China's domestic environmental policy in the issue area of energy diversity and domestic pollution control and also general prediction about how China will act in the international stage for climate change in the future. Most of the work have a positive prediction on China's role in international climate change effort (K. Li 2000; Bao 2015; J. Wang et al. 2018). One of the features of the literature in Chinese language on climate change policy is that they tend to use professional terms and calculations in ecology or meteorology to analyze the policy implementation and to compare the implementation result to the initial policy target rather than focusing on the policy formation process.

Abundant literature in regards of China's environmental policy formation and China's role in international climate change negotiation can be taken as valuable sources and research background for our study (Bjørkum 2005; Heggelund 2007; Oberheitmann and Sternfeld 2009; Stensdal 2014; Mu 2018; Gallagher et al. 2019). Each literature holds different focal point on the factors that can influence China's climate change policy. Summing up, explanatory factors that are presented and analyzed in existing literature includes (1) The need for domestic economic development; (2) Energy shortage; (3) Environmental problems; (4) The growing scientific knowledge on climate change; (5) Moral concerns. In regards of the first category, Heggelund tries to understand it from a social development perspective, she argues that economic development is the priority of the national policy agenda and "*climate change is one area where the conflict between poverty and sustainable development is apparent, as it is closely link to economic development*" (G. Heggelund 2007, p 158). Wang tries to analyze the factor through China's per capita GDP. He argues that although China's economic is growing constantly, its per capita GDP is still low. This may cause China's reluctant of accepting binding commitment in GHG reduction (B. Wang 2009). Williams also regards economic development as one of the crucial concerns for China's climate change policy formation. Nevertheless, she argues that the need for economic development can be a pusher for China's engagement in climate change (Williams 2014). In the analysis, she mentions the concept of "green growth" and argues that Chinese leaders see low-carbon industries as an opportunity that holds growth potential. Thus, economic concerns may actually lead to a proactive climate strategy (ibid). Ma analyzed China's climate policy after Paris Agreement and concludes that with the economic slowdown and a medium-speed growth prospect, "*China's commitments coincide with the transition to a low-carbon, service-based market economy*" and therefore China's commitment to Paris Agreement is likely to be accomplished with ease (Ma 2016, p 70).

The second factor related to energy consumption is usually discussed together with economic development. As stated by Heggelund (2007), "*economic growth in China continues to be fueled by fossil-based energy*". In her article, she links China's energy policy direct to climate change policy by arguing that cheap energy can generate rapid economic growth, reduce poverty and thus raise living standards. The energy

shortages lead to high energy consumption and the ensuing problems then lead to policy measures being introduced (G. Heggelund 2007). Similarly, Wang (2009) also argues that energy consumption is closely connected to GHG emissions. The need to control the high energy consumption will naturally result in reduction of GHG emissions. In addition, Wang introduces "energy security" in his analysis. Energy security can be understood as China's heavy reliance on foreign oil that puts China in a fragile and controversial situation in international politics (B. Wang 2009). The issue of energy security has certainly become one of the biggest concerns for Chinese leaders and they would thus launch policies with the aim of increasing energy efficiency and encourage the consumption of renewable energy. Engels examines drivers of China's shift to a low-carbon approach and she also addresses the importance of energy security. In her article, she argues that although China has abundant domestic coal resources, it is not sufficient to satisfy the needs of hyper-growth industrial production since the 1990s. Therefore, an overall reduction in energy demand was expected in order to increase the energy security (Engels 2018).

Compared to the first two factors, the other three factors are less discussed among researchers and are usually not the main research objects. In regards of environmental problems, Wang relates this factor directly to climate change damage cost and argues that the health costs of air and water pollution can be harmful for China's GDP and that may cause government leader's attention in publishing stringent environmental regulations. (B. Wang 2009). Williams discusses this factor in ecological perspective. She argues that the impact of climate change itself can be a driver of climate change policy, since China is already seeing the consequences of climate change, such us drought in the north and flooding in the south. Thus, stringent environmental policies can significantly reduce the risk of climate change. Meanwhile, solving domestic environmental problems is coincident with the international goal of GHG emissions (Williams 2014). However, she concludes that environmental problem is still a secondary factor, since "*the relationship between climate, environmental, energy and economic policies is complex*" (Williams 2014. p 19). Thus, she introduces the concept of "ecological civilization" which combines the message about energy, environmental degradation and industry restructuring and is the overall narrative of China's climate change strategies. Namely, government leaders believe that "*economic gains should be balanced against environmental consequences*" (Williams 2014, p 20).

Regarding the factor of scientific knowledge, Wang analyze it both in the perspective of governmental actor and non-state actor. He argues that the growing perception of climate change related knowledge mainly from IPCC has provided a valid scientific basis for decision-makers in "*establishing a long-term socio-economic development strategy and participation in international climate change activities*" (B. Wang 2009, p 102). Meanwhile, China's environmental NGOs can also influence the government and enterprises by advocating renewable energy policies (B. Wang 2009, p 103).

Regarding the last factor, Hedberg argues in his article *Climate Change, Moral Integrity, and Obligations to Reduce Individual Greenhouse Gas Emissions* that individuals should live with integrity and thus they have a *prima facie* obligation to work on a collective political solution on climate change. Thus, an appeal to integrity provides a valid moral reason for governmental leaders to reduce GHG emissions (Hedberg 2018). Wiener examines the best way to engage China in climate change politics and analyzes the impact of moral obligation and beliefs. He argues that moral obligation is however unlikely to promote stringent climate change policy in China's case because of the lack of a deep consensus on a moral basis for mitigation action (Wiener 2008, P 1812). Rather, moral obligation may have opposite effect on China's environmental politics. It could trigger a revival of Maoist thought that human will triumph over nature, which can only make China a dragger in international climate change effort (Wiener 2008). However, what may motivate decision-makers to act on mitigation is the belief that the consequences of climate change will eventually lead to political instability in China. This is based on a longstanding traditional belief advanced by Chinese ancient philosopher Dong Zhongshu that extreme weather or natural disasters is a sign of political upheaval (Wiener 2008, p 1819).

2.2 Emerging Powers and Responsible Powers in Climate Change

We also review the literature that covers China's role in international climate change negotiation, with the focal point on China's evolving international image and identity. Especially after Copenhagen Conference in 2009, rising powers also demonstrated their abilities to promote or veto global negotiations in issue area of

climate change. In order to response to this shift, a significant amount of literature has arisen.

One of the well-known works in this area could be Hochstetler and Milkoreit's article on power transitions in the climate change negotiations. In their article, the changing identity of the BASIC countries is examined and this new identity are proved to change the current order of global governance of climate change and beyond (Hochstetler and Milkoreit 2014). According to Hochstetler and Milkoreit, in international climate negotiations, emerging powers tend to act differently as they do in international economic and financial institutions. When it comes to climate negotiations, emerging powers are often unwilling to be at the center of the negotiation table and express less concern even if they are less involved in the process (ibid). What has caused such a united behavior for the BASIC group in climate area? Why such an uneasy defensive coalition formed all of a sudden during COP 15? Hallding et.al try to answer this question in a material perspective. In their research, key factors are presented in order to explain the cooperation of the BASIC groups: they are aware of the scarcity of global resources and thus is not able to copy the development pathway of today's industrialized countries. In consideration of the remaining carbon space, critically limited resources could be another key factor (Hallding et al. 2013) Hochstetler and Milkoreit also argues that this source of unease comes from the increased responsibilities in climate negotiations. Namely, the climate issue requires a "burden sharing" task, in which the mitigation (economic) cost is for a shared good (Hochstetler and Milkoreit 2014).

This brings us to another perspective in understanding China's role in international climate change negotiation: the norm of being responsible power in global effort on climate change. On the one hand, the question of who should be responsible for global climate change is still unclear. On the other hand, powerful states such as U.S. and China tend to regard themselves as responsible power in climate change in a sense of being able to take the lead in international negotiation. In the paper *The Climate Responsibilities of Industrial Carbon Producers*, Frumhoff et al. discuss the conceptual territory of responsibility and conclude that the major investor-owned fossil energy enterprises are of great responsibility for climate change (Frumhoff, Heede, and Oreskes 2015). Kopra in her book *China and Great Power Responsibility for Climate*

Change has brought this brough this issue to the international level focusing on the increasing prominence of Asian actors on the global stage (Kopra 2019). In her work, China's evolving notions of great power responsibility in context of international climate politics and argues that " *China's rise to great power status and its increasing engagement in international practices will not only shape the contemporary international order but also generate a transformation of international norms*" (Kopra 2019 p.2). Building on the English school of international relations, which assumes that "*states from an international society, the workings of which great powers have special responsibilities to safe guard*", Kopra proposes that states and individuals have ethical responsibilities and analyzed the interaction between two norms: the great power responsibility and the climate responsibility and thus emphasized the necessity of involving normative concern to China's climate change policy (Kopra 2019). "*Responsibility is a principle criterion that states seeking recognition as great powers must fulfil*" (Kopra 2019 p 3).

Similarly, (Hopewell 2015) also suggests that power and influences do not merely come from material factors. Hopewell's work mainly focuses on climate strategy in India and Brazil, as these two countries has successfully performed influences both in Copenhagen and Cancun climate negotiation far beyond their economic weight. I argue that the same logic can be applied to China, in which ideational factors, besides material weight, also matter in China's climate strategy.

The existing literature can certainly provide a solid background for our study on China's climate change policy. However, there are also gaps among them. First of all, existing literature tends to focus on China's international response on climate change and neglect China's domestic climate change policies. This is probably due to the fact that China's domestic policy formation can hardly be seen as transparent and thus is an obstacle for non-Chinese speakers. Secondly, less attentions are paid on the process of policy change. When assessing the policies, researchers often take the most recent published political strategies as research object. The detailed discussion on the policy changes throughout the history is often not presented. If we involve policy change to our study, we will know what factors have triggered out such changes and thus more explanatory factors could be identified. Lastly, existing literature could focus more on the causal relationship between established factors and climate change policies.

Although factors that are capable to explain China's behavior on climate change are well established, for most of the works, the analyses are often presented as: Because factor A exists, we have certain policy outcome. In this way, it fails to answer the question: To what extend can this factor have impact in the policy formation process? Especially for environmental policy, which is related to global common goods and is thus different from other national policies, it is of great importance to examine the internal causal mechanisms between factors and the final policy outcomes.

2.3 Research Goals

The goal of this research is to use process tracing to understand China's policy evolution on climate change and to answer the question: What are the main driving forces in China's climate change policy formulation?

Although China, in coherence with other developing countries, emphasizes the principle of "common but differentiated responsibilities", there are significant transformations in China's climate change policies both at domestic and international level. China ratified the Kyoto protocol in 2002 and substantial policies are designed and implemented domestically that have positive effects to domestic environmental problems. For example, China's existing policies to promote renewable energy throughout the country appear at the top of the global rankings (UNEP 2019). On the international level, China can be taken as one of the key actors in climate change negotiations regarding its leading role in developing countries. Notably, during the Paris Conference in 2015, China has submitted its intended nationally determined contribution (INDC), which includes to peak carbon dioxide emissions by around 2030 and lower the CO2 emissions per unit of gross domestic product (GDP) by 60-65% from 2005 levels by 2030. This is the very first time that China has accepted the emission reduction targets in regards of its total carbon dioxide instead of focusing only on the CO2 emissions per unit GDP or per capita emissions as usual and it is also willing to fulfil the commitment, which is a relatively opposite position compared to China's stances before.

In order to analyze the formation of China's climate policy, I will pay attention to the following aspects:

a) Continuities and changes of China's stance in climate change

b) Key domestic political actors

c) The interactions between internal and external factors in the policy-making process

The research objects will primarily be domestic factors that influence China's mitigation actions and policy formation including the need of economic development, resource diversity and financial and technical support. The time frame of the research objects will correspond to the time of key international climate change agreement, namely from Kyoto protocol to Paris agreement, in which China had a major transition in its climate change policy.

3. Theoretical and Methodological Framework

The upcoming section begins with the theoretical framework, including the Interest-based theory developed by Sprinz and Vaahtoranta and the constructivism. This is then followed by our hypotheses. In the second session, the methodology as well as detailed research method will be presented.

3.1Theoretical Framework

Theories of negotiating positions are employed to inspire the formulation of our hypotheses, aiming to explain how a country's behavior is shaped towards environmental problems. I first employ the Interest-based theory developed by Sprinz and Vaahtoranta (1994) in order to address the material factors that influences China's preferences.

3.1.1 Interest-based Explanation

Original designed to explain and predict states preferences in international climate negotiations, the interest-based theory also focus on domestic factors that emphasize different characteristics of countries. It suggests that states tend to pursue

two major goals with the help of climate policies: to avoid the ecological vulnerability and to minor the cost of abatement and compliance (Sprinz and Vaahtoranta 1994). Although the interest-based theory is initially designed for predicting the behaviors of different countries in combating international ecological problems, it allows us to study climate policies in the socioeconomic aspect and sees economic capacity as one of the major determinant factors in political decision-making process. Therefore, we can also use the interest-base explanation to predict China's preference in regards of domestic climate policy-making. With the fact that China has conducted substantial economic reform whilst experienced environmental problems that proportional to its economic growth, it would be plausible to implement Sprinz and Vaahtoranta's theory to our single case study.

The core of the interest-based explanation consists of two indicators that predicts a country's level of support for any given areas in climate regulation: (1) Ecological vulnerability and (2) Abatement cost.

In this vein, the differences (high or low) in ecological vulnerability and economic abatement costs can also define a county's interests which would then divide countries in to four different types: "pushers", "intermediates", "draggers" and "bystanders". the illustration is presented in figure 1.

Figure 1. Four types of actors in Sprinz and Vaahtoranta's interest-based theory

	low vulnerability	**high vulnerability**
low abatement cost	Bystanders	Pushers
high abatement cost	Draggers	Intermediates

To be specific, "pushers" are in favor of the stringent international regulation as a result of high ecological vulnerability and low abatement cost, while "draggers" represent countries that strongly oppose the regulation. "Intermediates" are very cautious about their position. Although they have valid incentives to embrace a tight regulation due to high ecological vulnerability, they might not want to have a significant

amount of abatement cost. Lastly, "bystanders" should have less intentions to support international regulations but they tend to be more supportive than "draggers" because of the low cost (Sprinz and Vaahtoranta 1994).

Drawing on the interest-based theory, we can predict China's preferences on its domestic decision-making on climate issues. Namely, we test if ecological vulnerability and abatement cost are the main factors that define the core of climate policy agenda. In other words, we assume that climate policies, that have been published, highlighted and emphasized in China's Five-Year Plan and governmental reports on environmental protection, should be influenced by the two indicators to a significant degree.

The explanatory factors on China's climate change policy are listed below, which will be the main guide of our research hypotheses. According to the interest-based theory, states are self-interested actors that rationally pursue their goals based on calculation of cost and benefits (Sprinz and Vaahtoranta 1994).

Vulnerability

In order to integrate the interest-based approach into China's policy-making process, it is important to define our independent variables separately. Vulnerability in climate change has been defined by IPCC as "the propensity or predisposition to be adversely affected". This adverse effect may cause physical, economic or political damage in the long run. To be specific, in regards of different scenarios that caused by climate change, vulnerability can be seen as "future damage" (Wolf et al. 2013). A nation's vulnerability to climate change can also link to its adaption capacity. A country tends to be more vulnerable to climate change if its capacity to adapt is low (Bjørkum 2005). Thus, we argue that a country is likely to propose a climate change mediate policy if its territory is experiencing a higher degree of ecological vulnerability. Thus, our first hypothesis is:

H1: China's turn to a more stringent climate policy was influenced by China's increasing ecological vulnerability.

Abatement costs

Another independent variable proposed by the interest-based approach is the abatement costs, which refers to the amount of resources, usually the economic resources, a country would contribute to the solution of the problem, so that the negative consequences of climate change could be prevented (Bjørkum 2005). It is assumed by the interest-based explanation that if the abatement costs are higher, a country is not likely to be involved in the mitigation processes (Sprinz and Vaahtoranta 1994). However, it is not easy to calculate a country's abatement cost since climate change is a complex issue area and the mitigation cost can be involved in economy, energy technology sectors etc. Therefore, many researchers prefer to use substitution indicators for abatement costs. For instance, Sprinz and Vaahtorant use the consumption of Chlorofluorocarbon per unit of GDP to measure the abatement costs in their research of predicting countries behavior in regards of stratospheric ozone policies. With this logic in mind, it is crucial to choose an appropriate indicator to quantify the abatement costs in our case study. Our second hypothesis linked to this factor is as follows:

H2: China's turn to a more stringent climate policy was slowed down by its high abatement costs.

3.1.2 Normative Concerns in Constructivism

With the material explanatory factors sufficiently discussed in the first two hypotheses, the role of international environmental norms and will serve as external factors which can assert certain impact on China's climate change policy. Based on constructivist thought, the presence of norms should have a significant effect in what a country will behave within a given context (Finnemore et. al 1998). Therefore, one can expect a change of a country's identity overtime through the diffusion and internalization of international norms, which can further lead to the change of its policy choice.

Constructivism can offer a unique perspective in understanding state's behavior in climate change regime, since part of international climate politics is '*discourse and dialogue concerning what policies or activities, ours as well as theirs, are desirable of advisable or appropriate or acceptable or tolerable or prudent or politic or judicious or justified in the circumstances'* (R. H. Jackson 2000, p37).

Traditionally, a country's domestic mitigation policy should be based on international legal instrument. However, in recent years, a consensus can be made even without a formal agreement, what matters is the negotiation process itself that is capable of adjusting a country's perception to the problem and the way it should be handled (Bjørkum 2005). Constructivists treat norms as independent variables and problem-solving measures such as international agreement as dependent variables (Navari 2014, p209). Therefore, we propose that international normative concern related to environmental policy should be another independent variable in explaining the policy formation.

Constructivists describe the nature of policy-making process as dynamic that are both shaped by and shape identities and interests, which are thus understood as endogenous and socially constructed (Wendt 1999). In other words, they assume that norms lead to changes in a country's domestic and international behavior via the processed of socialization (Kopra 2019, p 4). Likewise, Finnemore and Sikkink (1998) describe norm as a standard of appropriate behavior for actors with a given identity". Nevertheless, there is also a linkage between normative theory and rationality:

"*... politically salient processes we call 'strategic social construction', in which actors strategize rationally to reconfigure preferences, identities, or social context. Rationality cannot be separated from any politically significant episode of normative influence or normative change, just as the normative context conditions any episode of rational choice. Norms and rationality are thus intimately connected*..." (Finnemore and Sikkink 1998, p 888)

With this logic in mind, it is important to understand how norms has emerged through social interactions and how should it influence a country's behavior or the decision of a coalition as a whole. For a country itself, it should not make decisions that are not "socially acceptable". Therefore, countries tend to adjust their behavior or even political stances due to pressures come from the international community, in which they are more likely to conform to their given identity instead of only pursuing their own interest optimization. This could also be influenced by the wish of political leaders to enhance their self-esteem (Finnemore and Sikkink, 1998). This phenomenon could be

observed especially in international coalition, in which several countries are supposed to share the same identity and thus the behavior of the coalition countries could be highly influenced by the so called "norm entrepreneurs" within the group, who is capable of convincing the coalition members to embrace a new norm. Once the new norm is accepted by the majority of the countries, there will be no longer public debate and the norm becomes internalized (ibid).

Following the thought of constructivism, norms can influence a country's position to a certain degree and thus can also affect the policy formulation in terms of climate change mitigation. In this vein, the final policy outcome might be different from that is predicted by the interest-based theory. Namely, countries that are defined by the interest-based theory as "bystanders" or "draggers", who initially showed less willingness to international climate change mitigation might experience a shift in their positions or identities and thus become "pushers" with the presence of strong norms.

H3: China's turn to a more stringent climate policy was influenced by the increasing socialization of China into climate norms.

3.1.3 Additional Factors on Climate Policy Formulation

Being inspired by the research outcome of the interest-based theory from Sprinz and Vaahtoranta, we then develop several other factors that may also have influence in the policy formation process of a county. One of the drawbacks of the interest-based theory is that it fails to explain why there are two types of "draggers" and why the policies toward stratospheric ozone gained more universal support than the policies toward acid rain (Sprinz and Vaahtoranta 1994). Therefore, additional factors can be considered so that the explanatory power could be enhanced for the policy formation (ibid). Concerning that the aim of our thesis is mainly focus on domestic factors that influence China's climate policy outcome, we then propose three additional factors.

Domestic Political System

Domestic interest representation of mass political attitudes can play a significant role in international negotiations (Sprinz and Vaahtoranta 1994). Following this thought, we argue that domestic political processes and bureaucratic bargaining can also affect

a country's climate policy outcome. One of the drawbacks of the interest-based approach is that it ignores the fact that negotiations and bargaining might take place on more than one level at the same time and more domestic actors are involved. National interests cannot be simply equal to the net cost and benefits. Rather, it should also be considered as the outcome of domestic politics processed (Bjørkum 2005). Thus, it provides us another perspective to explore the domestic policy process. Namely, instead to see a state as a unitary actor, we should also pay attention to other domestic actors. Similarly, Underdal also sees states as complex organizations in which " *policies are formed through a serious of policy games over which no single actors has full control*" (Underdal 1998, p 12). During the initial phase of decision-making, different political actors will form their "*multiple and to some extent conflicting objectives*" (ibid).

With this fact in mind, it is plausible to study how the interactions among domestic political actors will affect China's policy outcome on climate change mitigation, since China's policy on climate change cannot be completely isolated from other policy issues. For example, the emissions of GHG are usually simultaneously related to energy consumption, industrial production and agriculture etc. Thus, the final decision-making on climate change policy must take the opinions of different sectors or segments of society into consideration (Underdal 1998). The decision-making process on climate change can be seen as "*a function of leading actors' priorities and preferences on the area of climate change as well as other related areas*" (Bjørkum 2005, p 22). Hence, we are able to explain why China does not embrace certain climate policy in spite of being highly vulnerable in the issue area. Thus, the fourth hypothesis is focus on domestic policy process:

H4: China's turn to a more stringent climate policy was influenced by the changes in the domestic political system.

Epistemic Community

Due to the complexity of the nature of climate regime, knowledge plays an important role. Especially since Copenhagen negotiation, the influence of epistemic communities over countries' negotiation positions has increased (X. Gao 2018; Stensdal 2014). This could be explained by the notion that Government's behavior is likely to be influenced by the increased understanding of the consequence of climate

change in the regional or local scale (Harris 2003). And the question is where do governments acquire such knowledge? That is why we should shift our attention on epistemic communities -- the entities for knowledge delivery.

The definition of epistemic communities is "networks of knowledge-based communities with an authoritative claim to policy-relevant knowledge within their domain of expertise" (Haas 1992). The IPCC serves as an important hub of climate knowledge, in which climate experts from all over the world are dedicated in working on annual climate assessment. However, for some countries, especially developing countries, the assessment is perceived as Western science that promotes Western interests. This could be explained by the under-representation of experts from developing countries in the IPCC bureau (Bjørkum 2005). Thus, the question would be, whether China sees the IPCC as a legitimate source of climate change or just an institution that diffuse western ideas.

H5: China's turn to a more stringent climate policy was influenced by the input and activities of epistemic communities.

Public Opinion

It is argued by many researchers that the collective preferences of the mass public are essential for the political dynamics (Shwom et al. 2015; Anderson, Böhmelt, and Ward 2017). Nevertheless, public opinion on climate change can be seen as a relatively new research object, this can be explained by the fact that back in the 1990s, it was still a "luxury" for citizens to worry about the environmental issue especially in developing countries (Shwom et al., 2015). However, since public support becomes a more popular factor in shaping social response to climate change (UNESCO 2015), we cannot ignore this factor in regards of climate policy-making.

"Public opinion on climate change" refers to "*Beliefs about anthropogenic climate change, perceptions of climate change risks, concern about its seriousness, and thoughts on what, if anything, should be done to address it*" (Shwom et al., 2015, p 269). The focal point of existing research is mainly the predictor of public concerns in the issue area, yet there are still puzzles. For example, the Chinese public are among the least concerned on climate change, but they tend to be the most supportive of policies

to address the problem (Brechin 2010). This leads us to the thought that public opinion could be a pusher or at least a predictor to climate policy outcomes and can influence public policy through democratic processes (Shwom et al., 2015). Roberts conclude that civil societies (domestic NGOs) address their voices and opinions through government elections and media and thus can influence the ratification of environmental treaty (Roberts, Parks, and Vasquez 2004). Anderson et.al (2017) suggest that government leaders introduce policies that tend to favorable to the domestic public for their political survival. If the audience is in favor of environmental protection, the leaders propose such policies accordingly.

H6: China's turn to a more stringent climate policy was influenced by the changes in the domestic public opinion.

3.2Methodology

3.2.1 Process Tracing

In order to identify the causal relationship between established factors and China's climate change policy, we use process tracing as our research method. Process tracing is a method that has been used in the field of qualitative research, it involves the study of causal mechanisms that link antecedents with outcomes (Vanhala 2017). In recent years, it has been broadly used in the study of environmental politics (Beach and Pedersen 2013). In order to apply process tracing to our research, we need to first understand what causal relationship, or what Beach and Pederson call "causality", means as well as how can process tracing explore the causality between independent variable (X) and outcome (Y) in a way that is different from other case study methods.

What do we know about causality? Currently, there are two aspects that dominate the ontological debate on causality in the field of social sciences (Beach and Pedersen 2013). The first is based on the work by Hume and Hempel, which is focused on the connection between two explanatory factors as departure to understand causality. Three criteria developed by Hume for the causal relationship are: (1)X and Y must be

contiguous in space and time; (2) X must occur before Y; (3) a regular association should exist between X and Y (Vanhala 2017). An example would be, there is a common association between government to adopt stringent regulations on pollution control (X) and a significant improvement on air quality (Y). Thus, there will be a causal relationship between pollution regulation and air quality (Vanhala 2017). However, Beach and Pederson argue that, in this way, the actual causal mechanism on how regulations lead to better air quality is black-boxed and thus propose a second perspective in understanding causality (Beach and Pedersen 2013).

Beach and Pederson's work emphasis on the causal mechanisms in the sense of why and to what extend can X produce Y. The causal mechanism between independent variable and the outcome is described as *"…a theory of a system of interlocking parts that transmits causal forces from X to Y*" (Beach and Pedersen 2013 p 29).

"*The defining feature of a mechanismic ontology of causation is that we are interested in the theoretical process whereby X produces Y and in particular the transmission of what can be termed causal forces from X to Y.*" (Beach and Pedersen 2013, p 25)

Our research adopts the definition of causality from Beach and Pederson and take it as the core of process tracing. According to Beach and Pederson, "*the essence of process tracing is that scholars want to go beyond merely identifying correlations between independent variables (Xs) and outcomes (Ys)*" (Beach and Pedersen 2013, p 1). Thus, process tracing method is a valuable to study causal mechanisms in a single case research design (Beach and Pedersen 2013).

How should we use process tracing in practice? Before we integrate the method to our case study, we should understand the three variants of process tracing that are addressed by Beach and Pederson: theory-testing, theory-building and explaining-outcome. The differences among those three variants are "*whether they are theory-based or case-centric, the types of inferences being made, how they understand causal mechanisms, and whether and how they can be nested in mixed-method designs*" (Beach and Pedersen 2013, p 3). The first variant is theory-testing process tracing, which is a deductive theory that tests whether the proposed causal mechanism based on existing

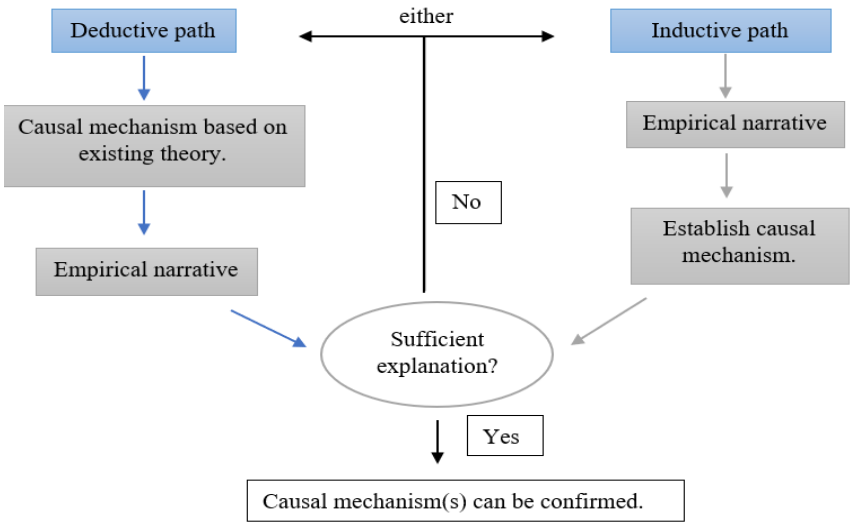
theory is presented in a given case. In other words, it tests whether the proposed mechanism is working as expected in the case. One of the drawbacks of theory-testing is that it is not able to prove whether the proposed mechanism is the only factor that leads to the outcome. The second variant is theory-building, which aims to build a theoretical explanation based on empirical evidence. The third variant is explaining-outcome process tracing, which aims to explore the possible explanation of a puzzling outcome in a specific historical case. The purpose is to "*craft a (minimally) sufficient explanation of the outcome of the case where the ambitions are more case-centric than theory-oriented*" (Beach and Pedersen 2013 p.3). With the three variants in mind, we are able to organize what we have in practice and what we preach, since these variants have significant methodological implications for research design when we take process-tracing as a single method (ibid).

Beach and Pederson also provide guidelines on working with the three variants in process tracing. As our research is less relevant to theory-building, we thus pay attention to theory-testing and outcome-explaining. In theory-testing process tracing, "*we know both X and Y and we either have existing conjectures about a plausible mechanism or are able to use logical reasoning to formulate a causal mechanism from existing theorization*"(Beach and Pedersen 2013, p 14). The first step of theory-testing is to conceptualize a causal mechanism between X and Y based on existing theory. Then the theorized causal mechanism needs to be operationalized and translated into case-specific predictions. In the last step, we collect empirical evidence that can be used to make causal inferences, which "*updates our confidence in (1) whether the hypothesized mechanism was present in the case and (2) whether the mechanism functioned as predicted or only some parts of the mechanism were present*" (ibid). However, theory testing is not able to test the explanatory power of competing mechanisms against each other.

Compared to theory-testing process tracing, the outcome-explaining is more widely used among researcher to explain certain outcome. The outcome-explaining can be also used as a powerful complement to theory testing. In theory testing, we cannot confirm that if the proposed mechanism is sufficient, inferences are made only in regards of whether the predicted mechanism exist in the reality case or not, whereas outcome-explaining is case-centric and pays closely attention to historical scholarship.

The ultimate explanations often have theoretical ambitions that reach beyond the single case. Theorized mechanisms can be therefore regarded as heuristic instruments with the function of building the best possible explanation for a certain outcome (Humphreys 2011; P. T. Jackson 2011). Due to the iterative nature of outcome-explaining, there are two paths that we can choose in utilizing the method to our study: deductive and inductive paths, as presented in figure 2. The deductive path is similar to the steps under theory-testing, in which the first step is to conceptualize a theory as a mechanism, then empirical tests are implemented and evaluated against the empirical record. Finally, we assess whether a sufficient explanation has been identified (Beach and Pedersen 2013).

Figure 2 Illustration on outcome-explaining process tracing



As a matter of fact, in most outcome-explaining research, existing theory may not be regarded as a sufficient explanation. This would lead to a supplement part of research, in which we can either choose the deduction path again or the inductive path. For the former, alternative theories should be tested to see if they can be sufficient explanation. If the inductive path (grey arrow in the figure) is chosen in the second stage, we need to find empirical evidence to build a better explanation. This path is more of a bottom-up type of analysis, in which we use empirical findings as the

foundation to build plausible explanations and causal mechanisms that produce the final outcome (Beach and Pedersen 2013).

3.2.2 Detailed Method

Dependent Variables and Independent Variables

The dependent variable for this study is China's policy on climate change. Integrated with process tracing method, the outcomes (Ys) should be China's climate change policy and China's stances in international climate change negotiations nowadays. As stated in previous chapter, China's climate policy has experienced significant change both domestically and internationally. Our primary research goal is thus to understand why China has adopted certain stances on climate issues that are different from the policies a decades ago when climate change first appeared in the national policy agenda. As we trace the process of the policy development, we also establish factors that are able to explain the change in policy agenda-setting and try to understand the question: What are the causal relationships between the established factors and the policy outcome in reality?

Subsequently, the independent variables (Xs) should be the explanatory factors which we have established based on existing theoretical frameworks and our empirical findings. Those factors including national perceived ecological vulnerabilities and climate change abatement cost which are well established in the interest-based explanation. As we mainly use the interest-based approach to examine domestic factors that influence the policy outcome, we also need to take external factors into consideration. This brings our attention to international norms, which also serves as independent variable inspired by constructivist thought. Other independent variables include the domestic policy process and the role of non-state actors in order to make our explanatory factors as sufficient as possible.

Detailed Method

With the methodology in process-tracing comprehensively discussed in the previous session, we now present the detailed method of conducting process tracing to

our single case study in China's climate change policy. Namely, we define what process should we trace, how do we integrate the established factors into practices that relate to our selected case and which process-tracing variant we will use in our case study.

Since causal explanations relies on fine grained historical analysis and a wide range of evidence, we trace the process of China's climate change policy from early 1990s to nowadays and examine the major changes in the policies. We found out that China has experienced a positive change in its mitigation action and the turning point is the mid-2000s. A remarkable change is that China submitted its INDC in 2015 in reducing its total CO2 emission and launched a series of domestic policies in reaching this target. The evolution of China's climate change policy will be presented in Chapter 3. Therefore, our established factors, either based on existing theories or empirical findings should be plausible to explain the observed policy change. As some of the established factors are based on existing theories including the interest-based theory and constructivism and others are rather from empirical evidence as supplement explanatory factors, we adopt outcome-explaining as our method to uncover the possible sufficient causal mechanisms that lead to the major policy change.

Generally speaking, it is not an easy task to integrate the existing mechanism, which is conceptualized from a theory, into practices of our selected case, since the research object of the original theory might be different from our research object. However, in order to make our analysis as accurate as possible, we follow the distinctions of studying environmental politics that environmental problems and governance should be linked to nature (Hochstetler and Laituri 2014) and that requires us to cooperate our study with physical and natural sciences (Vanhala 2017). For our established factors regarding ecological vulnerability and climate change abatement cost, we decide to quantify them in a way that should be more suitable for China, since there are abundant indicators which can be used to decide whether the vulnerability and abatement cost is low or high. Besides, China's ecological vulnerability has already proved to be high by many research organizations worldwide. However, if we only have the empirical data that proves the vulnerability is "high" without knowing its variation trend, it would be difficult to confirm if vulnerability as an explanatory factor can have certain impact on the policy outcome or not. We will use the same tactic in regards of

the measurement on climate change abatement cost and policy stringency. The detailed explanation will be presented in Chapter 5.

This does not mean that we will totally rely on the quantified data throughout the whole process-tracing, we will combine the empirical findings with the data in order to have the whole picture of the changes in the established factors and policy outcomes. In doing so, we are able to observe that if a change or unusual movement happens on climate change policy, whether there are also changes in the explanatory factors, for instance, the vulnerability has experienced a drop, in the same time frame. If so, we can further examine how has this factor triggered out the change through further collection of evidence. If not, this factor might not have the explanatory power.

For outcome-explaining, the core is about iteration. This means that first we will have explanatory factors based on existing theories following the approach of theory-testing. However, after going through the first path of outcome-explaining, we cannot make sure that the established factors are the only decisive factors for the policy formation. Due to the limited length of our study, we will not choose the first deductive path again as illustrated in figure 2. Therefore, we will go for the second path to find other plausible explanations in an inductive way based on our empirical findings in the historical mapping of the policy change.

The question thus would be: how should we establish new factors based on empirical findings? In the study of environmental politics, except combining environmental study to natural sciences, it is also important for us to pay attention to (1) Causality over multiple levels of government and (2) the wide range of actors in the decision-making process (Vanhala 2017). The first requires us to pay attention to the interactions among domestic political actors, since an environmental problem rarely coincides only with one agency that is responsible for addressing it (Steinberg and VanDeveer 2012). "*Many environmental problems and their solutions are complex and not fully understood: policies that deal with one problem may have unintended, damaging consequence elsewhere*" (Vanhala 2017, p 12). The wide range of actors indicates that non-state actors such as NGOs and corporations can also play as decisive factors or even pushers in the policy-making process through addressing environmental problems to the government and public (Vanhala 2017). Therefore, when we try to

establish factors other than theoretical based ones, we should pay closely attention to the above-mentioned aspects.

The source of the empirical evidence varies. For international sources, we mainly use books, published journal articles and news in the field of Chinese environmental politics and China's climate change policies. As the focal-point of this single case study is China's domestic policy formation, we will also refer to the document on official national communication published by the government in order to help us understand the policy agenda-setting. Since English literature on China's internal political process is limited, we will investigate policy text and government report for the relevant data regarding climate change though the official website of MEE.

4. Evolution of China's Climate Change Mitigation Policy

In this chapter, we have a historical mapping of China's climate strategy from the early 1990s when environmental issue was barely seen in Chinese political agenda until today. It also serves as our empirical finding on policy change. It will focus on China's position on climate key issues and domestic policies with main focal point of this chapter is China's domestic policy agenda-setting. Due to limited length of the study, it is not plausible to cover all the policies that related to environmental protection. Therefore, we will mainly illustrate policies that have been adopted to implement international climate change mitigation agreements, those includes energy efficiency, energy source diversity and pollution-related emissions. Together, those policies are categorized as "Climate Change Mitigation Policies" in this study. We use process-tracing to explain and assess the policy outcome in each historical period and to trace how problems and political attention interact with each other that finally leads to certain policy outcome. Institutional development will be covered as well so that we could examine how the interactions among different level of governmental actors can influence the policy outcomes. This chapter also serves as the contextual background of our analysis.

The historical period is divided into four different period based on China's involvement in different phases of international climate regime. The first period is the pre-Kyoto phase from 1988 to 1997 in which central planned economy is widely applied in China and the 8th FYP was implemented, which is the first ever governmental document that mentioned climate change. The second period is from 1998 to 2005, in which China has signed the Kyoto protocol and international pressure on legally binding commitment has entered into China's political agenda. The third period is from 2006 to 2015, in which China was undergoing its deepening economic reform and has been acting proactively to promote mitigation policies. The fourth period is from 2016 onwards, in which the 13th FYP was launched and China has signed Paris agreement which is a remarkable milestone of China's climate change behavior. Following the chronological mapping of China's stances on climate change, we describe changes and continuities that help us to further identify causal relationships within specific periods.

4.1The Pre-Kyoto Phase: 1988-1997

When climate change first appeared on international agenda in the 1980s, China seemed to be hesitated to address environmental issues. Rather, China in the 1980s was struggling with natural resource deficiency for almost three decades and was advocating a resource-intensive growth as its main development strategy (Schroeder 2008).

During the 1st FYP period (1953-1957), China's priority was the rapid development of heavy industry. Although China had consciously paid attention to the industrial layout and took preventive measures, the "five small industries" program were implemented in 1970, in which Chinese government provided major support fund of 8 billion RMB in local coalmine industry, iron and steel industry, cement industry, chemical fertilizer plant and Agricultural Machinery Plant in order to compensate the industrial production shrinks caused during the Cultural Revolution (Zheng, Peng, and Gao 2019). Consequently, environmental problems were gradually emerging.

As soon as climate change became a major issue on the international stage, China did give its rapid reaction by establishing coordination group if its own climate policy (Bjørkum, 2005). In 1988, the Intergovernmental Panel on Climate Change (IPCC) was created by the World Meteorological Organization and the United Nations

Environmental Program (UNEP). In the same year, China established its very first inter-agency group in order to coordinate with the global scientific efforts related to IPCC. The group was found by Environmental Protection Commission of the State Council, which was later expanded to the National Climate Change Coordination Group (NCCCG). This group gathered four important Chinese bureaucracies: the State Science and Technology Commission (SSTC), which is in charge of response strategies. the National Environmental Protection Agency (NEPA), which is responsible for environmental impact assessment. The State Meteorological Administration (SMA), which has the leading role in scientific research of environmental topics and the Ministry of Foreign Affairs (MOFA), which had the main task of leading Chinese delegation to the international negotiation table (Economy 1994).

In 1988, substantial administrative reforms also took place. The Ministry of Energy (MOE) was reestablished. The National Environmental Protection Agency (NEPA), which was initially established in the 1970s, was upgraded to a vice-Ministerial agency (L. Liu 2011).

In 1990, the First Assessment report was released by IPCC, which marked the beginning of the scientific discussions on climate change. Accordingly, the government has established the National Climate Change Coordination Group (NCCCG) under the supervision of the Environmental Protection Commission of the State Council. The coordination group was chaired by the State Councilor and the minister of the State Science and Technology Commission (SSTC). The essential agencies were the aforementioned four agencies for IPCC tasks plus two new ministerial agencies: the MOE and the State Planning Commission (SPC). NCCCG has its secretariat within the SMA. The main task of NCCCG was to address critical issues for China on the international negotiation table, among which the most significant would be scientific uncertainties, the connection between GHG reduction and domestic energy and economic development and the general position of China in international climate change negotiations.
(L. Liu 2011)

At the United Nation Conference on Environment and Development in Rio in 1992, Premier Li Peng clearly expressed China's stance that the situation that the goal

of environmental protection is in conflict with China's economic development goal, the priority should be economic development (Stensdal 2014).

"*The core elements of China's initial negotiation position included an emphasis on the major scientific uncertainties concerning climate change; focus on the protection of national sovereignty with an emphasis on developing countries' right and need to develop and thus not be committed to take on measures in conflict with development or conditional aid; the historical responsibility of industrial countries; and transfer of new and additional funding and technologies to developing countries*." (Hatch 2003, p 50)

In 1992, the United Nations Framework Convention on Climate Change (UNFCCC) was signed, which advocates international cooperation on GHG emission controlling, national policies and capacity building on adaptation to the impacts of climate change with the principle of "Common but differentiated responsibilities and respective capabilities" (L. Liu 2011). China and its developing county allies (G77-China) strongly supported the notion of differentiated obligations between industrialized countries and developing countries, which fitted very well in Chinese interests, given its rapid growth of economy and large GHG emission.

Soon after the UNFCCC came into force in 1994, the first Conference of Parties (COP) to the UNFCCC launched in 1995 with the core element on the proposal of a negotiating protocol. At first, China was skeptical to the new proposal regarding legally binding commitments and stated that it will not be interested in negotiating until the Annex I countries have fulfilled all of their commitments within the Convention. (Bjørkum 2005)

Domestically, China was experiencing its first economic reform from a central-planned economy to market economy. In 1993, a "Socialist Market Economic System" was established, which has led to a rapid economic boom latter. The government had to adopt some retrenchment policies to ensure an economic soft- landing. Consequently, the need for restructuring the financial system was adopted in 1993, which was a significant milestone for economy decentralization. At the same year, the State Economic and Trade Commission (SETC) was established and the MOE was abolished.(L. Liu 2011).

Another change during this period is the introducing of the four working groups of NCCCG with consistency of the member agencies as in IPCC tasks. The working groups were in charge of tasks related to international climate change regime. They were: (1) The working group for scientific assessments, chaired by the SMA and Chinese Academy of Sciences (CAS); (2) The working group for impacts and response strategies, chaired by SSTC and NEPA; (3) The working group for economic analysis, chaired by SPC and Ministry of Electric Power; (4) The working group for negotiation, chaired by MOFA and SSTC. This top-down working group structure can be taken as the foundation of China's institutional arrangements on climate change.
(L. Liu 2011)

In December 1997, the Kyoto Protocol was adopted during the COP3 in Kyoto. The protocol has set goals for Annex I countries (industrialized countries) to reduce their GHG emission by an average of 5.2% below the 1990 level by 2012. Notably, there were three "flexible mechanisms" in the Kyoto Protocol: Clean Development Mechanism (CDM), Joint Implementation between Annex I countries and Emission Trading.

At first, China was skeptical to all the mechanisms and proposed to delete the article on emission trading. The breakthrough of the negotiation was the appearance of G77-China, when a group of developing countries including China declared that the current commitment was inadequate and thus the effort from industrialized countries was urgently needed to combat the climate change. Thus, a general recognition of addressing climate change is formed by Chinese negotiators together with their developing country allies. Together with the G77, China opposed any proposal that requires commitments from developing countries, stating that it would be a violation of the "common but differentiated responsibility" principle. Consequently, there were little emission reduction targets set for developing countries. Generally speaking, the developing countries were proved to be quite influential in the Kyoto process (Bjørkum 2005).

In regards of the domestic environmental problem in this period, within the background of massive industrialization, there were not a great deal of environmental

problems recorded in this period. By 1989 China was experiencing economic reforms in a large scale, namely from central-planned economy to a market-based economy, aiming to reduce the poverty. The economic growth was fast during the period 1989-1995, with more than doubled GDP in 1995 compared to the data in 1989 (World Bank 2021). Nevertheless, there is a price to pay behind this rapid economic growth: a sudden increase in GHG emissions and an inevitable damage on environment. According to Annual Government Report on environmental status in 1995, the environmental pollution has the trend to spread from urban to rural areas, the scale of ecological damage was enlarging (MEE 1995).

The major environmental problems that related to industrial reform are coal smog pollution, acid rain, water pollution, industrial waste gas, and industrial wastewater, which consequently caused environmental pollution accidents and economic losses. A total number of 570 fishery water pollution incidents occurred in 1995, losing 37,000 tons of aquatic products and causing fishery economic losses of 560 million yuan. Environmental pollution is also an important cause of death of residents. In 1995, the mortality rate of malignant tumors among Chinese residents was 128.58 per 100,000 people, accounting for 21.85% of the total deaths. The respiratory system mortality rate was 92.54 per 100,000 people. As a matter of fact, malignant tumors and respiratory diseases are closely related to the environmental pollution. (MEE 1995)

4.2 From Global Issue to National Interest: 1998-2005

During this period, climate change gradually appeared in national policy documents. It was also the stage of adjustment and development for China's climate change mitigation strategy. From the late 1990s to early 2000s, political attention was paid to national economic development to a large degree. Economic performance was growing at a rapid speed in China, which consequently brought China more wealth and also increased demand for natural resources and energy. In order to adapt to the new market economy, a new round of administrative reform launched in 1998, which lead to a more powerful restructuring of governmental institutions (L. Liu 2011).

During this reform, the number of ministries dropped from 40 to 29. The SPC was restructured to State Development and Planning Commission (SDPC), the NEPA was upgraded to the State Environmental Protection Agency (SEPA), which is a ministerial-level agency. Many ministries related to industry were merged to industrial bureaus report directly to the State SETC (L. Liu 2011). The new round of economic reform has also led to the boom in small industrial associations, which existed both at national and provincial level and were usually in form of government organized non-governmental organizations (GONGOs). They were not only the service delivery agencies of the government, but it also became the place where gathers governmental officials who was resigned during the massive reform (Wu 2003).

Following the institutional reform, the inter-ministerial climate change coordination committee was also restructured in 1998 with the aim of building higher capacity of climate change related policy coordination. The new committee was renamed as the National Coordination Committee on Climate Change (NCCCC), which is chaired by SDPC. Other key actors include the Ministry of Science and Technology (MOST), the Ministry of Foreign Affairs (MOFA), the SMA and the SEPA. The Secretariat of the NCCCC in within the department of the regional Development of the SDPC. The new form of the committee marked the change of policy maker's perception towards climate change, it went from purely scientific to a domestic development issue. (L. Liu 2011, Wang 2009)

On the international perspective, the Kyoto protocol was signed in 1997 during COP 3, but there were remaining questions how to secure their ratification (Najam, Huq, and Sokona 2003). At the initial phase, China had the position that any compulsory emission reduction commitment is inappropriate for developing countries given its per capita emission is much lower that the world average level. Notably, China had its tactic in allying with the G-77 Group to emphasis their joined negotiation on all major issues. However, one cannot say that China's position was absolutely against the protocol. Take the CDM as an example: on the one hand, China stated that the CDM would be an excuse for developing countries to escape from their duty and also has the potential to exploit the developing countries. On the other hand, China started four Activities Implemented Jointly projects with Japan and Norway, which can be seen as China's

preparation for the CDM projects. In conducting this, China has collected project management experience and gained practical methods (CCChina 2002).

One of the important breakthrough during this period was China's attitude towards the CDM which was proposed in Kyoto Protocol. In COP-6, China called the CDM a "Win-Win" mechanism which should be beneficial for both developing and developed countries (Bjørkum 2005). China ratified the Kyoto Protocol in 2002 by allowing abatement activities implemented in China and integrating CDM into Chinese Law. Soon after the ratification, several capacity building projects were approved by NCCCC, most of the projects are CDM oriented and financially supported by international donors and foreign governments through bilateral agreements. The NDRC and the MOST discussed with the sponsors to distribute the support evenly, so that these projects could focus more on the emission reduction in different sectors and regions. Some of the trial projects even became real CDM projects (L. Liu 2011). The so called "CDM Measures" was jointly issued in 2005 by NDRC, MOST and MOFA.

Regarding domestic problems in this period, most of them are related to energy consumption and resource scarcity since the political attention was largely focused on national economic performances. As a matter of fact, the relationship between its GDP growth and energy intensity was not well balanced. China has increased its GDP significantly with quadrupling it, it has doubled the energy consumption between 1980 and 2000. As a matter of fact, the energy demand growth rate was higher than that of GDP (L. Liu 2011). The main reason of this increasing energy demand lied in the share of GDP provided by heavy industry, which was economic gain-oriented (L. Liu 2011). In 2002, China has officially entered into the World Trade Organization (WTO). in the same year, the Foreign Direct Investment (FDI) in China was 52.7 billion US dollars with the increase of 12.6% compared to the previous year. Consequently, China has become the largest economy entity that attracted FDI and its GHG emission has increased sharply as well. During the period from 2001 to 2005, China's share in global GHG emissions increase from 12% to 19.5%, approaching the figure of the US, the largest GHG emitter at that time (World Bank 2021).

The leadership has realized the importance of adapting to the new economic and social model. Therefore, in 2003, a new round of administrative reform started in

cooperate with the entry into the WTO. The SETC, which was responsible for industrial sector activities, was merged into the National Development and Reform Commission (NDRC, formally known as SDPC). In 2004, the government launched the advocacy of "building a resource-efficient and environment-friendly society", which specifically expressed the concerns regarding natural resources and environmental issues in line with sustainable development. This advocacy then led to the launch of policies and initiatives in the field of energy mix and energy efficiency. Correspondingly, the domestic climate change coordination committee was expanded, with its members from 7 to 12.
(L. Liu 2011)

Although environmental protection cannot be seen as national priority during this period, it became a domestic issue on national political agenda, several climate-change groups were set within China's political system. One of the most significant change happened during this reform was the administrative restructure in dealing with CDM projects. In 2004, the National CDM board was established under the NCCCC, co-chaired by the NDRC and the MOST. The NDRC was also responsible for approving CDM projects and coordinating international cooperation. In mid-2004, the NDRC, MOST and MOFA jointly promoted the Interim Measures for Operation and Management of Clean Development Mechanism Projects in China. This move marks China's positive feedback to the mechanisms in the Kyoto Protocol (L. Liu 2011). Further flexibility can be observed in international cooperation on climate change. For instance, in July 2006, China launched "Asia Pacific Partnership for Clean Development and Climate Change" with the US, Australia, Japan, South Korea and India. The six countries agreed to make efforts on developing and transferring technology to reduce GHG emissions (Asia-Pacific Partnership (APP) 2010). In 2007, China has also actively engaged in the Major Economies Meeting on Energy Security and Climate Change.

To sum up, the policies in this period had the trend of decoupling economic growth and environmental deterioration (Schroeder 2008). Although the 9th and 10th FYP reflected China's resolution to combat climate change and to reduce the GHG emissions, they were directly targeting to domestic problems such as air and water pollution and energy shortages.

4.3 Climate Change as a National Priority: 2006-2015

In February 2005, the Kyoto Protocol came into force, which was a milestone for the global climate change mitigation effort and marked a significant step for Annex I countries to fulfill their legally binding targets in reducing GHG emissions. As a party to the Kyoto Protocol, China has been acted proactively in international climate change regimes. As a matter of fact, although the Chinese delegation engaged actively in international negotiations during the post Kyoto regime, including COP13 in Bali and the welcomes the Bali Roadmap, it still emphasis its lower per capita GHG emissions as well as its unique development stage of industrialization and urbanization.
(L. Liu 2011)

Although the world's economy was hit by the financial crises during 2007-2009, China has managed to maintain its economic growth, which has in turn led to more GHG emission. Consequently, China became the world largest Carbon dioxide emitter since 2007 (OECD 2021). With this serious situation, Beijing decided to pay great political attention and thus gave priority to environmental degradation as well as to the climate change consequences (Stensdal 2014). Therefore, the political attention has increased dramatically towards the CDM since 2006, as the CDM can not only attract FDI in climate change related projects domestically, but it also provided China a positive image on climate change internationally, so that China could become the leading country in carrying out CDM projects (L. Liu 2011). In 2005, China set up priority types for CDM projects: (1) Development of new and renewable energy; (2) Efficiency improvement and (3) Methane recovery and utilization. Meanwhile, the approval process for CDM projects has been also adjusted, making the project development more efficient. Since 2007, China has become the leading country in hosting CDM projects (L. Liu 2011).

Domestically, the government was dedicated to keep the balance between economic growth and the increasing energy use as well as carbon emissions. Consequently, a great deal of domestic policies and initiatives were launched so that the China's industrial structure could be renewed and thus lead to higher energy efficiency. The "energy consumption per unit of GDP" was taken as a key indicator to

measure the efficiency of those policies. To be specific, China set up concrete goals regarding energy consumption. In 2005 China planned to increase the use of the renewable energy from 7% to 15% of the total energy production until 2020. In 2006, China set up the goal of reducing energy intensity by 20% from 2005 levels in the 11th FYP period (2005-2010). Meanwhile in 2007, China has finally launched the National Climate Change Program, which represented the consensus of China's top political leaders on the topic of climate change. Although the program did not set up clear quantitative goals and deadlines regarding GHG reduction, it attempted to integrate existing national energy policies to the 11th FYP.
(L. Liu 2011)

One of the most significant events in this period is the launch of the" Scientific Development Perspective", which was initially proposed by Chinese president Hu Jintao in 2003 and designed for overall national economic development, resource management and environmental protection (L. Liu 2011). Following the idea of Hu, a National Forum on Population, Resources and Environment was established in 2004. The Forum proposed the National Green Economic Accounting Method that has the function of evaluating local economic performance after reducing its resource consumption and environmental losses (Mu 2018). In 2005, the State Council issued the Notification on the Immediate Priorities for building a Conservative-Oriented Society. In the same year, the Decision to implement the Interim Provisions on Promoting Industrial Restructuring was issued. A number of national reports have been published , reflecting the inter-ministerial cooperation on sustainable development and climate change strategies (L. Liu 2011).

In 2008, a new round of ministerial elevation has begun, with the aim to reduce the cost of policy making and strengthen the implementation of the regulations. During this elevation, several ministries were integrated to form "Super Ministries", which were in charge of industry, transport, housing and construction, human resources and environment respectively (L. Liu 2011). Among them, the SEPA was escalated to a higher bureaucratic position with enforcement power – the Ministry of Environmental Protection (MEP) (Mu 2018).

Institutions in charge of energy consumption and emission reduction were reshuffled to in order to have an advanced the policy coordination. In 2007, the NCCCC was restructured and renamed as "National Climate Change Leading Group (NCCLG)", which is a department directly under the State Council, with China's Premier Wen Jiabao as its head and NDRC Climate Change Department as its secretariat. Notably, the group members of NCCLG were commissioners and ministers from various ministerial agencies. In doing so, the NCCLG has the highest level of policy coordination organ in regards of energy conservation (L. Liu 2011). This round of reform reflected that the government has taken three policy domains, namely energy saving, pollution reduction and climate change into national priority and they share the same level of priority (Qi et al. 2008).

Also starting from 2007, climate change task forces and province level policies has been established among local governments in a traditional top-down approach. Several capacity building projects on mitigation and adaption activities have been launched in some provinces, under the supervision of the central government. One of the well-known projects was the Program for Climate Change Mitigation and Adaptation in China, first carried out in 7 provinces and later expanded to 20 more provinces later in 2008 (L. Liu 2011). As a matter of fact, controlling GHG emissions was sometimes coherence with local interests, improved energy efficiency is also beneficial to the local economic growth (Qi et.al 2008).

As stated in the policy White Paper on climate change, "*China has adopted proactive policies and taken active actions to mitigate climate change*". A brief summary of domestic policy change is as follows:

(1) Adjusting the Economic Structure to Promote the Optimization and Upgrade of the Industrial Structure; (2) Striving to Save Energy and Improve Energy Efficiency; (3) Developing Renewable Energy and Optimizing Energy Mix; (4) Developing Recycling Economy to Reduce Greenhouse Gas Emissions; (5) Promoting Tree-planting and Afforestation Campaign and Increasing the Capability of Carbon Sequestration; (6) Intensifying R&D Efforts to Respond to Climate Change.
(State Council 2008)

During this period, China also managed to set concrete goals in reducing Carbon intensity in order to build a "low carbon society". Right before COP 15 in Copenhagen, Chinese Premier Wen declared that China ought to reduce its carbon GDP intensity (CO2 emissions per unit of GDP by 40%-45% by the end of 2020 compared to the figure in 2005. Similarly, the renewable energy share needs to be increased to 15% out of the total energy consumption by 2020 (GOV 2009). According to China's official data, by the end of 2018, China had reduced its carbon intensity by 45.8% compared to 2015 level. Therefore, the goal as per Copenhagen Accord in 2009 was fully achieved ahead of the schedule (G. M. Heggelund 2021).

In the Copenhagen Climate Summit in 2009, China's Premier gave a speech to express China's resolution in engaging in global cooperation in climate change mitigation:

"*Finally, I want to emphasize that the national goal in reducing GHG emissions is a voluntary action taken by China in accordance with domestic conditions. The target set-up should be responsible to the Chinese people as well as all humankind. It does not attach any conditions and is not linked to any country's emission reduction targets. We believe in words and deeds, no matter what results are formed during this conference, we will work hard to achieve or even exceed this goal.*"
(GOV 2009)

Another important turning point in this period is the shift of governmental approaches on climate change. When Xi Jinping became China's president in 2013, he gave much attention to market based and collaborative approaches instead of direct government regulations on environmental management. In 2013, a central leading group for comprehensive deepening reform was established with two major tasks in environmental sector: inter-agency collaboration in environmental management and the market-based instrument on environmental protection. The former should be associated with multiple government departments such as tax, financial, pricing and purchasing agencies in public sector. Those departments are encouraged to work together in formulating climate change related policies. The latter means that political attention should be shifted from local municipalities to large industrial enterprises. Through this approach, the MEP should be actively negotiating with the major industrial enterprises

in China, so that voluntary agreements on energy-saving and emission reduction could be signed. Enterprises with such voluntary agreements could then benefit from government policies, such as tax reduction and easy accesses to bank loan.
(Mu 2018)

Public engagement became significantly active during this period. International ENGOs such as Greenpeace and the Climate Group opened offices in China. Chinese local NGOs created the Climate Action Network. One of the key projects should be the Global Environment Institute's Identifying Opportunities and Key Stake Holders to Mitigate the Energy and Environment Crises in Southern China in 2007. This project has promoted the collaboration between research centers, independent enterprises, government organs, financing bodies and ENGOs in order to find market-based solutions to increase the energy efficiency. What's more, extreme natural phenomena and disasters were increasingly reported by the media and scientists. The political attention was shifted gradually from adaptation and capacity building to future natural disaster management.
(Stensdal 2014)

One of the most severe environmental problems that attracted most of the political attention during this period should be the haze weather. While the problem of industrial water pollution and abrupt pollution still exists, the policies put more effort on controlling the air quality. According to government report in 2012, almost every city has discharged air pollution which exceeded the standard amount to a large degree. The MEP has signed air quality responsibility contacts with cities. However, until 2013, only 4% of the contact cities managed to fulfill the targets set in the contract. In December 2013, China has experienced the most severe haze weather in history. The heavy haze started from north China centered in Beijing to the south and lasted for 15 days. Soon after the incident, although Beijing launched "Defending the Blue Sky" initiative, there were only 100 days of "blue sky" in 2013 as reported. The domestic air pollution problem seemed to have more priority than the growing pressure from international community on climate change and GHG emission reduction.
(Mu 2018)

4.4 After 2016: More Ambitious Climate Policy in Post-Paris Period

In December 2015, 195 countries gathered in Paris with the aim of creating a new global climate change agreement under the UNFCCC. The Paris Agreement can be seen as the very first universal and legally binding global climate pact that regulates concrete goals to limit the global warm to well below 2° C and request the parties to dedicate to limit the world temperature increase to 1.5° C by the year 2100 (UNFCCC). The main reason of why the Paris Agreement was accepted by different Parties of various interests in such a short time is the recognition of the principle "Common but differentiated responsibility", that serves as a balance between the developing countries with the interest in their own economic development and the interest of developed countries (Ma 2016). It was the very first time that China's top leaders attended for the international conference on climate change, which reflected the acknowledgement of the necessity of climate change by China. It also approved China's resolution to build a low-carbon society (Y. Gao 2016).

The year 2016 witnessed a significant step forward for China in combating climate change. With the 28% global share of GHG emission, China took proactive position in global climate change mitigation effort by ratifying the Paris Agreement. In doing so, China has reconfirmed its leading position and responsibility (World Resource Institute 2016). The Paris Agreement is obviously important for China in regards of its national FYP. China's sectoral 13th FYP for National and Economic and Social Development (2016-2020) has the goal to "Actively Engaging Climate Change", which can be extended in three key areas:

1) "Efficiently controlling GHG emission. This mainly targets the carbon emission of the electricity, steel, construction, and chemical industries; piloting various low-carbon projects; establishing a unified national carbon emissions trading scheme (ETS); improving carbon emission standard system; and promoting low-carbon technology and products. 2) Actively adapting to climate change. This refers to the establishment of technical standards for urban and rural planning, construction of infrastructures, and distribution of productivity; enhancing climate change observation

and alert system. 3) Widely undertaking international cooperation. This mainly refers to the importance of global collaboration following the principle of "common but differentiated responsibilities" with an emphasis on Intended Nationally Determined Contributions (INDCs); participating in climate change negotiations; deepening multilateral and bilateral conversations and concrete cooperation; and support of other developing countries' capacity building via a China South-South Climate Cooperation Fund."
(Xinhua Agency Report in Ma 2016, p 56)

Moreover, China submitted its INDC with the goal of peaking emissions "around 2030 and making best effort to realize an early peak" and a carbon emission intensity by 60%-65% of 2005 levels (NDRC 2015). The sectoral FYP for Energy Development has set an even clear binding target of 58% or below on the coal share in energy consumption. It turned out that China is capable to achieve this goal. By the end of 2019, the coal consuming accounted to 57.7% of the total energy consumption (National Bureau of Statistics 2020). In the similar vein, the 13th national FYP was published after COP 21. Referring to the Paris Agreement, the plan emphasized the need to strengthen the compliance work and to be prepared for domestic implementation and set objectives for energy consumption and emissions (G. M. Heggelund 2021).

After COP 21, the political attention was strongly focused on air pollution. Policy makers and experts also agreed to reduce the coal consumption, since coal is perceived as the most reliable energy source by China and energy security remains a dominate factor. As a matter of fact, China plans to achieve the Paris-related 13th FYP goal mainly through air pollution control and reducing coal consumption. Both of the sectors are dealt centrally (G. M. Heggelund 2021). Concrete goals were set in the air pollution action plan (2013-2017), this was then followed by the three-year air pollution action plan (2018-2020) with the aim to bring back blue sky (Legal Daily 2018). One of the tasks of the plan is to improve the air quality in big cities and that is also why China decided to switch to natural gas, since natural gas is generally taken as a bridge fuel until more renewable sources can be found and used (G. M. Heggelund 2021).

Beijing also promoted the National Emissions Trading System (ETS) as one of the powerful policy tools in reducing its GHG emissions. In 2017, a National Carbon Market was established and it should start with the power sector, as it is the largest emitting sector. This was followed by a two-year pilot phase. The real target-setting and the implementation should happen in 2020. Recently, a test of the national registry in Hubei province was performed smoothly. The MEE has approved the "Administrative Measures for Carbon Emission Trading (Trial)" for the launch of ETS in January 2021. This measure is officially entered into force in February 2021, which should be the legal base for the national carbon market and would mark a big step forward in realizing the carbon market in China.
(G.M. Heggelund 2021)

Notably, the publication of the 13th FYP also witnessed an even closer relationship between central government and local governments. Since 2014, the decision-making process has the trend to decentralization, the central government gave provinces more autonomy to make investments and drafting specific policy measures (Heggelund 2021). Right after the publication of the 13th FYP, a number of local level plans in dealing with climate change and cutting energy consumption have been issued by local governments, which indicated that under the 13th FYP, a number of action plans and specific policy measures were drafted both by the central government and local governments. In doing so, a "three-dimensional policy model" is formed, in which the central government is in charge of drafting policy guidelines. The drafted guidelines will then have significant impact in all areas of local government decision-making. Apart from those two dimensions, there are also private sector who has the incentives to win the favorable policy that has good subsidies. The local government would then supervise the local enterprises in case of a violation of the policy, for example, over emission. Meanwhile, the local government should also realize the goals that set by the central government (Ma 2016).

However, there are also challenges at the sub-national level, where central-level policies were implemented. Among provincial leaders, there were the consensus to cap and reduce the coal consumption on order to meet the mandatory target set by the central government. On the other hand, the intention of the local leaders is highly focused on coal-oriented industries. For example, several large coal producing provinces such as

Inner Mongolia with the production of 391 million tonnes/year and Shanxi with 133million tonnes/year, tend to rely on its traditional coal mining and downstream coal power, since the local economy and employment is highly related to them (G.M. Heggelund 2021). Thus, the implementation of the coal reduction targets is challenging especially in regards of provinces' sheer size and their limited capacity. Consequently, local governments would tend to ensure its province GDP growth first by obstructing the implementation of costly policies (Schreurs 2017). In order to solve this issue, six ministries including NDRC have jointly issued a notice in regards of excess capacity in key sectors, including cleaner energy (G.M. Heggelund 2021).

4.5 Chapter Summary

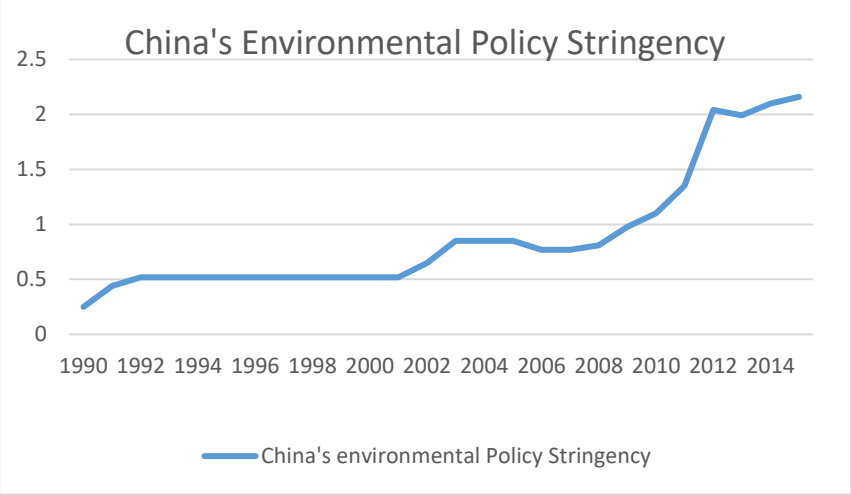
The climate change policy has evolved to a large extend throughout the historical period. Based on empirical observations, we argue that China's climate change policy stringency has increased significantly from early 1990s to nowadays. Policy stringency refers to "The degree to which environmental policies put an explicit or implicit price on polluting or environmentally harmful behavior" (OECD). For China's case, the policy stringency has increased in a way that it sacrifices part of its interest in energy consumption in order to reduce its overall GHG emissions.

To be specific, in the early stages of climate policy development, China's climate change mitigation policy and initiatives was not integrated into domestic law. Most of the policy statements can be found in articles and speeches published by government officials, which was merely used to claim national positions on global climate change issues (Qi, Ma, and Zhang 2007). Although China has established special climate change groups since 1988, the aim of the group is merely to respond to environmental problems posted by IPCC. Climate change was perceived as a purely scientific problem. Nevertheless, domestic environmental problems were not comprehensively addressed by the government until 1995. Therefore, we can confirm that the policy stringency is low in the 1990s.

The policy stringency started to grow since the beginning of 2000s. In the second selected period (1998-2005), the issue of climate change has experienced a transition

from being a scientific problem to a domestic development concern. This led to the publish of numerous policy statements and regulations including the CDM management rules. Although we can observe an increase in the policy stringency, we argue that China still held a relative passive position in combating climate change. The reason behind the dynamic policy arrangement is largely driven by domestic economic development, resource scarcity and the need for international support. China's attitude to climate change has substantially changed in the third selected phase (2006-2015), in which it has adopted proactive position in combating climate change both domestically and internationally. In this period, China has become the world's largest GHG emitter and it has launched its National Climate Change Program in 2007, which was later integrated into the national 11th FYP. For the first time, China has set concrete targets in reducing its carbon intensity. Since then, China has managed to change its image from a passive participant to a proactive actor in global climate change effort. After COP 21 in Paris, China decided to take a step forward. In 2016, China integrated its INDC in Paris Agreement to its national 13th FYP, which included reducing the assumption of China's most reliable resource— the coal assumption. Summing up, we argue that the policy stringency has shifted the degree from low to high. This tendency can be further proved by studies of OECD in figure 3.

Figure 3: China's Environmental Policy Stringency from 1990 to 2014



Source: (OECD 2021)

China's position in international climate change regime has experienced both continuity and changes. Namely, before mid-2000s, China was regarded as a reluctant

negotiator but it has successfully shift its image to an active cooperator afterwards. From the beginning of the international negotiation which can be marked by the signing the UNFCCC in 1992 to the COP-21 in Paris in 2015, the Chinese government has continuously insisted for the following positions: (1) China will actively participate in international cooperation on climate change and will voluntarily commit to its obligation; (2) Industrialized countries should take the lead in GHG reduction commitment and adopt binding targets; (3) Per capita GHG emissions should always be considered when setting emission reduction targets; (4) Industrialized countries are the primary contributors to global warming while obtaining greater economic success. Therefore, they should provide financial and technical support to developing countries in combating climate change.
(B. Wang 2009)

Changes in China's climate change policy can be also observed. First of all, China's position shifted during the COP-13 in Bali in 2007, by emphasis the responsibilities of Annex II countries. Previously, it was strongly against any proposal of emission reduction for developing countries, which would potentially damage the national economic development. Notably, it was clearly mentioned in the Bali action plan that mitigation actions should be supported by technology, financing and capacity building (B. Wang 2009). Secondly, China has initiated a number of domestic institutional reforms in order to have a more effective and functional national climate change coordination group, which reflects the growing significance of climate change mitigation in domestic political agenda. Last but not least, China also shifted its stances from fully UNFCCC and Kyoto Protocol- oriented to being open-minded to other pragmatic and flexible mechanisms (B. Wang 2009).

The important climate policies adopted in China is listed in appendix 1. One of the patterns of those policies is that they are usually engaged in multiple sectors and thus would require cooperation of specialists from different agencies in order to formulate a contrate policy. The target-setting by those policies and measures are served as reference scenario for better policy performance (L. Liu 2011). As a matter of fact, most of the policy goals haven been achieved with good results. Lastly, the climate change mitigation action has extended to local scales. Local governments are actively engaged and take GHG reduction as local priorities (ibid).

Among all these positive changes in domestic policy, we can observe that the one of the major changes in regards of domestic policy is that the ultimate goal of the policy has been transferred from purely energy efficiency-oriented to low-carbon oriented in a way that is not only for the benefit of domestic energy utilization. Internationally, the most significant change that we observed is China's submission of its INDC in 2015. China is the 43rd party to the UNFCCC to formally submit its INDC. One of the tasks of China's INDC is to peak its total carbon dioxide (CO2) emissions by 2030. Notably, this is the very first time that China has taken the concept of "total carbon dioxide emissions" into its international commitment. Before Paris Conference, although China has proactively participated international negotiations and set targets on carbon emission cuts as its commitment, they are all related to the carbon emission per unit of GDP, which is closely related to nation's economic capacity. In the following section, we discuss what factors has triggered the change that we have observed and the causality between them. Namely, why this factor is able to explain the change.

5 Analysis and Discussion: Explaining the Policy Change

In the previous chapter, we presented the historical development of China's climate change policy as well as the evolution of important political actors at different ministerial level. This provides us an overview of China's climate change mitigation action throughout different historical period. In process-tracing, the historical development of climate change policy can also serve as empirical evidence for us to test the proposed explanatory factors based on the theoretical framework.

After examining the policy outcomes, explanatory factors that associated with the hypotheses will be listed and discussed in this chapter. Namely, according to the interest-based theory, the national cost and benefit scenario could be the decisive factor that leads to certain adoption of the climate mitigation policy. Based on the constructivist thought, international norms can change the way decision-maker used to perceive problems and thus lead to a different policy outcome which cannot be predicted by the interest-based approach. However, we argue those two theory-based explanations are not sufficient to explain the final policy outcome. Therefore, we

propose other possible factors based on empirical observation in order to complete the second path of outcome-explaining process tracing in an inductive way. Political actors' perception of the problem and the interaction within different governmental entities can also have significant impact on domestic policy. Thus, domestic policy process will be another factor. We will also analyze the impact of non-state actors in policy-making process.

5.1 Perceived Ecological Vulnerability

In this section, we examine whether China's climate policy outcome can be predicted by Sprinz and Vaahtoranta's interest-based theory. Namely are the perceived ecological vulnerability and the climate change abatement cost the decisive matters of China's policy formation. Based on this theory, we have the hypothesis:

H1: China's turn to a more stringent climate policy was influenced by China's increasing ecological vulnerability.

It is thus crucial to measure and quantify the factors, which are served as independent variables to our study. In other words, only when we know the method to decide whether the vulnerability and abatement cost is low or high, can we implement the interest-based approach to our study.

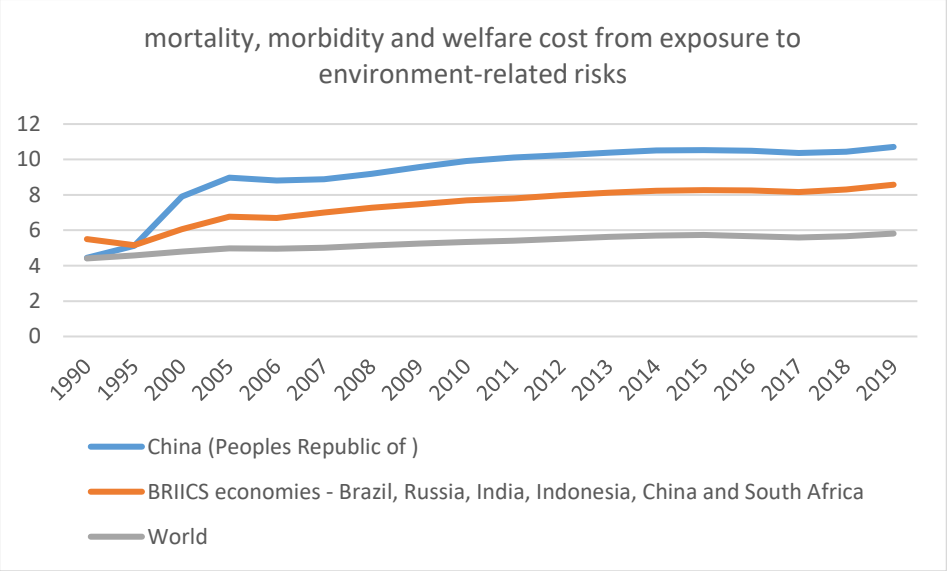
Vulnerability can have multiple folds of meanings. Geographically, China has the vast land of 9.6 million square kilometers which covers different climate zones. This complexity can further result in a variety of ecosystems in the territory of China, which means that the consequences of climate change will happen in China in different forms. From 1951 to 2017, the average annual surface temperature of China increased by 0.24℃ every 10 years (China Meteorological Administration 2018). Therefore, the overall impacts of climate change on China are less favorable.

In regards of ecological vulnerability, there are abundant sources to measure it in different standards and methods. As a matter of fact, ecological vulnerability is not dependent on only one or a few indicators. Rather, it is a complex figure that indicates a country's ecological environmental sensitivity through data collection in different

geographical areas over time and detailed calculation. As our research object is a country's perceived vulnerability, it would be reasonable to refer to the evaluation indices of ecological sensitivity published by Ministry of Ecology and Environment of the People's Republic of China (MEE). According to MEE, the environmental vulnerability has three main indicators: land desertification, soil erosion and rocky desertification. Under each indicator, there are also sub-indicators: Aridity index, soil texture, vegetation coverage and so on. With the combination of all the indicators, the vulnerability is then categorized into five different levels, from insensitive to extremely sensitive. However, our study focus should not be the calculation in geographical terms and China has already been defined as ecologically vulnerable both by its domestic scientists and international research institutions. Vulnerability to climate change cannot merely decided by the geographical terms and climate conditions, it should also take socio-economic capacity into consideration (Bjørkum 2005).

With this in mind, we decide to use a substitution indicator that can reflect a country's vulnerability to the consequence of climate change as accurate as possible. As a matter of fact, a country's vulnerability is closely linked to its ability to adapt to the consequence of climate change: If the adaption ability is more well advanced, the lower the vulnerability is. Consequently, the adaption ability depends highly on economic resources (Bjørkum 2005). Therefore, the higher the costs of adaptation, and the lower the capacity to adapt, the more vulnerable the country is to climate change impacts. Following this thought, we use the data of mortality, morbidity and welfare cost from exposure to environmental-related risks to indicate the vulnerability, which is a comprehensive data set that can accurately reflect ecological vulnerability over years. In this way, we are able to track the changes of the vulnerability degree in each historical period precisely without the intervening of other indicators.

Figure 4: Mortality, morbidity and welfare cost from exposure to environment-related risks from1990 to 2019



Source: OECD

Figure 4 shows the data of China's mortality, morbidity and welfare cost from exposure to environment across the period from 1990 to 2019. In order to have a relative accurate perception of the level of vulnerability, we add the data of BRIICS countries and the data for world average. As we can see from the figure, before 1995, China's cost has little difference that the world average with the 4.44% of GDP equivalent in 1990 for China and 4.41% for the world average. The year of 1995 can be seen as a significant turning point, after which China's cost has experienced a dramatic increase to 8.8% in 2006. The data in the same year for BRIICS country is 6.7% and 4.9% for world average. Therefore, China's vulnerability to climate change can be perceived as high since the late 1990s and the level of its vulnerability is growing steadily after 2007. By the end of 2019, China's cost is twice as much as the world average, with 10.71% for China and 5.82% for world average.

With the growing vulnerability in mind, we need to further examine whether the policy agenda setting and the national climate change mitigation action in the period of mid-1990s to mid-2000s could reflect this vulnerability to climate change. Notably, there are some connections between them, as this period is the adjustment and development period for China's climate change mitigation strategy. China has actively

participated the COP-3 in Kyoto and has ratified the Kyoto protocol in 1998. From 1998 to 2003, three important administrative reforms took place at governmental institution level and inter-ministerial level respectively, both with the aim of building higher capacity of climate change related policy coordination. In 2004, the advocacy of "building a resource-efficient and environment-friendly society" has been published by the government, which specifically mentioned the climate change related risks and the significance of the sustainable development. Under this government advocacy, a variety of policies and initiatives related to improvement of energy efficiency were launched.

All the policy changes in this period indicate that decision-maker's perception of the vulnerability caused by climate change was increasing. As it was stated by Liu Jiang, the former executive vice-chairman of NCCCC:

"China, with its fragile ecological environment, is vulnerable to negative impact of climate change. According to the preliminary studies by Chinese scientists, climate change will continue to exert profound influence on the ecological environment as well as the social-economic system in China…"

(Speech by Liu in Bjørkum 2005 p.49).

However, the growing perception of vulnerability did not lead to any concrete emission reduction target for China. Rather, it made the government being more aware of the domestic problems which were mainly related to energy consumption and resource scarcity. China's hesitation on legally binding commitment in international climate change regime can be mostly explained by China's capacity to resolve those perceived problems. Although climate change has been perceived as a threat by the government, it is still an issue that does not to be resolved urgently. After all, domestic problems that related to short term growth such as resource scarcity, environmental pollutions and the gap between the rich and poor have the priority status in the policy agenda (Bjørkum 2005).

As a matter of fact, the perceived vulnerability did contribute to China's active participation in international cooperation. Given that China is going to suffer more from the consequences of climate change makes it to push actions from industrialized countries together with other developing countries. China and India have played major

roles in pressuring developed countries to take the lead in emission reduction (Bjørkum 2005).

Being vulnerable to climate change can be a good excuse for China to ask funding and necessary technical support from developing countries. According to National Communication, "*China has its vulnerability to climate change mainly in the fields such as agriculture, natural ecology and forestry, water resources, sea level and coastal belts, desertification and natural disasters. Technical support and funds are thus necessary for promoting the adaptation capacity in the above mentioned fields*" (National Communication in Bjørkum 2005, p 50). The fact that China has high ecological vulnerability can also make China a victim in international climate change regime, so that it would be reasonable for it to ask for financial support from industrialized countries and legitimized the idea that industrialized countries should take the lead in mitigation actions(Bjørkum 2005).

Therefore, the hypothesis can be only partially confirmed. The increased perception of ecological vulnerability failed to promote active climate change policy domestically for the reason that its priority is lower than domestic economic development which will be harmful to the environment. On the other hand, the awareness of the consequence of the climate change pushed China to engaged in international negotiations for financial and technical support so that China would have enough capacity to tackle the climate issue. But this is based on its own interest calculation.

5.2 Abatement Cost

Our second hypothesis is regarding abatement cost for reducing GHG emissions and other climate mitigation actions:

H2: China's turn to a more stringent climate policy was slowed down by its high abatement costs.

In the case of China, the climate change abatement cost is can be seen as government's perception of the impact that reducing GHG emissions can have to

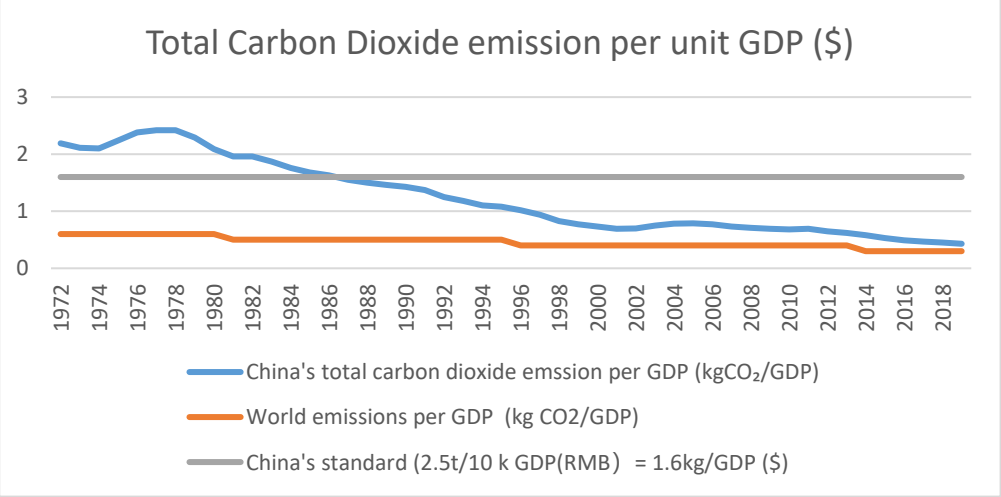
China's economic development. Starting from early 2000s, China's economy grew rapidly. Consequently, maintaining the economy growth has become the highest priority of the domestic political agenda, after all China is still a developing country and as mentioned in the previous chapter. China's economic development is closely related to the growth of heavy industry, which contributes the most of GHG. With this fact in mind, it would be necessary to exam the relationship between emission reduction and economic development, so that we could figure out to what extent is the impact of emission reduction less harmful to the economic development, which is also the point that the abatement cost can be regarded as low. On the other hand, if the abatement cost is high, it will have negative impact to the economic growth, which is clearly against China's national priority and thus China could not afford taking actions for climate change mitigation.

Notably, the abatement cost depends heavily on energy demands and the necessary fuel substitution (Bjørkum 2005). 90% of China's CO2 emissions are caused by energy activities (Z. Liu 2015). In order to reduce the CO2 emissions, there are two major strategies: the first is to increase energy efficiency and the second is to transfer the energy consumption from coal-intensive to other alternative sources (Bjørkum 2005). Therefore, the potential cost of mitigation action is highly depended on energy efficiency and energy conservation. If the abatement cost is high, China is more likely to rely on cheaper energy supplies, which are usually harmful to the environment, in order to maintain its economic growth at the same time and will be unlikely to have a proactive climate mitigation policy.

With the crucial relationship between energy efficiency and economic development in mind, it would be necessary to link energy consumption and economic development at the same time. In order to define whether the mitigation abatement cost is low or high as objective as possible, we need to quantify this factor. Namely, we use total carbon dioxide emission per ten thousand GDP (RMB) as a representative of China's national abatement cost. This figure shows the amount of carbon dioxide emitted in order to create GDP of ten thousand RMB. It is also proved to be a valid indicator of climate abatement cost by Institute of Geographic Sciences and Natural Resources Research (IGSNRR), which is a sub-research institution under CAS. As stated by IGSNRR, the standard carbon emission per ten thousand GDP is 2.5t/10,000

GDP (RMB) which equals to approximately 1.6kg/GDP (US dollar). Consequently, we compare the standard amount and the carbon emissions in reality: If the amount of emission in China exceeds 1.6kg/GDP US dollar, the abatement cost should be identified as high. If it is lower than this amount, the abatement cost can be considered as low. The exact carbon emission data every year are collected from Global Carbon Atlas. The result is showed in figure2.

Figure 5: Total carbon dioxide emission per GDP (kg CO2/GDP ($))



Source: (Globalcarbonatlas 2021)

Figure 5 presents the total carbon emission per GDP for China and world average from early 1970s until 2018. In order to compare the data, we also added the standard level which is regulated by IGSNRR. According to IGSNRR, only when the carbon emission is, or lower than 1.6 kg/GDP, is China able to combat the consequences of climate change and the threat to domestic environment could be minimized (Fang and Wang 2015). As the figure shows, the peak emission data was in 1978 with 2.42 kg/GDP. In 1986, China's emission level reached the standard level and has decreased steadily afterwards. By the end of 2018, China's total emission per GDP is nearly approaching the world average, with 0.43 kg/GDP for China and 0.3 kg/GDP for the later. Although China's emission level is much higher than that of world average throughout the whole period, the research object should be government's perception of the abatement cost and thus the data should be compared to nation's own standard which is set by research institutions under the supervision of the government instead of

the world average. Therefore, we would suggest that China's abatement cost related to climate change can be regarded as high before 1986 and low afterwards.

The peak point in the late 1970s can be explained by historical event, in which China's economy was severely hit by the Great Leap Forward (1958-1960) and the Cultural Revolution (1966-1976). In order to ease the impact of these event, the decision-makers are in favor of a resource-intensive approach, in which the government was highly supportive for the heavy industry in order to boom the economy in the possible shortest period. That was also the period that climate change can be hardly seen in the domestic political agenda.

It was not until 1988 that China has begun to take actions in combating climate change both domestically and internationally. However, domestically, China would see the issue of climate change as a purely scientific issue with lower priority than the domestic social development. Internationally, China supported the principle of "Common but differentiated responsibilities and respective capabilities" when the UNFCCC was signed in 1992.

The abatement cost is not only related to the CO2 emission per GDP, but it also indicates that there could be other potential abatement measures with relative low CO2 emissions but with higher energy efficiency, such as renewable energy like solar power and wind power (Bjørkum 2005). However, such renewable energy sources are not commercially profitable. For example, the power of 1 KW/h generated from coal is 0.35 Yuan. While the price for wind-generated power for 1KW/h is 0.5 to 0.6 Yuan (Guan 2004). Although China has abundant coal resources, it is aware of the coal shortages since the beginning of 2000s. It found out that the energy demand can have faster increase than energy supply (China Daily 2005) and the energy demand will continue to grow without doubt. Meanwhile, the abatement cost is not limited to physical impacts happening within the territory, it can be also influenced by damages to China's allies and trade partners (Wiener 2008). The fear that emission reduction could raise business cost is deeply rooted in the mind of decision-makers, which may result a relocation in which investment and jobs related to economic growth would move to other countries that have cheaper labors (Kopra 2019).

It is worth to notice that since early 1990s, although China's abatement cost can be regarded as much higher than world average, the figure was below the national standard. This indicates that on the one hand, it is reasonable for China to present its victim image by showing the world that its capacity to climate mitigation action is relatively limited in regards of its high abatement cost compared to the world average. On the other hand, domestically, the perceived costs appear to be falling in the view of government leaders. In the then Chinese president Hu's "harmonious society" advocation, he argued that the cost of major reforms should be lower than the cost of timid reforms (Wiener 2008). This could explain the fact that since 1988, China has begun a series of institutional reform internally to increase the efficiency of decision-making in climate change and has also managed to launch a number of policies in response to domestic environmental problem as well as carbon emission associate with climate change. Internationally, the design of international climate policy regime can create the incentives for parties to cooperate (Wiener 2008), this fulfills China's incentive for technological and financial support from international community, given its high abatement cost.

Therefore, the hypothesis focus on mitigation abatement cost can be confirmed. The positive side effects are fully recognized and China has been taking active action domestically. It is based on the nation's own calculation that those mitigation actions are designed to promote better domestic ecological environment and will not be harmful to its economic development. China's perceived abatement costs appear to be falling every year and its proactiveness in climate change policy has been increasing. The abatement cost is strongly related to national expected economic consequences and thus can be seen as a decisive factor on China's climate policy.

5.3 International Norm

With the explanatory factors related to national interest well discussed in the previous session. We then shift our attention to international aspect with the focal point on norms. China has become one of the essential actors in promoting effective international climate regime and the transformation of its climate policy can be defined by both domestic and international factors. Based on constructivist approach, the transformation of China's climate change policies can be explained by environment-

related norms taken by the Chinese government. With this in mind, we have our third hypothesis:

H3: China's turn to a more stringent climate policy was influenced by the increasing socialization of China into climate norms.

According to constructivist assumption, norms can define the interests of actors and thus changing the actors preferences and identities through socialization (Schroeder 2008). In regards of the adherence to norms, our primarily focus is on China's perception of equity in international climate regime. Equity in climate change refers to "*fair burden-sharing based on responsibility (total, historical or per capita), capacity (depended in level of development and technologies) and affectedness (vulnerability)"* (Bjørkum 2005 p 46). As climate change is perceived as a global common, it is of great importance for developing countries to have fair share. According to Chinese governmental lead, equity is regarded as a very important element since the initial phase of the UNFCCC. National development should be taken as priority concern for all nations (MOFA interview in Bjørkum 2005). Therefore, the notion of "common but differentiated responsibilities" has become one of the key principles when it comes to climate change negotiations. Specifically, China and other developing strongly advocate the principle on differentiation while developed countries constantly address the responsibility to combat climate change should be "common" (ibid).

China's persistence in the principle of equity can be explained by its sovereignty concern, which can be further extended to two aspects: national integrity and economic development. Historically, China had a humiliating history of foreign invasion from Opium Wars to the end of the Second World War and had suffered from the isolation by western powers for nearly three decades. Therefore, both government leaders and the citizens are sensitive when it comes to national integrity, which reflects the importance of the principle of non-intervention in China's foreign policy (B. Wang 2009). When it comes to climate change, the principle of non-intervention is still valid since China regards climate change policy as part of its foreign policy and it means that China as a sovereign state is eligible to consume and control its own natural resources without external intervention (Bjørkum 2005).

Another perspective to understand the notion of equity would be economic development. For China, any binding commitment on GHG emission reduction would make China to give up part of its right to develop into a wealthier country. With the fast economic growth since the beginning of 2000s, China's demand on energy has inevitably increased and will keep growing in the future. It is therefore difficult for government leaders to picture a scenario in which both high energy consumption and intense GHG emission reduction exists at the same time (B. Wang 2009). This further proves that international norms and principles are deeply rooted in China's climate change policy: emission reduction commitments for developing countries are generally considered as unfair.

How do the principle of "common but differentiated responsibilities" influence China's policy on climate change? A starting point would be to understanding the positions of developing countries in international climate change regime (Bjørkum 2005). Notably, the strategic solidarity with other developing countries prevents China from ignoring the notion of "common but differentiated responsibility" (B. Wang 2009). The solidarity can be explained by sharing common interests in economy and other key assets in regards of China's foreign policy. Before Copenhagen negotiation, it was China's advocation of this principle that leads to the solidarity with G-77. "*The 'common but differentiated responsibility" principle gives China's nonbinding commitment the appearance of legitimacy while providing strong bargaining leverage in negotiations of financial and technology transfers for GHG emission reductions*." (Wang 2009, p 99). Since Copenhagen negotiation, the rise of the BASIC coalition has taken the normative impact for China's climate policy to the next level. Through BASIC coalition, China with Brazil, India and South Africa tried to form a new identity as emerging powers and intended to introduce a new norm of behaviour: a third kind of actor in international climate change regime, namely not fully developed but not developing, who should help each other to account for their stances in negotiations in which their counterparts were confused by their reluctance to take mitigation commitments, even if their material status has clearly changed in the past decade. This BASIC joint identity is in favour of a reluctant but defensive position with the focal point that developed countries should take their responsibility in mitigation action based on the principle of equity and their historical responsibility (Hochstetler and Milkoreit 2014).

However, either the solidarity with G-77 countries or the joint identity as in BASIC is not likely to prevent China from not taking any actions in combating climate change. Out of image concern, active participation in reducing GHG emission will certainly improve China's image as a responsible power (B. Wang 2009). In multilateral negotiations such as APEC, ASEAN and G8-affiliated meetings, climate change issue is unavoidable. During the meeting, leaders often address China as "responsible power" in climate change (ibid). The concept of "responsibilisation" thus provides another perspective in regards of normative practices.

Responsibilisation is defined as the process that leads to responsibility being socially constructed (Kopra 2019). "*Some issues are respinsibilised via discursive practices in order to promote their normative importance*" (Kopra 2019, p 27). For China, government leaders take "keeping one's promises" as an essential element of a responsible power in international negotiations and this norm of behaviour naturally move the issue of climate change to the front of the political agenda (B. Wang 2009). As a matter of fact, China believes that as a member of international society, it has the responsibility to act towards global common issues. Therefore, China has decided to actively participate in international climate negotiation at the very first stage with the role of responsible representative of developing countries (Kopra 2019). As stated by Song Jian, then chair of the State Science and Technology Commission in 1991:

"*As we develop the economy, we must guarantee a balanced ecological environment and maintain in good order our natural resources so that future generations will have their rightful heritage. To this end, we should be ready to pay more or, if necessary, slow down the economic development*."

(Kopra 2019 p 134)

It is worth to notice that not only China regards itself as responsible power, other countries also tend to perceive China as responsible power in regards of climate change. China was welcomed officially in the Copenhagen negotiation, developed countries and EU doubted China's method and target setting and China was perceived as a "dead weight" during Copenhagen negotiation. However, during the Paris Conference in 2015, China was recognised as a leader even by the developed countries (X. Gao 2018). With

this in mind, it would be reasonable to say that major events on international climate negotiations such as Kyoto and Paris negotiations promote a global understanding on climate responsibility and respective norms (Kopra 2019). Since the Copenhagen conference in 2009, China has engaged in international climate negotiations in a more constructive way. Although Chinese government official still insist that China is not able to and will not accept legally binding targets, it did take proper mitigation actions proportionate to its size and population:

"*China will endeavor to lower its carbon dioxide emissions per unit of GDP by 40–45% by 2020 compared to the 2005 level, increase the share of non-fossil fuels in primary energy consumption to around 15% by 2020 and increase forest coverage by 40 million hectares and forest stock volume by 1.3 billion cubic meters by 2020 from the 2005 levels."*

(China's national mitigation action commitment in Kopra 2019, p 136)

An important event that proves China's self-perception as a responsible power is during the Paris conference. During the conference, China announced its commitments in peaking its CO2 emissions. Notably, this time China no longer focuses on reducing the amount of carbon per unit GDP, but it shifted its attention to the absolute CO2 emissions. Such decision presents a strong signal to the world of China's resolution and its responsibility in combating climate change and an international agreement is of great necessity (Kopra 2019).

To sum up, international norms in regards of climate change can have significant influence on China's climate change policy and it can be a powerful explanatory factor. Thus, the hypothesis can be confirmed. The notion of "common but differentiated responsibilities" is deeply rooted in China's identity due to historical reason and domestic development issue just as other developing countries do, which caused the low level of proactiveness the initial phase of climate change negotiations. Since Copenhagen negotiation, China realized its identity as an environmental power. At first, this self-perception as responsible power was out of image concern since China wanted to fit itself into the international community and would like to get rid of the reputation of "China Threat". Later with more positive feedback from the international community, the Chinese government acknowledged its willingness in taking part in the formulation

of mitigation practices, which it takes as an opportunity to present its resolution to the rest of the world. In this sense, China's climate change policy can be motivated by international norm of being a responsible power. If there is doubt about China's responsibility in climate change from international society, China is likely to find ways to dilute the doubt through more active engagement in international negotiation and substantive cooperative commitments.

5.4 Domestic Policy Process

Based on our empirical observation, we find out one of the features of China's climate change policy evolution is through multiple times of institutional reforms at the ministerial level. Those reforms contribute a more efficient policy formulation system in response to domestic environmental problem as well as international climate change issue. Therefore, we further examine whether domestic policy process can explain the policy change.

Policy development can be seen as a process in which multi-level political actors have built up the network to formulate climate change policy through institutional reforms and policy coordination (L. Liu 2011). Meanwhile, national net benefits can be influenced by political institutions and structures, which may help account for national actions (Wiener 2008). Therefore, we have the hypothesis focusing on domestic political actors:

H4: China's turn to a more stringent climate policy was influenced by the changes in the domestic political system.

In this session, we have the following focal points in regards of China's climate change decision-making: (1) what are the central actors; (2) who is the most influential actor; (3) how does the distribution of influences and interactions among them look like. One of the major features of the policy evolution is the interaction among minitrial level agencies through institutional reforms. Those agencies represent interests and priorities shaped by their positions and roles. Consequently, "*the outcome of the climate policy will not necessarily be the interests of the nation as a whole, it might as well reflect the*

most influential actor's self-interest and the way climate change policy options are seen to interfere with the other (and often higher ranked) priorities of that bureaucracy" (Bjørkum 2005 p.54).

The establishment of the National Climate Change Coordination Group (NCCCG) in 1990s marked the beginning of the inter-ministerial interaction in combating climate change. It has experienced several power shifts through the years. Before 1998, the SMA has the major responsibility in coordinating climate change issue. After 1998, this scope has transferred to the NDRC which represents the nation's interests in economic development. Currently, the State Council has the leading position in decision-making and coordinating around 20 ministerial agencies involved in the climate change policy process (L. Liu 2011). Among all the ministerial agencies, five agencies can be regarded as the most influential in the policy process: the NDRC, the MOST , the MOFA the MEP and the SMA, Their responsibility distribution are presented in table 2:

Table 1 Responsibility distribution within National Climate Coordination Committee

Scope	Working Group	Chair Agency
International climate change negotiations, cooperation and policy development	scientific assessment	SMA, CAS
	impact assessment and technological response strategies	MOST, MEE
	economic implications	NDRC
	FCCC-related matters	MOFA, MOST
Domestic climate-related policy formulation and implementation	Energy conservation and emission reduction	NDRC, MEE

Source: (L. Liu 2011)

As it is presented in the table, the NDRC has the dominated position in the climate change policy-making both at international and domestic level. Meanwhile, energy conservation has been given parallel importance as emission reduction related to climate change. Therefore, we can confirm that the climate decision-making are mainly formulated by major government agencies at the central level with the State Council as main decision making body supported by the Central Party Committee and

National People's Congress. The NDRC, which represents the national interest in economic growth, is the most influential ministerial actor in coordinating the domestic and international climate change policy process. This proves that China perceives climate change more than an environment issue, but essentially a national development issue.

Given the NDRC is the most influential actor, to what extend can it shape China's climate change policy or, will the policy look different if other parallel ministerial actors exert more influence on the decision-making process? Due to the typical top-down approach of China's policy formulation, the interest conflict is not likely to happen in different governmental level, for example, the NDRC is not possible to hold a different position against the State Council. Therefore, the increased interaction among actors in the same ministerial level can provide useful insights. Certainly, it is difficult to know the concrete mechanisms in regards of China's policy formation among different agencies due to limited sources, yet two events can provide valid evidence: the implementation of Montreal Protocol in 1987 and the power shift from NDRC to MEE in 2018.

In 1987, the SEPA was assigned to the Montreal Protocol implementation in coordinating and evaluating the costs and benefits. The SEPA (the current MEE) was regarded as a relative weak agency at that time and due to inter-agency competition, it would promote SEPA's self-interest in demonstrating its capacity through successfully carrying out the Montreal project ((Bjørkum 2005). However, other ministerial agencies with the interest of taking over the project argued that the SEPA did not have enough capacity to take charge of the project and expressed their concern that once SEPA takes the lead position, it will obtain heavier control over China's other efforts in solving environmental problems (Bjørkum 2005). This could be explained by the fact that the interest of SEPA lied mainly on a scientific matter, such as the ecological consequence of climate change to China and the tighter cooperation with foreign experts. However, this would have marginal effects on national economic development which was at the top of policy priorities at that time. And that could be the reason that other agencies wanted to exert their influences on the Montreal project so that the implementation of the protocol would be on the path of national economic development.

The second incident is also related to SEPA, only it should be called the Ministry of Environment Protection (MEP) in 2018 after multiple times of institutional reforms. This time, the idea of the climate change office being shifted out of the NDRC has raised the debate. Namely, a new environment ministry – the Ministry of Ecology and Environment (MEE) were built to supersede the MEP. Notably, this so called "mega-department" not only absorbed the functions originally under MEP, it also supervises the climate change office that was set originally under the NDRC. One of the scopes of MEE was "Climate change and emissions reduction policies, currently under the NDRC" (Climate Home News 2018). While the public has an overall positive feedback to this change, citing the extra political power of managing domestic pollutants with GHG emissions, some agency leads and climate policy experts are worrying that moving climate policy-making from the once powerful economic planning body, the NDRC to an environmental ministry will lower the priority of climate change, which is likely to become the unintended casualty of this reshuffle (ibid).

As a matter of fact, the MEP and the NDRC holds different positions in regards of the best policy in regulating carbon emissions. The former has been supporting for a carbon tax for a long time, while NDRC has been the supervisory body of the national cap and trade scheme for carbon emissions since 2017. Both policies are said to be beneficial for GHG emission reduction and economic development in the long run. Although it is hard to exam the impact of this reshuffle between MEP and NDRC to China's climate change policy in such a short period, as the MEE has been in charge for three years when this diploma thesis is being working on, we can still use it as a valid source of the influence from bureaucratic politics. Based on the policy outcome in the previous session, the National Carbon Trading Scheme (ETS) has been already launched in seven pilot carbon markets and is ought to be fully implemented in the 2020s, while the policy regarding carbon tax is still an important policy proposal without a mature outline of its implementation. With this in mind, we can conclude that the MEE might be the most proactive agency in climate change policy in the near future, the NDRC will keep exerting its influence to MEE and other relevant agencies to make sure the final policy outcome is in line with its interests associate with domestic economic development and international climate change negotiations.

To sum up, the hypothesis regarding domestic policy process can be confirmed. The interaction among political actors, especially ministerial level actors, can be a crucial explanatory factor of China's policy on climate change. The interest of NDRC could shape the policy outcome to a large degree, despite that it may not be the most proactive actor in climate change.

5.5 Epistemic Community and Public Awareness

The last explanatory factor for China's climate policy is related to the perception of the new knowledge and public engagement in climate change. Based on our observation, public engagement in the issue area of climate change has increased since mid-2000s. As a matter of fact, mid-2000s is also the time when the stringency of China's climate change policy has raised dramatically. Therefore, we assume that the diffusion of scientific knowledge on climate change might change policy-maker's understanding of this issue and shift our attention to non-state actors. As the knowledge diffusion not only happens among political actors but also happens in public such as research institutions and among citizens through education, we will analyze the following hypotheses together.

H5: China's turn to a more stringent climate policy was influenced by the input and activities of epistemic communities.

H6: China's turn to a more stringent climate policy was influenced by the changes in the domestic public opinion.

First, we examine whether the diffusion of the knowledge is capable to explain the policy change. In the initial phase of the climate change negotiation, China's cautious stance on climate issue can be explained by the fact that governmental leaders had little knowledge about the potential consequence of climate change that would affect China. With the completion of a number of scientific research program on climate change and the release of the IPCC reports over the years, policy-maker's understanding of this issue has been increased both for the world and for China itself (B. Wang 2009). However, the question remains: to what extend can the diffusion of the knowledge on climate change affect China's policy formulation? To answer this

question, we need to examine the knowledge diffusion in two levels: the diffusion happens among research institutions and public citizens. The former can be seen as an official method for government to acquire new knowledges since some of the academic institutions have close relationship with agencies from national climate change coordination committee. The later can be regarded as knowledge perception of non-state actors, who can exert necessary pressures to government with the aim of environmental protection.

In China, research institution can provide a strong scientific basis for decision-makers to establish a long-term socio-economic development strategy (B. Wang 2009). Consequently, numerous research institutions have been involved in the climate change policy process. As a matter of fact, almost all the ministry agencies in China have research institutes attached to them, which are usually regarded as GONGOs. With this special relationship with the government, these research institutions are often in charge of research programs that are delegated and financially supported by decision-making agencies (L. Liu 2011). Notably, most of the institutions are attached to ministerial agencies including MOST, SMA, MOFA and MEE with the research areas of sustainable development, environmental impact assessment, national science and technology policy and climate diplomacy. As the most influential agency, the NDRC has only one institute attached to it regarding climate change policy with the focal point on energy development advisory (ibid).

The diffusion of the knowledge happens between the international scientific community and the Chinese scientific community (Bjørkum 2005). Internationally, China obtains the first scientific knowledge mainly through attending the UN conference on climate change and the assessment report from IPCC. Since the COP 6 in 2001, China has increased the number of its delegates in participating the conferences. The share of the personnel from academic agencies has been increasing as well (L. Liu 2011). In the past two decades, China has actively engaged in the preparation work of every IPCC assessment report. The number of Chinese experts working in the assessment has been increasing and the structure of participating personnel has been optimized (Xiao 2016). Meanwhile, it is worth to notice that the current Co-Chair of

the IPCC Working Group I[1] (WG I) is Zhai Panmao, who has been actively joined the IPCC WG I assessment activities since 1998 and was the lead author for WG I from 2008-2015 (Working Group I, IPCC). Currently Zhai is also the Vice President of Academy of Meteorological Sciences which is an institute attached to SMA, that is because one of the way of China participating in the IPCC is to assign domestic scientist to IPCC related tasks (Xiao 2016). In this way, the Chinese IPCC experts have double-identity: On the one hand, they have to pursue China's national interests. On the other hand, as part of the scientific process, they have to devote themselves to provide the latest scientific knowledge to decision-makers. How to balance the relationship between science and politics has become a tough problem that many experts and scholars are facing when participating in the IPCC assessment report.

In general, we can conclude that individual researchers as well as research institutions have enjoyed more freedom in expressing their insights and research results regarding climate change. The knowledge diffusion through epistemic community has been well advanced. But it still remains unclear whether the knowledge will be fully reflected on China's climate policy. First, China's real perception of IPCC report is questionable. Throughout the compilation process of the IPCC report, developed countries and developing countries have different control over the information sources of climate change. The "indirectness" of the information sources determines China's lack of trust in the IPCC assessment report (Xiao 2016). Second, the Chinese experts in IPCC is not deployed to NDRC, the most influential agency in policy formation. Those factors are likely to cause the scenario in which the latest scientific information does not necessarily match the interest of decision-maker and the later would then ignore the scientific results but focusing on national socio-economic development based on the logic of the previous hypothesis.

Discussion on climate change among public are growing significantly as well. Besides research institutions, there are also non-state actors including business groups, mass media and NGOs who constantly express their opinion on climate change. In general, these actors have a relative weak status in the policy formation process due to limited resources and influence to decision-makers (L. Liu 2011). As for business

[1] WG I assesses the physical science of climate change.

groups, although they have been assigned tasks regarding emission reduction and are one of the crucial parts of the climate policy development, the decentralization due to corporatization reforms since 1990s has weakened its relationship with the central government. Their supervision body are shifted to local governments and other level provincial governments. The state will no longer provide subsidize for corporation that are not profitable (Richerzhagen and Scholz 2007). Due to the fact that there might be interests conflict between local and central government regarding mitigation measures, for example, the promotion of the local officials is closely related to the economic performance of the area (A. Li 2016), the local governments may not be in favor of tight mitigation actions. Thus, the role of business group is minimized in the policy formation process. Even though there are still industrial SOEs which are directly supervised by the central government, they are more concerned about the impact of mitigation regulations on their economic performance (L. Liu 2011).

The media coverage of climate change issue has been growing as well. Figure 6 presents the media coverage on climate change topic from 2000 to 2020.

Figure 6. Search results of Media Coverage on Climate Change[2]

Source: https://kns.cnki.net

As the figure presents, since the pre-Copenhagen period, the media coverage on climate change has been increased dramatically. This trend exists until 2015, when

[2] Results are obtained by searching "climate change" as key word from CKNI search engine, a full-text database of important Chinese newspapers

China has been actively engaged in the COP-21 in Paris. Since 2015, the media coverage has a downward trend. In China, the media is not necessary in the policy formation process, but its tasks is usually related to the supervision of the policy implementation and propagating governmental initiatives to the public audience (Richerzhagen and Scholz 2007) With this in mind, the function of the mass media is more significant after certain policy measure has been launched.

China's environmental NGOs and other non-profit organizations are also paying greater attention on climate change. However, unlike Western NGOs, which can exert political pressure to decision-makers and thus influence the policy agenda-setting, the NGOs in China cannot be regarded as crucial actors in policy formation, due to the fact that they are often constrained by government administrative regulations and lack of financial support and personnel (L. Liu 2011). Domestic environmental NGOs such as Greenpeace China and Friends of Nature are dedicated in the issue of pollution and biodiversity (B. Wang 2009). Non-profit organization such as Climate Group focuses also on awareness building and can provide a complement to the official mitigation actions (L. Liu 2011). Therefore, China's NGOs have their interests more into public awareness building and thus have little impact on climate change policy formation.

Summing up, the hypothesis regarding epistemic knowledge and public awareness cannot be confirmed. For domestic non-state actors, they are not capable to engage in the policy-making process due to government administrative regulations. In the aspect of epistemic community, China has consistent motivation in obtaining the latest scientific knowledge on climate change, but it remains unclear whether the knowledge itself is sufficient enough to change the policy agenda-setting, because the policy maker might still decide to accept the knowledge that is in favor of China's major national interests.

6 Conclusion

The goal of this research is to identify factors that can sufficiently explain China's policy change on climate change issue. With the help of outcome-explaining process tracing, we examine the historical development of China's climate change policy and to identify the causal relationship between established factors and the final policy outcome. Based on our empirical observation, we found out that China's climate change policy has experienced both continuity and changes in the past decades. In general, we can confirm that China's climate change policy has experienced a positive transition. As China's role become more and more critical in international climate change regime, it is of great importance for us to understand the major driving forces behind those changes in order to better engage China to the global effort on climate change.

With the method of process tracing, the analysis is conducted to verify our hypotheses on the explanatory factors behind the policy formulation. Based on empirical finding, we identify two major changes in China's climate change policy: (1) Domestically, the policy has been transferred from purely energy efficiency-oriented to low-carbon oriented; (2) Internationally, China first involves concept of "total carbon dioxide emissions" as national emission reduction commitment into its INDC during COP 21 in Paris. We further examine in the analytical chapter about what factors have triggered out such changes.

Following the guideline of outcome-explaining, we first establish three factors based on existing theories, namely the national perceived ecological vulnerability and climate change abatement cost inspired by the interest-based theory and the impact of norm based on constructivism. We then argue that these three factors cannot sufficiently explain the policy change and thus propose further explanatory factors based on our empirical observation.

In regards of perceived vulnerability, we find out this factor is not able to fully explain the policy change. With the help of quantified scientific data, we can see that the national perceived vulnerability is increasing steadily throughout the historical

period and it looks coherent with China's active engagement in international climate change negotiation. However, the growing perception of vulnerability did not contribute to any emission commitment for China. Rather, this makes China being more aware of domestic environmental problems. Domestically, the intention to grow its economy has higher priority than solving environmental issue. This factor did lead to China's active participation in international cooperation, which can be explained by China's relative low capacity to adapt to climate change and its wish for technological and financial support from international community. Another explanatory factor related to abatement cost is also based on interest-based theory. We find out that the climate change abatement cost can be a powerful explanation to the policy change. Although China's abatement cost can be regarded as high compared to the world average data, China has its own standard on how to measure the abatement cost and it has fully aware of the positive side effects of the emission mitigation action. The abatement cost is based on the nation's own calculation that mitigation actions are designed to promote better domestic ecological environment and will not be harmful to its economic development and is thus not perceived as an obstacle for decision-makers.

The factor regarding international norms can also be a plausible explanation to the changes. International norm can affect China's climate change policy in two ways. Before Copenhagen negotiation, the notion of "common but differentiated responsibilities" is deeply rooted in China's identity due to historical reason and domestic development concern, which can explain China's low proactiveness in the initial phase of climate change negotiation. However, since Copenhagen negotiation, China realized its identity as an environmental power. The notion of "responsible power" in international climate change negotiations has promoted China's willingness in combating climate change and in formulating substantial policies in emission mitigation.

As a matter of fact, we are not able to guarantee that the factors based on existing theories are sufficient explanations for the final policy outcome. One of the features of China's climate change policy evolution is multiple times of institutional reforms at ministerial level. Therefore, we assume that the interactions among domestic political actors could explain the policy change and find out that the national policy on climate change can be influenced by the most powerful government agency to a large degree.

Among a number of governmental agencies that deal with climate change, the MEE and the NDRC are proved to be prominent actors. In reality, the policy outcomes are usually connected to the interest of the NDRC rather than MEE. Although the NDRC may not be the most proactive actor in the policy area of climate change, it is regarded as the most influential actor with the priority in domestic development. Lastly, we examine the impact of non-state actors. The first factor is related to epistemic knowledge diffusion and it influences decision-making in two ways. One is the direct way, in which research institutions have direct communication channels with ministry agencies and deliver the latest scientific knowledge to decision-makers. Doing so, decision-makers might change their understanding on climate change. Another way is rather an indirect way, in which public awareness could be raised by media, domestic NGOs and through education. We find out that non-state actors have marginal impact in the policy-making process and thus cannot be taken as explanatory factors in regards of climate change policy.

To sum up, we use process tracing to prove that interest-based theory cannot be fully applied to China's policy transition in climate change due to China's special status: A leader in international climate change regime but not a fully industrialized country. We also identified positive changes in China's climate change policy in a comprehensive historical period and investigate the reason behind those changes. We may predict that with growing capacity, China is likely to take more proactive stances in climate change both domestically and internationally. However, among all the explanatory factors that has been proved in our study, we are not able to measure impact that each factor has. In other word, our research did not examine whether domestic factors weigh more than international factors or vice versa. This aspect is encouraged to be further analyzed in future studies.

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Appendix

Appendix 1. Important Climate Change Policies adopted in China

Year	Name of the Policy	Issued by (Agency)	Mitigation Targets
2004	Clean Development Mechanism (CDM) management rules	Inter-agency committee (led by NDRC)	Regulation on CDM Projects
2006	China's 11th FYP	National People's Congress	To reduce energy intensity by 20% and the main pollutants by 10% below 2005 levels by 2010
2006	Top-1000 Industrial Energy Conservation Program	Interagency plan, led by the NDRC	Reducing energy use of the 1000 most energy-intensive enterprises from 9 industrial sectors
2007	Energy Efficiency Appliance Standards	NDRC	Reduce residential electricity use by 10% by 2010; promoting mandatory minimum efficiency standards
2007	Medium and Long Term Development Plan for Renewable Energy	NDRC	An investment of 263 billion USD by 2020 on renewable energy, and to increase renewable energy consumption to 10% of total energy consumption by 2010 and 15% by 2020.
2007	Closing Inefficient Industrial Plants	NDRC	Closing inefficient cement and steel factories with the production capacity lower than 250 million tons and 55 million tons, by 2010.
2007	National Climate Change Program	State Council	China's first global warming initiative. Addressing activities both to mitigate GHG emissions and to adapt to the impacts of climate change

2008	China's Policies and Actions for Addressing Climate Change	State Council	Formulating a coordinated response toward national and international challenges
2008	Program for Climate Change Mitigation and Adaptation in China	NDRC	Capacity building for local governments; Promoting local climate strategies in accordance with the national program.
2009	China's Targets on Carbon Emission Cuts beyond the Kyoto	State Council	Reducing carbon intensity (carbon emission per unit of GDP) by 40- 45%, below 2005 levels by 2020
2010, updated in 2017	Low Carbon City	NDRC	to develop low carbon dioxide emission industries, establish a GHG emission data collection and management system, and encourage residents to adopt green consumption patterns.
2011	National Carbon Trading Scheme (Trail) (ETS)	State Council	To contribute to the effective control and gradual reduction of carbon emissions in China and to the achievement of green and low carbon development. First implemented in 7 pilot carbon markets. To be fully implemented in the 2020s.
2013	Air Pollution Action Plan	State Council	Reducing energy-related air pollution
2016	China's 13th FYP for Energy Development	National People's Congress	Reducing coal consumption at 58% in total energy consumption or below by 2020
2016, first issued in 2011 for the 12th FYP	Work Plan for GHG Emission Control during the 13th Five-Year Plan Period (2016-2020)	State Council	to lower carbon dioxide emission per GDP unit by 18% of 2015 emission level by 2020

2017	Program for the Construction of an Energy-saving Standard System	NDRC	Covering all major energy intensive industries and products and enabling 80 percent of China's energy efficiency standards to be on par with international standards by 2020.

Source: (Gallagher et al. 2019; G. M. Heggelund 2021; L. Liu 2011)