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China's Shift to Climate Change Mitigation From the Neo-Realist Perspective

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ABSTRACT

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This work deals with China's shift to climate change mitigation and green technologies from the neo-realist perspective with the use of rational choice analysis based on capabilities. China has for decades faced worsening environmental degradation and adverse impacts of climate change that has among other things, negatively influenced China's territory, population, and economy. China has started to support climate change mitigation and develop green technologies to improve the environmental degradation quite recently, which poses a question; What is the significance of China's shift in approach to climate change mitigation and green technologies? With the use of the neo-realist theory, this work focuses on state capabilities, shows their development since the 90s to see why China finds itself in this position and analyzes costs and benefits of China's ignorance or action to mitigate climate change and environmental degradation. This work uses several kinds of sources from academic articles to reports and news and finds that China got into position when it can no longer ignore these environmental issues if it wishes to preserve and possibly improve its capabilities and therefore security and survival in the anarchic international system. The significance of China's shift to the mitigation of climate change and the application of green technologies then lies in its ability to react to threats and challenges in this anarchic system rationally. Considering that China is a rising great power, growths both economically and militarily and invests significantly into technologies and their application, it has a great potential of gaining a significant capability advantage and power on the expense of other states, especially those that take no or lesser initiative in climate change mitigation and application of green technologies. This includes capabilities like population, state capacity, technologies, energy security and economic performance that are crucial for the security and survival of states.

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Chapter 1: Introduction

Climate change and environmental degradation are widely discussed topics worldwide, especially due to their adverse effect on the states and people. Effects of climate change are already visible through, for example, rising sea levels, extreme weather or droughts and according to the Intergovernmental Panel on Climate Change (IPCC) these changes "have had widespread impacts on human and natural systems."[1] As of 2014 the IPCC reports also recognize the climate change effects as harmful to states and that human influence on the climate system is clear.[2] The exposure to effects of climate change can, according to the IPCC, lead to economic shocks, poverty and even "increased risk of violent conflicts."[3] One of the affected states is also China that has, equally to most other states, been experiencing these impacts of climate change and environmental degradation within its territory and on its capabilities.

The rapid industrialization and fast economic growth made China the largest emitter of carbon dioxide (CO_2) in the world but also one of the most vulnerable countries to the adverse impacts of climate change.[4] Chinese coastal cities are being affected by rising sea levels, high urbanization in many areas causes over-extraction of groundwater and land sinking, decreased glacier coverage diminishes water volume in important rivers, worsened air quality decreases the health, working effectiveness, and satisfaction of China's population.[5] Despite this, China has overlooked the environmental degradation within the state for several decades and became highly reliant on coal energy, which further worsens China's pollution situation.[6]

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[1] IPCC, Summary for Policymakers, *In: Climate Change 2014: Impacts, Adaptation, and Vulnerability*, *Part A: Global and Sectoral Aspects*, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, (Cambridge: Cambridge University Press, 2014): 2.
[2] IPCC, Summary for Policymakers, 3.
[3] IPCC, Summary for Policymakers, 16.
[4] Ross Garnaut, Frank Jotzo and Stephen Howes, "China's rapid emissions growth and global climate change policy" in *China's Dilemma, Book Subtitle: Economic Growth, the Environment, and Climate Change*, (ANU Press, 2008): 171.
[5] Elisa Chih-Yin Lai, "Climate Change Impacts on China's Environment: Biophysical Impacts," *Wilson Center,* July 7, 2011, Accessed April 1, 2019, https://www.wilsoncenter.org/publication/climate-change-impacts-chinas-environment-biophysical-impacts.
[6] Ross Garnaut, Frank Jotzo and Stephen Howes, "China's rapid emissions growth and global climate change policy," 171.

The environmental degradation in exchange for economic growth has been for long perceived as an acceptable cost but became an issue that could no longer be ignored. According to China's National Climate Change Program (CNCCP), the adverse effects of climate change on China's socio-economic system and ecosystem will continue.[7] This means that different kinds of capabilities China possesses are currently at risk or already are being negatively influenced by climate change. In 2011, China experienced the most natural disasters compared to other countries, and it has led the list ever since.[8] Moreover, China faces issues with air pollution, which has been the result of China's industrial development.[9] The pollution has adverse environmental and health consequences that are increasingly visible for the Chinese population too and subsequently creates extra costs for the state or economic losses connected to weaker work force.[10] What has, therefore, once helped the rapid growth of the Chinese economy is now threatening it: the CO_2 emissions. Climate change together with environmental degradation that occurred due to the long-term industrial development of the country and lack of mitigation policies has, as this work claims, been negatively affecting the capabilities of the state.

The change of China's approach towards climate change and environmental degradation had appeared more significantly around the time of signing the Paris Agreement when China's "proactivity replaced passivity," and China signed and ratified the Paris Agreement.[11] The country also became more active in applying mitigation policies such as support of renewable energy in the country and development of the green technologies field.[12] This way China reacted to the worsening issue of climate change and the connected environmental degradation and it even

[7] National Development and Reform Commission People's Republic of China, *China's national climate change program,* June 2007, http://en.ndrc.gov.cn/newsrelease/200706/P020070604561191006823.pdf.
[8] Statista, "Environment in China – Statistics and Facts," Accessed February 8, 2019, https://www.statista.com/topics/2028/environment-in-china/.
[9] Eleanor Albert, and Beina Xu, "China's environmental crisis," *Council on Foreign Relations*. Last updated January 18, 2016. Accessed February 2, 2019, https://www.cfr.org/backgrounder/chinas-environmental-crisis.
[10] The World Bank, "Helping China Fight Air Pollution," June 11, 2018, Accessed February 8, 2019, https://www.worldbank.org/en/news/feature/2018/06/11/helping-china-fight-air-pollution.
[11] Jiahua Pan, "The evolution and transformation of China's climate change response strategy: From preventing 'black swan' events to reducing 'grey rhino' risks," in *China's 40 Years of Reform and Development: 1978–2018*, (Australia: ANU Press, 2018), 529.
[12] Ibid.

reached its 2020 CO_2 reduction goal in 2017.[13] Currently, the country dominates the field of clean energy technologies, finances it the most in the world and also manufactures most of these technologies.[14] For example, China is the leader in the manufacturing of electric vehicles and their sales since 2015, and the same thing applies to solar panels and wind turbines.[15] China has also been increasing the percentage of renewable energy in its mix in an effort to decrease coal consumption and reliance on it. As of 2016, China had some 35% share of renewable energy in its energy mix, including hydropower, wind power, and solar power.[16] This change in China's approach to climate change mitigation, environmental degradation and support for green technologies, however, raises a question of what is the significance of this shift?

Looking through the lenses of the neo-realist approach this work focuses mainly on China's capabilities and how these are affected or developed in connection to climate change and environmental degradation and how China's power and security can be enhanced thanks to this shift. These capabilities are also considered as either domestic or international drivers to China's mitigation. This work will, therefore, argue that China, being a rational actor in the anarchic international arena, strives for power and survival, which means that it acts in a way that increases or at least preserves its capabilities that are crucial for the survival of the state.[17] Put simply, the work looks at the issue of climate change and environmental degradation in China through the neo-realist approach with the main focus on the state's capabilities and how these are affected or changed based on the action or non-action in solving this issue. Population, state capacity, and economy are examples of capabilities that China as a state possesses and that are negatively

[13] United Nations, "China Meets 2020 Carbon Target Three Years Ahead of Schedule," *UNFCCC,* March 28, 2018, Accessed April 20, 2019, https://unfccc.int/news/china-meets-2020-carbon-target-three-years-ahead-of-schedule.
[14] Institute for Energy Economics and Financial Analysis, "Ieefa Report: China in 2017 Continued to Position Itself for Global Clean Energy Dominance," January 9, 2018, Accessed February 9, 2019, http://ieefa.org/ieefa-report-china-continues-position-global-clean-energy-dominance-2017/.
[15] Tim McDonald, "China powers up electric car market," *BBC News,* January 11, 2019, Accessed February 13, 2019.; Reinhilde Veugelers, "China is the world's new science and technology powerhouse," *Bruegel,* August 30, 2017, Accessed March 9, 2019, http://bruegel.org/2017/08/china-is-the-worlds-new-science-and-technology-powerhouse/.
[16] International Energy Agency, "World Energy Outlook 2017: China," November 14, 2017, Accessed February 13, 2019, https://www.iea.org/weo/china/.
[17] Kenneth N. Waltz, *Theory of International Politics*, (Long Grove: Waveland Press, 1979), 97.

influenced by climate change and environmental degradation or deteriorate because of the decreased quality of other capabilities of the state.

If one should look more closely to the issue of capabilities in connection to climate change in China, it becomes visible that climate change and the connected environmental degradation is a security threat to Chinese capabilities. Levy describes the security of the state as highly connected to the environment.[18] According to him, the environmental degradation becomes a physical threat when environmental damage causes significant loss of life or welfare.[19] Climate change can also indirectly harm the state due to conflicts inside the country caused by an insufficient amount of resources or other issues.[20] Considering that China "is one of the countries most vulnerable to the adverse impact of climate change," from the neo-realist point of view Chinese steps of climate change mitigation are highly rational.[21] Taking steps towards climate change mitigation and green technologies, this work shows that China can, for example, improve its population capability by applying technologies that improve air quality. Such step further affects the health and productivity of the citizens.[22] With improvements of this kind the state can gain on the production of green technologies as it can mitigate the environmental degradation, ensure the satisfaction of people, which are therefore less likely to revolt against the government and this way the country can secure its state capacity.[23]

According to Wiener, "climate change may exacerbate political and social stresses within China, which the leadership may seek to avoid in order to maintain political stability."[24] The economy then can be significantly affected based on the performance of the population and state capacity

[18] Marc A. Levy, "Is the Environment a National Security Issue?," *International Security* 20, no. 2 (1995): 36.
[19] Levy, "Is the Environment a National Security Issue?," 46.
[20] Levy, "Is the Environment a National Security Issue?," 61.; Richard A. Matthew, Ted Gaulin, et al., "The Elusive Quest: Linking Environmental Change and Conflict" *Canadian Journal of Political Science / Revue Canadienne De Science Politique* 36, no. 4 (2003): 858.
[21] Ross Garnaut Fang Cai, and Song Ligang, "China's Climate Change Mitigation in International Context: Issues for Australia and China." In *China: A New Model for Growth and Development* (ANU Press, 2013): 281.
[22] Wayne M. Morrison, "China's Economic Rise: History, Trends, Challenges, and Implications for the United States," *Congressional Research Service,* (February 2018): 41.
[23] Jonathan B. Wiener, "Climate Change Policy and Policy Change in China," *UCLA Law Review* 55, No. 6 (2008): 1805.
[24] Ibid.

capabilities.[25] Other capabilities, such as the development of green technology sector and its significance for energy security are then, as this work claims, capabilities that China can significantly enhance while other countries like the USA stagnate in their efforts.[26] It can also give China a strategic advantage in capability and power growth compared to other countries.[27]

This work is divided into several sections starting with the neo-realist theory where it focuses mainly on capabilities and climate change as a security threat to these capabilities. Crippling military, population, and economy but also exposing the state's vulnerabilities are some of the possible negative impacts of climate change and environmental degradation that are discussed as a security threat to the state. With the neo-realist approach, the rational choice analysis methodology is applied to the case of China and its shift to climate change mitigation. Here the work sees China as a rational actor that applies cost-benefit calculations to determine the steps that achieve the "highest expected utility."[28] The chapter two of this work will look at the neo-realist theory and rational choice analysis methodology to show their connection to this case of China's climate change mitigation and support of green technologies.

In order to get a better knowledge of where China finds itself today and why it mitigates climate change to an unprecedented extent, the chapter 3 of this work provides a background to China's capabilities, vulnerabilities and approach to climate change since the signing of Kyoto Protocol in the 90s.[29] Specifically, the work firstly looks into more detail to the development of climate change and environmental degradation in China and its effect on the state. It further looks at how China approached the issue of climate change through its policies and policy priorities change in the period between the signing of the Kyoto protocol and current date. China's strategic turning point towards climate change and environmental degradation is then being marked in 2014 and after the

[25] Morrison, "China's Economic Rise," 41.
[26] Katy Murphy, "Governor Jerry Brwon While Trump is AWOL, China is emerging a climate leader: Gov. Jerry Brown reacts to Trump on Paris climate accord," *Chinese American Forum* 33, No. 1. (2017): 14-15.
[27] Ibid.
[28] Rafael Wittek, "Rational Choice Theory," *Research Gate,* (January 2013): 689.
[29] Lichao He, "China's Climate-Change Policy From Kyoto To Copenhagen: Domestic Needs And International Aspirations," *Asian Perspective* 34, No. 3 (2010): 9.

signing of the Paris agreement in 2015 when the country became more active in mitigating the climate change which also becomes a point of discussion in this thesis.[30] Finally, chapter 3 also looks at the development of China's capabilities and vulnerabilities in the same period, between the 90s and current date in order to see how these capabilities were affected by the environmental degradation and climate change. Population, state capacity, green technologies, energy security, and economy, are the primary capabilities being discussed. The description of these capabilities intends to give a more detailed picture of how China became a supporter of climate change mitigation.

Having the basic idea about China's capabilities, vulnerabilities and necessities to gain power and security, the chapter 4 and 5 then focus in more detail on the current domestic and international drivers to China's climate change and environmental degradation mitigation. These chapters analyze the logic behind this action into more detail and show that China does this as a rational state to increase its power and gain an advantage to other countries in the anarchic international system. Chapter 4 focuses on the current domestic drivers of mitigation through the set of capabilities; namely population, political capacity and green technologies that it needs to sustain if it wishes to remain powerful and survive. The main focus goes to the recent negative impacts of climate change and environmental degradation on these capabilities within China's territory and how China intends to tackle this issue through the application of greener policies and technologies.

Chapter 5 then looks at the international drivers of climate change and environmental degradation mitigation which for the purpose of this work is energy security and economic growth with green technologies again being a partial solution to the vulnerability of these two capabilities. Green technologies and their increased development in China is, therefore, a capability that bridges the domestic and international aspect. Chapter 5, same like chapter 4, thus, demonstrate that China's climate change mitigation and shift to green technologies is not about some moral

[30] Pan, "The evolution and transformation of China's climate change response strategy," 529.

awakening but instead about rational behavior to the domestic and international security challenges that endanger China's capabilities and so its power, strength, and survival in the untrustworthy international anarchic system.

The conclusion then summarizes the previous chapters and shows that the significance of China's shift in approach to climate change mitigation and green technologies is precisely the capability enhancement that this behavior allows. The shift to mitigation and increased construction and application of green technologies has the potential of improving China's overall capabilities, increasing its power and gaining capability and power advantage on the expense of states that do not mitigate or take a lesser initiative in climate change mitigation.

Chapter 2: Theory and Method

2.1 Theory – Neo-realism

2.1.1 General overview

This chapter focuses on the neo-realist theory in connection to climate change mitigation and support of green technologies as a part of state's capability building and protection. Several concepts related to state capabilities are discussed to demonstrate that the enhancement of such capabilities allows countries to gain an advantage on the expense of other states in the international system. Neo-realism lays on several assumptions about the international system, which is based on anarchy, the desire for survival, differing capabilities and states own interests.[31] Mearsheimer at the same time lists five bedrock assumptions of the neo-realist world such as; the international system is anarchic, state posses military capability, states distrust each other, primary goal of a state is to survive, and states are rational actors.[32]

The first assumption describes the anarchic international system as an ordering principle where "independent states have no central authority above them."[33] While hierarchy is an ordering principle that exists within individual states, above the country, there is an anarchic system.[34] In an environment where no world government with authority over the states exists, sovereign states have to ensure their survival.[35] The neo-realists, therefore, see states as main actors who collect power through capabilities to ensure their survival.[36]

Mearsheimer describes the second assumption as a presence of military capability in every powerful state, at least to a certain extent. This means that states have the ability to threaten and

[31] Kenneth N. Waltz, *Theory of International Politics*, (Long Grove: Waveland Press, 1979), 97.
[32] John J. Mearsheimer, *The tragedy of great power politics*, (New York: W.W., 2001), 30-33.
[33] Mearsheimer, *The tragedy of great power politics*, 30.
[34] Waltz, *Theory of International Politics*, 88.
[35] Mearsheimer, *The tragedy of great power politics*, 30.
[36] Stephen M. Walt, *The Origins of Alliances* (London: Cornell University Press, 1987), 263-285.; Jeffrey W. Taliaferro, "Security Seeking under Anarchy: Defensive Realism Revisited." *International Security* 25, no. 3 (2000): 128-129.

destroy each other.[37] He, however, acknowledges that the size of military capability differs for each state.[38] At the same time, neo-realism does not recognize only military capability but also other capabilities that range from economy and technology to several kinds of state resources including population.[39] All these capabilities add up to a state power, which is collected in order to survive. While Mearsheimer as an offensive realist sees sense in gathering as much power as possible, Waltz as a defensive realist considers such collection of power as unwise because other states will tend to balance against such threat which in turn could further endanger the country that collected the power at a first place.[40]

According to Walt, the reaction of weaker states on the emerging power will be the formation of alliances or an increase of "internal efforts in order to reduce their vulnerability."[41] Although neo-realists do not find a consensus on how much power should be collected, they agree that; "power is a means to an end and the ultimate end is survival."[42] For neo-realists, survival is, therefore, the primary goal and one of the assumptions about the international structure. What is considered as survival is namely to "maintain their territorial integrity and the autonomy of their domestic political order."[43] Without survival, it is unlikely that the state would be able to pursue other aims.[44]

Another assumption is that states do not trust each other, as they can never be sure about the intentions of other sovereign states. The hostility in the anarchic system can always appear, and causes for such aggression are various. A non-existent world government means that states do not have to obey anyone, which consequently makes these actors untrustworthy. States for this reason always feel threatened by other countries that could potentially attack them.[45] Although other states

[37] Mearsheimer, *The tragedy of great power politics*, 30.
[38] Ibid.
[39] Stephen G. Brooks and William C. Wohlforth, *World Out of Balance: International Relations and the Challenge of American Primacy* (Oxford and Princeton: Princeton University Press, 2008): 46.
[40] Kenneth N. Waltz, "Structural Realism after the Cold War" *The MIT Press 25*, No.1 (Summer, 2000): 28.
[41] Stephen M. Walt, *The Origins of Alliances* (London: Cornell University Press, 1987), 263.
[42] Ned Lebow, *International relations theories: Discipline and Diversity*, ed. Tim Dunne et al. (Oxford: Oxford University Press, 2010): 72.
[43] Mearsheimer, *The tragedy of great power politics*, 31.
[44] Ibid.
[45] Mearsheimer, *The tragedy of great power politics*, 30.

do not necessarily have to be hostile, the certainty of what the other states' intentions are basically does not exist.[46] So, even though states, including the great powers, can behave like status-quo actors, they have no guarantee that their neighbor is not a revisionist one.[47] At the same time, according to Fordham, especially great powers are the ones who pursue "major power foreign policy" as their capabilities allow for expansion of their influence.[48] This automatically creates distrust, which encourages states to collect power for the sake of survival.[49]

Finally, neo-realists assume that states are rational actors. "They are aware of their external environment, and they think strategically about how to survive in it."[50] The states also come up with strategies that would maximize their likelihood of survival in the self-help world.[51] Other states consider the preferences of individual countries and their behavior in the anarchic system and alternate their behavior accordingly. Actions of other states are therefore likely to affect the other country's behavior and survival strategy.[52]

The neo-realist world is the world of threat; one state endangers the other in the anarchic system where all try to survive through a collection of capabilities and power. The lack of trust and unpredictability pushes the state into a circle of the collection of capabilities and balancing of power where an increase of their capabilities causes other countries to react in order to balance the threat and vice versa. Simply put, the improvement of one states' position threatens the others who consequently try to increase their power too. The result is a security competition between countries.[53]

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[46] Mearsheimer, *The tragedy of great power politics*, 31.
[47] Lebow, *International relations theories*, 74.
[48] Benjamin O. Fordham, "Who Wants to Be a Major Power? Explaining the Expansion of Foreign Policy Ambition." *Journal of Peace Research* 48, no. 5 (2011): 589.
[49] Mearsheimer, *The tragedy of great power politics*, 31.
[50] Mearsheimer, *The tragedy of great power politics*, 31.
[51] Lebow, *International relations theories*. 74.
[52] Mearsheimer, *The tragedy of great power politics*, 31.
[53] Robert Jervis, "Cooperation Under the Security Dilemma," *World Politics* 30, no. 2 (1978): 170.

2.1.2 Neo-realism, capabilities and power

A state that acts in the anarchic international system is like any other existing state exposed to threats posed by other countries. As rational actors, states collect capabilities that help them to sustain and increase their power and protect themselves from other countries, for example, the revisionist ones. In the past, there has been a change in how much power an individual state possessed and the same change in power relations occurs even today.

According to Katz, the strength of great powers and their status as a great power is "constantly fluctuating and uncertain."[54] Like in history, when power relations were changing, today the position of states is not guaranteed or secured either.[55] Since the end of the Cold War countries like China, Russia or India have increasingly been called rising great powers that wish to catch up with the US as a global great power.[56] Great power is by meaning a state that "differs from other countries by being more powerful."[57] Great powers can be stronger militarily or economically or both, however, it does not necessarily guarantee their ability to prevent other great powers from rising. Simply put, great powers are not equally powerful because they differ in capabilities they possess.[58] The neo-realist logic, however, is that the more capabilities relative to other states the country has the better chance of becoming a great power and survive.

Considering that the power relations are changing with time, all the states including the great powers need to remain cautious to other great powers or states that would want to balance their power.[59] The collection of various kinds of capabilities is therefore crucial not only for common states but also for great powers in order to assure their long-term survival and their position as great powers. Great powers can, at the same time, be regional or global, and while regional great power

[54] Jervis, "Cooperation Under the Security Dilemma," 170.
[55] Kenneth N. Waltz, "Structural Realism after the Cold War," *International Security* 25 (2006): 33.
[56] Mark N. Katz, "Great Powers in the Twenty-first Century," *Journal of International Relations and Sustainable Development,* No.10 (Winter 2018): 124.
[57] Ibid.
[58] Ibid.
[59] Chas W. Freeman, "China as a Great Power: Remarks to China Renaissance Capital Investors," *Middle East Policy Council,* November 7, 2014, Accessed February 3, 2019, https://www.mepc.org/speeches/china-great-power.

can influence mostly only its region, global great powers can operate in more areas.[60] Nevertheless, from the neo-realist point of view, either of these great powers, same like other states without the great power status, still need to keep their strong position in the anarchic system to survive. This necessarily means that states have to sustain or expand their capabilities through which the state power is measured.[61]

Treverton and Jones think of states as "capability containers" where countries need to transform their capabilities, be it demographic, economic or technological ones into useful instruments, for example, combat proficiency.[62] The capabilities mentioned above are part of the hard power that states have, and that is necessary to survive in the neo-realist anarchical international system of continuous threat.[63] Capabilities such as population, political capacity, economic growth, energy security, technologies, and environmental resources are therefore also crucial capabilities the state owns. While military strength is an important part of the neo-realist theory, according to Treverton and Jones, variables like technology, energy, population or economy "identify the great powers in the international system" and are also drivers of their national power.[64] At the same time, variables like economic power are a foundation of military power.[65] Such conversion of available capabilities into the state's power, like military power, however, differs in every country and is dependent among other things on political capacity to do so.[66]

Treverton and Jones also identified future security threats that are no longer only military threats but also demographic changes, health threats or environmental hazards such as global pollution.[67] These changes and hazards affect the capabilities of the country and its ability to protect itself in the anarchic international system. Such hazards are therefore "threat multipliers" because they

[60] Freeman, "China as a Great Power: Remarks to China Renaissance Capital Investors."
[61] Gregory S. Treverton, and Seth G. Jones, *Measuring National Power*, (Santa Monica: RAND Corporation, 2005): 20.
[62] Treverton, and Jones, *Measuring National Power*, ix.
[63] Treverton and Jones, *Measuring National Power*, 1.
[64] Treverton and Jones, *Measuring National Power*, 5.
[65] Ibid.
[66] Ibid.
[67] Treverton and Jones, *Measuring National Power*, 6.

strengthen different threats and endanger the state's capabilities, which in turn further threaten the state's power, security, and survival.[68] So, when thinking about the states power and ability to survive, it is necessary to include not only the military threats it faces and military capabilities it owns but also other capabilities that significantly contribute to its survival. Moreover, the already mentioned economic performance, population, technologic development, political capacity or energy security are capabilities that not only contribute to the states power and survival; they can also be transformed into military capacity.[69]

Such capabilities, therefore, need to be taken into account with the same seriousness as traditional military capabilities of the state because the economy, technology, and population are capabilities directly connected to military strength and mainly to the survival of the state. Sustention of these capabilities also determines the state's power and security position in the anarchic international system. By acknowledging these capabilities as part of the states ability to survive, the neo-realist theory will be able to explain benefits from actions like climate mitigation and the development of green technologies.[70] What is crucial to consider, are also variables that can negatively influence the state's capabilities. For the purpose of this work, it is primarily environmental degradation and climate change that have the capacity to affect the country's capabilities and their sustention negatively.

2.1.3 Climate change and environmental degradation as capability and security threats

Firstly, what is for this thesis understood as climate change is a change in usual weather patterns that appear globally.[71] What is, however, different between local weather and climate is that "weather can change in just a few hours, climate takes hundreds or even millions of years to

[68] Amar Causevic, "Facing an Unpredictable Threat: Is NATO Ideally Placed to Manage Climate Change as a Non-Traditional Threat Multiplier?" *Connections QJ* 16, no. 2 (2017): 66.
[69] Treverton and Jones, *Measuring National Power*, 4.
[70] Anthony H. F. Li, "Hopes of Limiting Global Warming? China and the Paris Agreement on Climate Change," *China Perspectives 105*, no. 1 (2016): 51.
[71] NASA, "What Is Climate Change?" August 2017, Accessed February 2, 2019, https://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-climate-change-k4.html.

change."[72] Global warming, identified as "long-term warming of the planet since the early 20th century" and climate change are understood as human-induced, and environmental degradation is part of the overall climate change problem that states are experiencing, and that threatens their survival.[73] Overall, the depletion of soil, water resources or worsened quality of air, are signs of environmental degradation.[74]

Climate change would be by neo-realists like Mearsheimer considered a non-traditional threat, one that is not a traditional military threat that the neo-realist theory usually deals with.[75] Levy, however, describes the security of the state as highly connected to the environment. He relates the security and environment in three forms; existential, physical and political.[76] The environmental degradation, as he mentions, becomes a physical threat when environmental damage causes significant loss of life or welfare.[77] Climate change can also indirectly harm the state due to conflicts inside the country caused by an insufficient amount of resources or other issues.[78] This idea can be connected to Causevic's thinking about climate change as a threat multiplier. Simply put, climate change has the capacity of worsening the already existing problems that the state might have. This includes water shortages, draughts but also an acceleration of instability and, as Causevic mentions, climate change can also "exacerbate other drivers of insecurity that will simultaneously affect the environmental, economic, social, and political fabric of any modern society."[79] Climate change is considered a threat multiplier by states and their militaries as well

[72] NASA, "What Is Climate Change?"
[73] NASA, "Climate Change: How do we know?," Last Updated, January 31, 2019, Accessed February 3, 2019, https://climate.nasa.gov/evidence/.; Edward Grumbine, "Assessing Environmental Security in China," *Frontiers in Ecology and the Environment* 12, no. 7 (2014): 403.
[74] NASA, "What's in a name? Weather, global warming and climate change," Last updated February 7, 2019, Accessed February 21, 2019, https://climate.nasa.gov/resources/global-warming/.; Josy O'Donnel, "Environmental Degradation – What You Need To Know and Its Harmful Effects," *Conservation Institute,* May 15, 2018, Accessed February 7, 2019, https://www.conservationinstitute.org/environmental-degradation/.
[75] Mark J. Lacy, *Security and Climate Change: International Relations and the Limits of Realism.* Routledge Research in Environmental Politics. (London: Routledge, 2005), 73.
[76] Levy, "Is the Environment a National Security Issue?," *International Security* 20, no. 2 (1995): 36.
[77] Levy, "Is the Environment a National Security Issue?," 46.
[78] Levy, "Is the Environment a National Security Issue?," 61.; Richard A. Matthew, Ted Gaulin, et al., "The Elusive Quest: Linking Environmental Change and Conflict," *Canadian Journal of Political Science / Revue Canadienne De Science Politique* 36, no. 4 (2003): 858.
[79] Causevic, "Facing an Unpredictable Threat," 66.

because it has the potential of disrupting military supply chains and affect military structures, for example, due to rising sea levels.[80] From the neo-realist point of view, sustention of military capability is the priority for the state's security.

Dumaine and Mintzer then perceive climate change not primarily as an environmental concern but mainly as a problem of "national economic policy, strategic planning, public health, infrastructure, finance, and international security."[81] What it means is that the state is worried about its capabilities, and economic performance, public health or infrastructure is part of it. Climate change can expose the vulnerability of the state, which in the neo-realist thinking is the last thing the state would want if it wishes to survive. The state will, therefore, take steps that will decrease its vulnerability and eliminate or protect itself from the threat. In terms of climate change, it means climate change mitigation.

Mitigation of climate change can be described as an effort to "reduce or prevent emission of greenhouse gases" which are the cause of global warming and subsequently of climate change.[82] This effort includes the state's search for alternative sources of energy, such as renewable energy and increased use of green technologies to reduce emissions. The mitigation can come on the local, regional, national and international level.[83] From the neo-realist point of view, the mitigation of climate change would be a rational step; simply it is a way to avoid the threat that climate change poses to the state's capabilities. Mitigation would allow the state to sustain its capabilities, be powerful, survive and possibly gain an advantage to other countries in the international system, especially to those that do not mitigate.

[80] United Nations, "Climate Change Threatens National Security Says Pentagon," October 14, 2014, Accessed February 14, 2019, https://unfccc.int/news/climate-change-threatens-national-security-says-pentagon.
[81] Carol Dumaine and Irving Mintzer, "Confronting Climate Change and Reframing Security," SAIS Review of International Affairs 35, no. 1 (2015): 6.
[82] UN Environment, "Mitigation," Accessed February 3, 2019, https://www.unenvironment.org/explore-topics/climate-change/what-we-do/mitigation.
[83] Ibid.

2.2 Method - Rational choice analysis based on capabilities

2.2.1 General Overview

The rational choice analysis stems from the rational choice theory, which as Quackenbush says is rather a "descriptive phrase used to describe any of a number of individual theories that use the rationality assumption."[84] The rational choice then assumes that what happens is a result of the rational actor's choices.[85] Wittek describes the rational choice theory as an "umbrella term" for several models that explain "social phenomena as outcomes of individual action that can in some way be construed as rational."[86] As Snidal mentions, this theory is viewed more like a "methodological approach," which will also be the case of this work.[87]

Essential elements for rational choice are the preferences of the actor that are based on available information and cost-benefit thinking. The cost-benefit calculations determine the steps of the actor who wants to achieve the "highest expected utility."[88] The state as a rational actor then takes rationally motivated steps and bases them on the already mentioned available information.[89] Rational actors can calculate alternative courses of action and decide for the most advantageous one.[90] The cost of action versus the profit the actor can make is the motivation. The self-interest and ability to achieve the best possible outcome is, therefore, the basis of rational choice.

The rationality is often mentioned among neo-realists and is also one of the Mearsheimer's assumptions about the actors in the anarchic international system.[91] For Mearsheimer, the possibility of irrationality exists, but he describes a state that acts irrationally as "foolish and

[84] Stephen L. Quackenbush, "The Rationality of Rational Choice Theory." *International Interactions 30*, no.2. (April 2004): 92.
[85] Peter Hedström, "Introduction to This Special Issue on Rational Choice Theory." *Acta Sociologica* 36, no. 3 (1993): 167.
[86] Rafael Wittek, "Rational Choice Theory," *Research Gate,* (January 2013): 688.
[87] Duncan Snidal, *Rational Choice and International Relations* (London: SAGE Publication, 2012): 87.
[88] Wittek, "Rational Choice Theory," 689.
[89] Gary Browning, Abigail Halcli and Frank Webster, *Understanding Contemporary Society: Theories of the Present* (London: SAGE Publications Ltd., 2000): 127.
[90] Ibid.
[91] Mearsheimer, *The tragedy of great power politics*, 31.

reckless."[92] Nevertheless, for the purpose of this work, the rationality will be defined as cost-benefit calculation where actors wish to achieve the best possible outcome for themselves. The thesis will particularly use the rational choice analysis to look at Chinese capabilities. Since according to the rational choice theory the rationality of the state is driven by the costs and benefits of its action or inaction, this rational choice analysis will help describe the significance and benefits of China's shift to climate change mitigation and green technologies through capability sustention and collection.

2.2.2 Methodology of Rational choice analysis used for the case of China

The method of rational choice analysis will serve to explain the significance of Chinese change of policies towards climate change mitigation and green technology and how it benefits the country. One chapter of this work is devoted to the background of China's environmental degradation since the late 90s and its approach to climate change mitigation and green technologies. This includes the history of Chinese participation in international climate agreements since the Kyoto protocol until the post-Paris agreement period, as well as the history of the development of China's capabilities and vulnerabilities.

The capabilities that this work will talk about include population that presents the state's valuable aspect of China's economic growth. Population also presents an important aspect to the state capacity in form of the government sustention. The performance of this state's population capability can be affected by environmental degradation and climate change. The health and mortality in connection to the development of air quality in China are examples of its population capability vulnerability that has the potential of negatively influencing other capabilities. Such capabilities can be, for example, political capacity understood as China's government political stability that is affected by aspects like climate protests. Other capabilities that will be discussed are

[92] John J. Mearsheimer, "Reckless States and Realism," *International Relations 23*, no 2 (2009): 251.

technological development mainly concerning green and renewable technologies, China's energy security, which is interpreted as "the uninterrupted availability of energy sources at an affordable price, and finally, its economic growth."[93] The first part of the work will be therefore structured as a summary of the development of China's approach to climate change and the state capabilities in order to provide an idea of how the state developed and why it finds itself in its current position with the need to mitigate climate change and environmental degradation. Second part will then analyse domestic and international drivers for China's shift in mitigation policies taking into consideration mainly the recent events from Paris Agreement until 2019. It will simply analyse the various incentives China has to mitigate climate change and the environmental degradation.

The first part of the work will summarize the climate change and environmental degradation with the use of the IPCC reports from 1995 to 2018 on climate change and NASA findings. Chinese official statements and other articles will then provide the basic picture of the situation that China faces in terms of climate change and its adverse effects. Having the issue of climate change and its impacts on China in mind, the work will subsequently look at the development of China's approach towards this issue. Academic articles and official government statements that focus on China's climate negotiations and development of its approach towards the responsibility for climate change and its possible mitigation since Kyoto protocol until the post-Paris agreement period will be reviewed within the same period between 1995 to 2018.[94]

The work will also focus on the development of China's capabilities and vulnerabilities. Air quality will be assessed with the use of, for example, World Bank data, articles, and reviews.[95] Concerning health and mortality, the UN data and academic articles will help assess the impact of

[93] International Energy Agency, "What is energy security?: Defining energy security," Accessed February 3, 2019, https://www.iea.org/topics/energysecurity/whatisenergysecurity/.
[94] Lichao He, "China's Climate-Change Policy From Kyoto To Copenhagen: Domestic Needs And International Aspirations," *Asian Perspective* 34, No. 3 (2010).; Zhang Zhizhong, "Forces Behind China's Climate Change Policy," in Matthew Paterson and Graham Smith, eds., Global Warming and East Asia, (London: Routledge, 2003).
[95] Haakon Vennemo et al., "Environmental Pollution in China: Status and Trends Article," *Review of Environmental Economics and Policy* 3, no. 2 (July 2009): 4.; Eleanor Albert, and Beina Xu, "China's environmental crisis."; World Bank, *China's environment in the new century: Clean water, clear skies*, (Washington D.C.: The World Bank, 1997): 1-111.

environmental degradation and climate change on China's population which is part of its set of capabilities. The population as capability is important because it can influence the political capacity of the state and its performance.

Political capacity is at the same time another kind of capability China has and that determines the survival of the state. This work will look at how political stability is affected by the Chinese protests connected to environmental degradation. Without political stability, the state becomes unstable and therefore the prospects of its survival decrease. Information about demonstrations will be collected mainly from news articles or academic articles that will provide a basic idea about the influence of climate change on political stability.[96] These data will be restricted to the periods between the Kyoto protocol and 2018.

China's technological development is another point to focus on as part of the country's capability range. The work will primarily look at China's technological development in green and renewable technologies where the country has recorded a significant rise.[97] This includes technologies that China applies with the effort to tackle climate change and environmental degradation. The economic growth of the country will be summarized with the use of data from the World Bank and the Congressional Research Service. The chapter will also look at China's energy security; this means its access to energy, energy mix and increasing role of renewable energy in energy security of the country."[98] Analysis and reports of several academic authors will be used to summarize China's development in this sector between the late 1990s and 2018.[99] Finally, news and academic articles will also serve as sources for making a basic summary of China's economic

[96] John Kennedy, "Environmental Protests in China on Dramatic Rise, Experts Say." *South China Morning Post*, October 29, 2012, https://www.scmp.com/news/china/article/1072407/environmental-protests-china-rise-expert-says.; Kingsyhon Lee and Ming-sho Ho, "The Maoming Anti-PX Protest of 2014: An Environmental Movement in Contemporary China," *China Perspectives* 3 (2014): 33-39.
[97] Yanfei Li, "Understanding China's Technological Rise," *The Diplomat,* August 3, 2018, Accessed January 29, 2019.
[98] International Energy Agency, "World Energy Outlook 2017: China," November 14, 2017, Accessed February 13, 2019, https://www.iea.org/weo/china/.
[99] Kwang Ho, "Analysing China's Energy Security: A Source For Conflict?" *The Journal of East Asian Affairs* 23, No. 1 (Spring/Summer 2009): 89-114.

growth since the 90s until present.[100]

The first part of the work will overall focus on the development of the above-mentioned capabilities and vulnerabilities and their indicators up until the present. It will help to gain a better understanding of China's current situation, how it got to it, and to create a base for further data analysis. Therefore, once having knowledge of these capabilities, they will be used in the following sections as either domestic or international drivers for China's shift to climate change mitigation and green technologies.

The second part of the work will then be looking at domestic and international drivers of China's climate change mitigation and green technologies. Mainly, the work will focus on the country's population, political capability, and technology. It will develop the idea of what the significance of China's shift to climate change mitigation and green technology is by using these particular capabilities. The capabilities and vulnerabilities are the drivers for change and the sources collected in the previous chapter will be used to support this idea. Additional academic and other sources will also be used to show how the rational state sustains and improves its capabilities to remain powerful and ensure its survival. International drivers of China's shift to climate change mitigation will then primarily work with economic growth and energy security. Current development of these capabilities and how they benefit China as a power-seeking state will be discussed. Economic and green growth reports, academic articles and newspaper articles will be some of the sources to develop the argument of China's shift in climate mitigation being shaped by these drivers.

Finally, the work will summarize the overall significance of China's shift in approach to climate change mitigation and green technologies based on previously used data and their explanation within the neo-realist thinking. It will consider broader consequences of China's climate mitigation mainly that it will gain several kinds of advantages including the economic and security advantage.

[100] Peter Pham, "Is There a Secret Growth Hormone Added to China's Economy?" *Forbes,* March 6, 2018, https://www.forbes.com/sites/peterpham/2018/03/06/is-there-a-secret-growth-hormone-added-to-chinas-economy/#27745a033f13.

Chapter 3: Background of China's capabilities, vulnerabilities, and approach to climate change

This background chapter will look at the development of China's capabilities and vulnerabilities since 90s and show that China has not always favored climate change mitigation as it found more benefits to its capability collection in ignoring environmental degradation. Development of climate change, China's approach to climate change mitigation and development of its capabilities and vulnerabilities in the period between the 1990s and 2018 will provide a context to its relatively recent significant shift in climate change mitigation policies in 2014/2015. First capabilities to be discussed are population, state capacity and green technologies as these are in the following chapter described as domestic drivers of China's climate change mitigation, or simply reasons for the shift in China's mitigation. Energy security and economic growth will follow as international drivers for this mitigation. Analyzing China's capabilities in more detail will also provide a better understanding of their importance to China's security and survival in the anarchic international system from the neo-realist point of view. The development of these capabilities in the period of almost thirty years will also give a better idea of why currently China acts the way it does.

3.1 Climate change, environmental degradation and China

Climate change and environmental degradation have become an increasingly pressing issue worldwide. The United Nations (UN) Intergovernmental Panel on Climate Change (IPCC) provides reports on climate change and its impacts and these reports ever since 1990 have stated that climate change would potentially cause adverse effects including sea level rise, extreme weather and further affect industry, infrastructure, agriculture, and human settlements.[101] Although these findings were reported already in 1995, the understanding of environmental processes was limited and as the IPCC report from 1995 mentions, impact of climate change "is difficult to quantify, and

[101] IPCC, *Climate Change 1995: Impacts, Adaptations and Mitigation of Climate Change: Scientific-Technical Analyses* (Cambridge University Press, 1996), 9.

existing studies are limited in scope."[102]

With over twenty years that scientists devoted to further studies of climate change since 1995, the certainty of the interconnectedness of climate change and issues of rising sea levels, droughts, extreme weather the states are experiencing has risen. While reports before and shortly after the year 2000 talk about potential sensitivity and vulnerability of the states on the effects of climate change, the 2014 report already talks about "high confidence" that these effects are harmful.[103] The headline statement of the 2014 report also says that "human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems."[104] The scientific research has shown that the impacts of climate change are already visible. With "high confidence" the report also says that climate change has more negative than positive effects, for example, on the crop yields.[105] Higher exposure to extreme weather, poverty, economic shocks and "increased risk of violent conflicts" connected to such negative events are also mentioned in the report, and there is a high agreement among the scientists that such events will appear.[106]

The most recent special IPCC report from October 2018 informs that the human activity has caused "1.0°C of global warming above pre-industrial levels" and according to NASA, "most of the warming occurred in the past 35 years."[107] It is estimated that if the speed of warming continues at the current rate, by 2030, the temperature will be 1,5°C above the pre-industrial levels.[108] Although 1,5°C increase in temperature does not sound like much, it will cause an increase of mean temperature in oceans and lands, and subsequently, droughts or heavy precipitation will appear in several regions. NASA stated that the evidence of rapid climate change is precisely the rise of

[102] IPCC, Climate Change 1995, 4.
[103] IPCC, Climate Change 1995, 4.; IPCC, Summary for Policymakers, *In: Climate Change 2014: Impacts, Adaptation, and Vulnerability*, https://www.ipcc.ch/pdf/assessment-report/ar5/wg2/ar5_wgII_spm_en.pdf.
[104] IPCC, Summary for Policymakers, 2.
[105] Ibid.
[106] IPCC, Summary for Policymakers, 16.
[107] NASA, "Climate Change: How do we know?"
[108]IPCC, "Summary for Policymakers of IPCC Special Report on Global Warming of 1,5°C approved by governments," October 8, 2018, Accessed February 7, 2019.

temperature, warming oceans, shrinking ice sheets, glacial retreat, sea level rise, ocean acidification, and extreme weather events.[109] In connection to this, the climate-related risks to water supply, livelihoods, health, and economic growth will increase too.[110] These adverse effects of climate change appear globally, and China is not left behind.

China has suffered several kinds of negative impacts caused by climate change and environmental degradation ranging from air pollution or decrease of water quality to deteriorating health of its population and economic losses. Due to rapid industrial development in the 20th and 21st century to increase its economic growth, China has become the biggest carbon dioxide emitter worldwide and overlooked the environmental degradation in its territory for decades.[111] China also became the most reliant country on coal for energy-use in the world and so the most carbon-intensive country.[112] Based on the information from the Chinese National Development Commission (NDRC), currently "China is one of the countries most vulnerable to the adverse impact of climate change."[113]

The adverse impacts are specifically rising sea levels that are affecting China's cities and the average sea level in the coast increased by 90mm over the past 30 years.[114] The high urbanization of the cities and over-extraction of ground water "decreases land load carrying capacity and accelerates land sinking."[115] It is estimated that some areas will suffer up to 60cm rise of the sea level by 2050 and will negatively affect the urban areas.[116] Further issue is China's decrease in glacier coverage, which is affecting the water volume in major rivers and change in their pattern. The shortage of water is imminent and currently, some 40% of China's population lives in region

[109] IPCC, "Summary for Policymakers of IPCC Special Report on Global Warming of 1,5°C approved by governments."
[110] Ibid.
[111] Global Carbon Atlas, "CO2 Emissions," Accessed February 9, 2019, http://www.globalcarbonatlas.org/en/CO2-emissions; Eleanor Albert, and Beina Xu, "China's environmental crisis."
[112] Ross Garnaut et. al., "China's rapid emissions growth and global climate change policy," 171.
[113] Ibid.
[114] Lai, "Climate Change Impacts on China's Environment: Biophysical Impacts."
[115] Ibid.
[116] Ibid

with water shortages.[117] The water shortages also directly affect wetlands and cause further desertification in China's territory and inevitably cause the extinction of many of the China's fauna and flora species. China has also been experiencing an increased frequency and intensity of climate events like heat waves, severe draughts and heavy rains that subsequently cause higher likelihood of tropical cyclones, mudslides, floods and more.[118] These events cause China economic losses of some USD 37,5 billion every year.[119]

What has, therefore, once helped the rapid growth of the Chinese economy is now threatening it to an extent that can no longer be ignored; the CO_2 emissions. One of the suggested steps to stop the increase of average temperature and pollution is to lower the CO_2 emissions that are considered as one of the causes of human-induced climate change.[120] Internationally, such efforts have appeared with the Kyoto protocol that was signed in 1997 and continue until the present day through the Conference of the Parties (COP) within the United Nations Framework Convention on Climate Change (UNFCCC) and through climate agreements.[121] Chinese approach towards climate mitigation and reduction of CO_2 emissions has, however, changed even within the COP meetings and negotiations.

3.2 China's approach to climate change mitigation since the Kyoto Protocol until the post-Paris agreement period

The Kyoto Protocol was officially signed at the third Conference of Parties (COP) and bound developed countries to reduce their CO_2 emissions.[122] China's policy towards this agreement has been to avoid commitments on the reduction of CO_2 emissions arguing that developed countries are

[117] Lai, "Climate Change Impacts on China's Environment: Biophysical Impacts."
[118] Ibid.
[119] Ibid
[120] NASA, "Climate Change: How do we know?"
[121] He, "China's Climate-Change Policy From Kyoto To Copenhagen: Domestic Needs And International Aspirations," 9.; United Nations, "Conference of the Parties (COP)," *UNFCCC,* Accessed February 20, 2019, https://unfccc.int/process/bodies/supreme-bodies/conference-of-the-parties-cop.
[122] Unied Nations, "Climate Negotiations Timeline," *UN Sustainable Development Goals*, Accessed February 9, 2019, https://www.un.org/sustainabledevelopment/climate-negotiations-timeline/.

the principal emitters of greenhouse gas emissions (GHGs) and "should bear the primary responsibility in addressing the climate-change problem."[123] In fact, in the late 90s, China was not even considered a middle-level developed country and China itself saw the primary purpose in eradicating poverty and achieving rapid economic development.[124] China has simply refused to impose targets on the reduction of emissions, as it believed that the protection of the environment should not be done at the expense of its economy.[125] The benefits of mitigating climate change were at that time significantly lower than the benefits of ignoring the issue as rapid growth was providing for other kinds of capabilities. At the same time, it connected the issue of climate change with national sovereignty when claiming that all developing countries "have the right to develop and should neither be obliged to undertake measures that might impede development nor subject to conditions being placed on aid or development."[126] In 2005, when the Kyoto Protocol became effective, China kept claiming its status of developing country and its right to economically develop. According to the statistics, the coal energy demand doubled since 1990, and by 2006 some 90% of "new electricity-generation capacity was coal-fired."[127]

China's slight shift in approach occurred in 2007, at the same time when it became the largest CO_2 emitter worldwide and the same time when the IPCC described with a high degree of certainty that climate change and human activity were connected.[128] China came with a National Climate Change Program (NCCP) where it stated that climate change was an issue of development. This indicated that China would keep sacrificing the environment for the sake of its economic development.[129] Nevertheless, China recognized the issue of climate change and global warming not only by setting the NCCP but also by confirming the rising average temperatures in the country

[123] Zhizhong, "Forces Behind China's Climate Change Policy," 68.
[124] He, "China's Climate-Change Policy From Kyoto To Copenhagen," 9.
[125] He, "China's Climate-Change Policy From Kyoto To Copenhagen," 6.
[126] John Vidal, and David Adam, "China overtakes US as world's biggest CO2 emitter," *The Guardian,* June 19, 2007, Accessed February 9, 2019, https://www.theguardian.com/environment/2007/jun/19/china.usnews; Gang Chen, "China's Diplomacy On Climate Change," *The Journal of East Asian Affairs* 22, No. 1 (Spring/Summer 2008): 148.
[127] Ross Garnaut et al., "China's rapid emissions growth and global climate change policy," 175.
[128] John Vidal, and David Adam, "China overtakes US as world's biggest CO2 emitter."; Chen, "China's Diplomacy On Climate Change," 146.
[129] Chen, "China's Diplomacy On Climate Change," 159.

and by putting forward voluntary targets on cutting emissions.[130]

First more serious promises about the pace of the rise of greenhouse gas emissions were made in 2009 at the Copenhagen negotiations.[131] China's State Council declared the state would work on energy saving society and would develop a low-carbon economy.[132] Even then, however, China together with South Africa, India and Brazil (BASIC) emphasized that the principle of historical responsibility of developed states needed to be remembered and therefore placing the main burden on developed countries.[133] However, what became significant was Obama's cap-and-trade energy bill and his remark that "there is no longer a question about whether jobs and industries of the 21st century will be centered on clean, renewable energy" the question became which country would create these jobs and industries.[134] China became to see the potential of green energy technologies, and as Lichao He mentions, it also intended "to occupy the commanding heights in the new round of competition that is centered on green technology and economy."[135] In 2011, China released its Twelfth five-year plan for economic and social development from 2011 to 2015 where it devoted for the first time in history a full chapter on climate change response.[136] Rather than a moral awakening, however, it was a cost-benefit calculation to China's strategic retention of capabilities and adaptability to climate change.[137]

What is being marked as China's strategic turning point to climate change response is the year 2014. "Proactivity replaced passivity" and China not only signed and ratified the Paris Agreement shortly after in 2015 but in its thirteenth five-year plan it called for "more aggressive actions to

[130] Chen, "China's Diplomacy On Climate Change," 160.
[131] Kathryn Hochstetler and Manjana Milkoreit, "Responsibilities in Transition: Emerging Powers in the Climate Change Negotiations," *Global Governance* 21, No. 2 (June 2015): 205.
[132] He, "China's Climate-Change Policy From Kyoto To Copenhagen," 12.
[133] Hochstetler and Milkoreit, "Responsibilities in Transition: Emerging Powers in the Climate Change Negotiations," 213.
[134] "President Barack Obama Statement on the Energy Bill," June 25, 2009, Washington, D.C., The White House, Office of the Press Secretary, https://obamawhitehouse.archives.gov/the-press-office/remarks-president-importance-passing-a-historic-energy-bill.
[135] He, "China's Climate-Change Policy From Kyoto To Copenhagen," 18.
[136] Pan, "The evolution and transformation of China's climate change response strategy," 529.
[137] China's National People's Congress,*12th Five-Year Plan (2011-2015) for National Economic and Social Development,* (China: Central Compilation & Translation Press, 2011), chapter 21.

respond to climate change."[138] While chapter 46 of the plan talks about adaptation and efforts to slow down climate change by controlling carbon emissions, chapter 47 talks about ensuring China's security by improving its capabilities and chapter 48 then calls for "environmentally friendly industries."[139] China also pledged it would peak carbon emissions by 2030 and "reduce carbon intensity by 60-65% from 2005 levels."[140] Ultimately, the Paris agreement made 195 countries including China to consent on a legally binding limiting of global warming to 2°C above pre-industrial levels and aim to reduce it to 1,5°C by the end of the century.[141]

China has also become referred to as a leader in climate change mitigation. According to Governor Brown, with Trump "going AWOL, China is emerging as the leader on climate change for the world."[142] Although authors like Engels dispute the Chinese leadership in climate change mitigation, it is certain that China stepped up the efforts to mitigate climate change and pursue its future growth in a low-carbon way.[143] Especially wind and solar energy, as well as green technologies, became a field dominated by China.[144] Furthermore, in 2017 China managed to cut its CO_2 emissions "per unit of GDP by 46 percent from the 2005 level" which means it fulfilled its target three years in advance.[145] According to Xie Zhenhua, the representative of China to UNFCCC negotiations, this achievement is recognition of China's effort that ranges from efforts to tackle climate change to promotion of "historic opportunity to achieve sustainable development and

[138] Pan, "The evolution and transformation of China's climate change response strategy," 529.
[139] Central Committee of the Communist Party of China, *The 13th Five-Year Plan For Economic And Social Development Of The Peoples Republic Of China*: *(2016–2020),* (China: Central Compilation & Translation Press, 2016), chapter 47. http://en.ndrc.gov.cn/policyrelease/201612/P020161207645766966662.pdf.
[140] Li, "Hopes of Limiting Global Warming?" 50.
[141] Li, "Hopes of Limiting Global Warming?" 51.
[142] Katy Murphy, "Governor Jerry Brwon While Trump is AWOL, China is emerging a climate leader: Gov. Jerry Brown reacts to Trump on Paris climate accord," *Chinese American Forum* 33, No. 1. (2017): 14-15.
[143] Anita Engels, "Understanding how China is championing climate change mitigation," *Palgrave Communications* 4, no.1 (August 14, 2018): 1-6.
[144] NRDC, "The Road From Paris: Chinas Progress Toward Its Climate Pledge," NRDC Issue Brief, November 2017, Accessed February 8, 2019, https://www.nrdc.org/sites/default/files/paris-climate-conference-China-IB.pdf.; Institute for Energy Economics and Financial Analysis, "Ieefa Report: China in 2017 Continued to Position Itself for Global Clean Energy Dominance," January 9, 2018, Accessed February 9, 2019, http://ieefa.org/ieefa-report-china-continues-position-global-clean-energy-dominance-2017/.
[145] United Nations, "China Meets 2020 Carbon Target Three Years Ahead of Schedule."

pushing the transition towards green low-carbon development."[146]

When looking at the development of China's policy priority, it shifted from forecasting and reacting to disasters, to engagement in scientific and technological research, to defending China's right for economic development on the expense of environmental degradation, to today when it mitigates climate change by lowering its carbon emissions through a high speed of renewable energy development.[147] China started to increasingly consider the security and other implications of climate change and their effect on the state capabilities, such as the country's population, political capacity, economic growth and others that are crucial for the power and survival of the state in the international arena.

3.3 Development of China's capabilities and vulnerabilities

China possesses various capabilities ranging from military to human and technological capabilities. It has stepped from the position of a poor country in the 20th century into the 21st century as a rising great power with a growing economy and an increasingly capable military as part of its capabilities.[148] It is currently second to the US in economy and military expenditure and is expected to surpass the US in the future.[149]As this work claims, however, the military is not the only capability ensuring the state's survival. China has with the time developed other capabilities that are at the same time being affected by climate change and environmental degradation. This sub-chapter discusses the development of capabilities that significantly influence China's great power status and security in the international arena. These capabilities are also domestic and international drivers to China's mitigation, they are either internal or external reasons that force

[146] United Nations, "China Meets 2020 Carbon Target Three Years Ahead of Schedule."
[147] Pan, "The evolution and transformation of China's climate change response strategy."; Jan Burck et al., *Climate Change Performance Index: Results 2018,* (Berlin: Germanwatch, 2017), https://www.climate-change-performance-index.org/sites/default/files/documents/the_climate_change_performance_index_2018.pdf.
[148] Michael S. Chase, "The U.S. "Rebalancing" Policy and China's Search for a "New Type of Great Power Relationship" with the United States: Some Potential Implications for Taiwan," *American Journal of Chinese Studies* 21 (2014): 128.
[149] Alex Gray, "The world's 10 biggest economies in 2017," March 9, 2017, Accessed February 13, 2019, https://www.weforum.org/agenda/2017/03/worlds-biggest-economies-in-2017/.

China to shift its climate change policies. The description of the development of these capabilities is done to provide a more detailed picture of how China got into the position of the supporter of climate change mitigation and that its primary objective is the capability sustention and development.

Population

The population is one of the state's capabilities, that is, at the same time, vulnerable to negative changes of the environment. Air quality, in particular, is a good example of pollution and environmental degradation issue in China for decades that has negatively influenced the health of the population. In the late 90s, China has been tackling high concentrations of sulfur dioxide (SO_2) and acid rains due to increased demand for energy that was mainly coal-based.[150] Already in this period, the concentrations of particulates and sulfur dioxide in many parts of China were significantly above the World Health Organization (WHO) guidelines.[151] The air pollution was also linked to a high number of premature deaths, especially in cities.[152] By 2001, as the energy demand grew and reliance on coal continued, one-third of China's territory was affected by acid rains causing further damages on crops, aquatic life and human health.[153] A fast-growing problem also became motor vehicle emissions that worsened air pollution.[154] In terms of health consequences, the diesel-driven trucks and buses became a matter of concern, as the diesel engines are carcinogens.[155]

By 2007 China became the biggest emitter of SO_2 and CO_2 and in 2013 "Beijing experienced a prolonged bout of smog so severe that citizens dubbed it an 'airpocalypse'."[156] The hazardous

[150] The World Bank, *China's environment in the new century: Clean water, clear skies*, 8.
[151] The World Bank, *China's environment in the new century: Clean water, clear skies,* 9.
[152] The World Bank, *China: Air, Land, Water. Environmental priorities for a new millennium*, (Washington D.C.: The World Bank, 2001): 76.
[153] Ibid.
[154] The World Bank, *China: Air, Land, Water. Environmental priorities for a new millennium*, 78.
[155] The World Bank, *China: Air, Land, Water. Environmental priorities for a new millennium*, 89.
[156] Vennemo et al., "Environmental Pollution in China: Status and Trends Article," 4.; Albert, and Xu, "China's environmental crisis."

particles were forty times higher than what was recognized as safe by the WHO.[157] In 2015, some 80% of China's cities that were monitored for air pollution did not meet the national pollution standards.[158] 2015 also became the year when China started taking more serious steps towards the reduction of coal consumption and has taken active steps to reduce CO_2 emissions.[159] Overall, air pollution was connected to "reduced lung function, respiratory symptoms, chronic bronchitis, cardiovascular, and cerebrovascular diseases.[160] Based on the data since the 90s until 2016, the Health Effects Institute (HEI) estimated that China annually faces "1,1 million early deaths from outdoor air pollution."[161] The negative implications of air pollution are not only debilitating the population as the state's capability but are also raising the population's domestic discontent that influences China's government stability, another capability the state has.

State capacity

The population's level of satisfaction with the regime can challenge the state's political stability. The public tolerance for environmental issues has "decreased markedly, as reflected in the rise of public protests against polluting projects across the country" and while protests are usually limited in their scale, they have caused social unrest in the country that the government has to tackle.[162] Based on the information provided by Yang Chaofei, vice-chairman of the Chinese Society for Environmental Sciences, environmental "mass incidents" have grown approximately 29% every year in the period from 1996 to 2011.[163] Just in 2005, China reported 50 thousand protests

[157] Albert, and Xu, "China's environmental crisis."
[158] Ibid.
[159] China Power Team, "Is air quality in China a social problem?" *China Power*, Last updated October 16, 2018, Accessed February 10, 2019, https://chinapower.csis.org/air-quality/.
[160] The World Bank, *Cost of pollution in China: Economic estimates of physical damages,* (Washington D.C.: The World Bank: 2007): 19.
[161] Li Jing, "1.1 trillion yuan in economic losses from pollution in 2010, China report says," *South China Morning Post,* March 28, 2013, Accessed February 12, 2019, https://www.scmp.com/news/china/article/1201364/11-tr-yuan-economic-losses-pollution-2010-china-report-says.; Health Effects Institute, "*Over 7 Billion People Face Unsafe Air: State of Global Air 2018,"*April 17, 2018, https://www.healtheffects.org/sites/default/files/soga2018-press-release_0.pdf.
[162] Li, "Hopes of Limiting Global Warming?" 51.
[163] Kennedy, "Environmental Protests in China on Dramatic Rise, Experts Say."

connected to the environment and pollution.[164] The governmental release of statistics on protests was stopped in 2010; however, it was estimated that in the same year there were some 180 thousand protests and riots.[165] As of 2007, notable "anti-PX" (Paraxylene plants) protests appeared in the country as a result of their negative environmental and health effects.[166] By 2014, anti-PX protests in Maoming reached thousands of participants, lasted for two days with the local government failing to respond constructively, only suppressing the protestors violently with the police force after it first failed to disperse the crowds.[167]

The year 2015, however, brought a change in the government response to environmental degradation and population complaints, as president Xi Jinping created a Central Environmental Inspection Team also called "green team" to push local enforcement of environmental and climate change mitigation and to make sure China is meeting its climate targets. The inspection at the same time cooperates with the concerned public when searching for the infractions.[168] Such actions allow the state to appease the public and direct the activities of the citizens towards projects that are not threatening the state's political stability and capacity. The state at the same time manages to use its capabilities to improve its different set of capabilities that have been negatively influenced by climate change and environmental degradation. China's capabilities this way also become domestic and international drivers for China's climate change mitigation.

Green Technologies

China's technological capabilities have been given momentum, and from a poor developing country, China became a significant producer of "medium-level technology" such as machinery,

[164] Kimberly Go et al., "Trial by Fire: A Chinese NGO's Work on Environmental Health Litigation in China." *The Wilson Center*, July 7, 2011, Accessed February 13, 2019, https://www.wilsoncenter.org/publication/trial-fire-chinese-ngos-work-environmental- health-litigation-china.
[165] Kennedy, "Environmental Protests in China on Dramatic Rise, Experts Say."
[166] Lee, and Ho, "The Maoming Anti-PX Protest of 2014," 33.
[167] Lee, and Ho, "The Maoming Anti-PX Protest of 2014," 36.
[168] Leign Wedell, "What Did China's 'Green Teams' Accomplish," *The Diplomat,* February 10, 2018, Accessed February 13, 2019, https://thediplomat.com/2018/02/what-did-chinas-green-teams-accomplish/.

electronics and recently also renewable energy equipment.[169] The first signs of high technology industrialization, including the nascent green technology appeared in 2001-2002.[170] This has been with the years increasingly supported mainly due to the necessity to resolve China's significant dependence on energy imports from the Middle East and environmental issues, particularly air pollution.[171] Investment into energy technology projects has started to increase around 2001, and by 2005 the investment was fifty times higher than in 1991.[172] Favoured technologies in this period were "clean coal" and wind turbines. Solar cell industry in China emerged in 2003, and by 2008 China led the world production.[173] In terms of investment to renewable energy, China set a goal of USD 300 billion in its Twelfth Five-Year Plan from 2012 to 2016. Already by 2014, China became one of the biggest investors into renewables putting some USD 90 billion into renewable energy technologies.[174] Currently, China is dominant in renewable clean energy technologies as well as in their building and financing.[175] China is also both the biggest manufacturer and the biggest market for cars globally, and by 2020, it plans to have five million new-energy (electric and hybrid) cars on the roads as a part of climate change mitigation plan.[176] The support of green technologies development is a highly rational step that will allow China to increase its energy security and, at the same time, profit economically as the biggest exporter of green renewable technologies.

Energy Security

China's economic development and industrialization have brought a high demand for energy, in particular, demand for oil. Ever since 1993 China became a net importer of oil and lost its

[169] Li, "Understanding China's Technological Rise."
[170] Joel R. Campbell, "Becoming a Techno-Industrial Power: Chinese Science and Technology Policy," *Brookings Issue in Technological Innovation,* no. 23 (April 2013): 1.
[171] Campbell, "Becoming a Techno-Industrial Power," 13.
[172] Campbell, "Becoming a Techno-Industrial Power," 14.
[173] Ibid.
[174] Albert, and Xu, "China's environmental crisis."
[175] Institute for Energy Economics and Financial Analysis, "Ieefa Report: China in 2017 Continued to Position Itself for Global Clean Energy Dominance."
[176] Dana Hull and Joe Deaux, "Elon Musk IS Squaring Off Against China for the Future of Tesla," *Bloomberg,* June 23, 2016, Accessed February 13, 2019."; Tim McDonald, "China powers up electric car market," *BBC News,* January 11, 2019, Accessed February 13, 2019.

"autonomy over her energy security interests."[177] The dependency has increased to higher numbers, and as of 2008, some 53% of China's consumed oil was imported.[178] In 2009 China also became a net exporter of coal, and by 2013 the oil import reached 59% and natural gas import some 28%.[179] The short-term supply and long-term availability of oil has also become an issue due to global oil reserves and production as well as geopolitical instability in several oil-rich regions.[180] In 2012 China released its Twelfth Five-Year Plan for National Strategic Emerging Industries where it mentions renewable energy industry as "one of the key strategic emerging industries."[181] China considered the potential of renewable energy especially due to its growing needs for energy consumption. In 2017, China accounted for 23% of the overall global energy consumption and its gas consumption increased by 15%. However, adding more renewable energy into its mix, China managed to decrease the share of coal in the mix from 74% in 2007 to 58% in 2017.[182] As of 2016 the share of renewable energy in China's energy mix was 20% in hydropower, 9% wind power and 5% solar power and keeps rising.[183] As Huang and Mathews mention, China's gap between domestic production of fossil fuels and their import is growing together with China's increased demand for energy consumption. This worsens the country's energy dependency and therefore security. However, the authors add that green energy shift is reducing this dependence and hence improving China's energy security. "Green power generation by 2017 was reducing the fossil fuel imports gap by 20%."[184] The development of renewable energy technology is therefore highly rational step that allows China to improve its energy security while also reducing the environmental

[177] Chun, "Analysing China's Energy Security: A Source For Conflict?" 91.
[178] Bing Wanga et al., "Role of renewable energy in China's energy security and climate change mitigation: An index decomposition analysis," *Renewable and Sustainable Energy Reviews* 90, (July 2018): 187.
[179] Ibid.
[180] Chun, "Analysing China's Energy Security: A Source For Conflict?" 92.
[181] Wanga et. al. "Role of renewable energy in China's energy security and climate change mitigation," 187.
[182] BP, "Country Insight – China," *BP p.l.c.,* Accessed February 13, 2019, https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/country-and-regional-insights/china.html; https://www.iea.org/weo/china/.
[183] International Energy Agency, "World Energy Outlook 2017: China."
[184] John Mathews and Xin Huang, "China's green energy revolution has saved the country from catastrophic dependence on fossil fuel imports," *Energy post,* March 21, 2018, Accessed February 13, 2019, https://energypost.eu/chinas-green-energy-revolution-has-saved-the-country-from-catastrophic-dependence-on-fossil-fuel-imports/.

impacts of coal consumption and tackling climate change.

Economic Growth

With China's economic reforms in 1979, the country managed to become one of the fastest growing economies in the world with its annual gross domestic product (GDP) growth being on average 9.5%. This means that China was able to more than double the size of its economy every eight years.[185] From 2008 to 2010 the real GDP growth was on average 9.7%, but ever since 2010, the number has fallen to 6,7% in 2016 and slightly grew to 6,9% in 2017.[186] The economic growth was achieved by the industrialization of the country and transformation of itself to a "world's production house."[187] The outsourcing of production of developed countries to China brought the country to place high importance on manufacturing with 2006 reaching 32% of value added in % of GDP.[188]

The fast development of the country that primarily emphasized heavy industry, however, was done at the expense of the environment and adverse effects are visible across the country. In 2004, the "Green GDP" project showed that China lost some 512 billion Yuan (app. USD 76 billion) on environmental costs and by 2010 the number doubled.[189] This cost to China's pollution presented 2,5% of its total economic output in 2010. According to Jing, "the cost of pollution also grew more rapidly than GDP in 2010, up 13.7 per cent compared with GDP growth of 10.4 per cent."[190] Further costs are connected to health impacts and loss of productivity from China's pollution that

[185] Wayne M. Morrison, "China's Economic Rise: History, Trends, Challenges, and Implications for the United States," *Congressional Research Service,* (February 2018): 5.
[186] Pham, "Is There a Secret Growth Hormone Added to China's Economy?"; The World Bank, "GDP growth (annual %): China," Accessed February 12, 2019, https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2017&locations=CN&start=2003.
[187] Pham, "Is There a Secret Growth Hormone Added to China's Economy?"
[188] The World Bank, "Manufacturing, value added (% of GDP)," Accessed February 13, 2019, https://data.worldbank.org/indicator/NV.IND.MANF.ZS?locations=CN.
[189] Li Jing, "1.1 trillion yuan in economic losses from pollution in 2010, China report says," *South China Morning Post,* March 28, 2013, Accessed February 12, 2019, https://www.scmp.com/news/china/article/1201364/11-tr-yuan-economic-losses-pollution-2010-china-report-says.
[190] Ibid.

was estimated to be equal to 6,5% of GDP each year from 2000 to 2010.[191] Water and soil pollution added extra 2,1% and 1,1% as a percentage of GDP.[192] These losses to China's GDP that appear due to climate change and environmental degradation also present a threat to China's capabilities that it utilizes for the growth of its power and security. The new possible solution for its issue has become the green financing, which was officially defined by the government in 2016 and that promotes country's investment into the green sector. Such investment should help to reduce the carbon emissions, tackle the environmental degradation, and therefore help to stop the loss of capabilities.[193]

[191] Morrison, "China's Economic Rise," 41.
[192] Morrison, "China's Economic Rise," 41.
[193] The International Institute of Green Finance, "Establishing China's Green Financial System: Progress Report 2017," *Central University of Finance and Economics,* (2017): 13.

Chapter 4: The domestic drivers of China's climate change mitigation

After Chapter 3, where development of China's approach to climate change and as well as the development of its capabilities and vulnerabilities was described in order to gain general understanding of how China got to the position where it stands today, chapters 4 and 5 are analyzing China's current domestic and international drivers to climate change mitigation and application of green technologies. These two chapters mainly analyze the logic behind China's actions with the intention to show that this is done with a logic of a rational state that wishes to maintain and increase its power in order to gain advantage to other states in the international system and survive. China's drivers to mitigating climate change are basically the capabilities that China can enhance if it mitigates, or lose if it doesn't. These capabilities are closely interconnected and influence one another. A possible way to imagine this interconnectedness is a circle where improvement of one kind of capability leads to the amelioration of another, which again affects the first one. These capabilities are therefore driving China to act in a way that maximizes its gains and allows for the power increase.

This chapter focuses on a set of domestic drivers such as population, political capacity, and green technology that are significant capabilities China cannot afford to lose if it wishes to stay powerful and survive. As a rational actor in the international arena, China mitigates climate change in order to sustain its human capital, the satisfaction of the population and political stability. The international drivers are then the energy security and economic growth, which are, however, also closely connected to the home drivers. Overall, China's shift to climate change mitigation is not the matter of moral awakening to address the challenge of climate change but rather an action to react to domestic and international challenges that present a possible risk to China's power and survival.[194]

[194] Engels, "Understanding how China is championing climate change mitigation."

4.1 China's population

China's population is one of the country's significant drivers to climate change mitigation while being also a capability that cannot be overlooked. The vulnerability of the population to the negative impacts of growing environmental issues in the country made the state to tackle this issue in order to protect its capability. Rising sea levels in coastal cities, lack of water, increased rate and strength of disasters, and worsening air quality in the majority of Chinese cities are factors that affect the population.[195] This subchapter looks at the current state of China's population and the country's steps to deal with this issue. This is aimed to support the idea that China protects its capabilities in a rational way to sustain and increase its power and position in the world arena.

The population in China is at constant health and higher mortality risk due to environmental degradation and climate change. Outdoor and indoor air pollution as well as water and heavy metals pollution have a significant impact on China's population.[196] Especially air and water pollution are China's primary concern, and according to the World Bank data, there is an economic burden due to the premature mortality and morbidity from air pollution. Specifically, it was 157.3 billion Yuan in 2003, and by 2010 this has reached some 341 billion Yuan.[197] This cost was mainly attributable to premature deaths caused by air pollution.

Only in 2015, China faced 1.1 million deaths related to air pollution, which made it half of the total air pollution deaths worldwide.[198] These deaths counted into this number are mainly heart diseases, lung cancers, strokes, and other respiratory illnesses. These deaths are a result of high particulate matter concentrations that in China consistently exceed the WHO recommended levels by five times, especially the PM2.5.[199] The particulate matters of a diameter of less than 2.5

[195] Haidong Kan, "Environment and health in China: challenges and opportunities," *Environmental health perspectives 117*, No.12 (2009): 530-1.
[196] Ibid.
[197] The World Bank, *Cost of pollution in China: Economic estimates of physical damages,* (Washington D.C.: The World Bank: 2007): xiii.; Haidong Kan, "Environment and health in China."
[198] China Power Team, "Is air quality in China a social problem?" *China Power,* February 15, 2016, Accessed March 9, 2019, https://chinapower.csis.org/air-quality/.
[199] China Power Team, "Is air quality in China a social problem?"

micrometers (PM2.5) are the most significant danger to China's population health because these particulates have the ability to accumulate deep inside their lungs.[200] This air pollution does not only cause China a loss of significant workforce capability but also brings extra economic costs to the country. For example, in 2007 the lost labor productivity caused by air pollution illnesses meant a loss of about 133 million workdays which was equivalent to 1.34% of China's GDP and lowered the household disposable income by USD 90 million.[201] The RAND report from 2015 then claims that the combination of air pollution health problems and lost labor productivity between 2000 and 2010 reached 6.5% of the country's GDP per year.[202]

The issues of pollution, however, do not end with air pollution; water pollution is causing significant damages too. According to the World Bank, water scarcity is a serious issue that is closely related to water pollution. "Surface water pollution has put pressure on the use of groundwater for agricultural and industrial purposes."[203] This creates an overuse of non-renewable resource and increases the risk of seawater intrusion to freshwater aquifers.[204] Lack of water is also an issue not that emphasized compared to air pollution but presents an important constraint to Chinese growth. The overall cost of water scarcity and pollution was estimated at 147 billion Yuan which makes about 1% of China's GDP.[205] Currently, two-thirds of China's cities face water shortages, and water reserves in many of them have extreme water shortages comparable to the ones in the Middle East.[206] In 2014, one-third of Chinese provinces did not meet the water criteria that were set by the World Bank on 1500m^3 per person, and for example, Beijing's water provisions only had 100m^3 in 2015.[207] Climate change is believed to exacerbate this already existing

[200] China Power Team, "Is air quality in China a social problem?"
[201] China Power Team, "Is air quality in China a social problem?"
[202] Ibid.
[203] The World Bank, *Cost of pollution in China: Economic estimates of physical damages,* (Washington D.C.: The World Bank: 2007): xvi.
[204] Ibid.
[205] Ibid.
[206] Joshua Bray, "Examining Water Issues in China," *Sydney Environment Institute,* March 22, 2018, Accessed March 9, 2019, http://sydney.edu.au/environment-institute/blog/examining-water-issues-china/.
[207] Ben Abbs, "The growing water crisis in China," *Global Risks Insights,* August 10, 2017, Accessed March 9, 2019, https://globalriskinsights.com/2017/08/shocks-china-growing-water-crisis/.

problem.[208] It is also to say that some 85% of water usage in China is done by agriculture and industry.[209] The shortages of drinking water are also accompanied by another issue; the pollution of fresh water by China's factories.[210] The inefficient water management, water pollution, lack of water for human consumption in contrast with growing demand for high water-consumption lifestyle is affecting the population and costs the state its capabilities.

The air and water pollution also cause material and crop damages that are further affecting the state's performance and the wellbeing of its population capability. For example, "acid rains cost 30 billion Yuan in crop damage and 7 billion in material damage annually."[211] In USD this would be approximately 4,5 billion and 1 billion respectively. Here it is important to remember that acid rains are caused by Sulphur oxide (SO) emissions that have increased with fossil fuel use.[212] The air pollution, therefore, creates not only health issues but also material and economic issues where the annual cost of damaged crops reaches 30 billion Yuan and amounts 1.8% of the value of China's agricultural output.[213] Acid rain also further damages building materials, forests and pollutes water. Irrigation for agriculture and fisheries with such polluted water then costs another 7 billion Yuan annually.[214]

Overall, the air and water pollution are a significant risk for China's population capability with air pollution posing "large health risk in urban areas and water pollution significant health risk in rural areas."[215] These health impacts, high premature mortality caused by pollution but also other issues like economic losses are then mobilizing one China's capability against another one; population against the state's stability. This capability will be later analyzed in the upcoming subchapter. China as a rational state sees the risks and impacts of pollution on its capabilities and

[208] Bray, "Examining Water Issues in China."
[209] Abbs, "The growing water crisis in China."
[210] Bray, "Examining Water Issues in China."
[211] The World Bank, *Cost of pollution in China: Economic estimates of physical damages,* (Washington D.C.: The World Bank: 2007): xvii.
[212] The World Bank, *Cost of pollution in China,* 131.
[213] Ibid.
[214] Ibid.
[215] Ibid.

has started taking steps to tackle the issue.

China has especially since the signing of the Paris agreement in 2015 stepped up its efforts to decrease the CO_2 and partly SO emissions and this way to tackle the environmental degradation and climate change that are affecting the state's population capability. Taken generally, apart from the Paris agreement where China agreed to curb its CO_2 emissions, it has also raised spending to curb the pollution to 40.5 billion Yuan (USD 6.4 billion).[216] According to Kearns and Dormido, "the government's war on air pollution fits neatly with another goal: domination of the global electric-vehicle industry."[217] Although Tesla is the best-known innovator in this field, China is actually the leader of electric vehicles and their sales since 2015 and should reach some 7 million sold cars annually by 2025.[218] The same thing applies to green energy technologies like solar panels and wind turbines.[219]

China's necessity to solve the issue of climate change and environmental degradation including pollution brings the country a new capability in the form of renewable technologies that will also be discussed in the upcoming chapter. The fact that China has great manufacturing and working power (population) also allows it to take leadership in the production of these technologies and improve its economy. This technology is at the same time the main factor that has the potential of improving the health and mortality rates in the country and therefore protects the population capability. The population is after all a significant influencer of the country's performance and stability, as this work will show in the next sub-chapter.

[216] Jeff Kearns, Hannah Dormido and Alyssa McDonald, "China's War on Pollution Will Change the World," *Bloomberg,* March 9, 2018, Accessed March 9, 2019, https://www.bloomberg.com/graphics/2018-china-pollution/.
[217] Jeff Kearns, Hannah Dormido and Alyssa McDonald, "China's War on Pollution Will Change the World."
[218] Dana Hull and Joe Deaux, "Elon Musk IS Squaring Off Against China for the Future of Tesla," *Bloomberg,* June 23, 2016, Accessed February 13, 2019."; Tim McDonald, "China powers up electric car market," *BBC News,* January 11, 2019, Accessed February 13, 2019.
[219] Reinhilde Veugelers, "China is the world's new science and technology powerhouse," *Bruegel,* August 30, 2017, Accessed March 9, 2019, http://bruegel.org/2017/08/china-is-the-worlds-new-science-and-technology-powerhouse/.

4.2 China's political capacity

China's political capacity is primarily about the state's government stability and the ability to tackle issues it faces. Climate change mitigation for China means an issue that affects its population capability, and that can cause a great discontent among its citizens. With climate mitigation the satisfaction of people is therefore likely to increase and chances of revolting against the government decrease. According to Wiener, "climate change may exacerbate political and social stresses within China, which the leadership may seek to avoid in order to maintain political stability."[220] As was already mentioned in the previous chapter, the tolerance for environmental issues in China has decreased among the citizens who increasingly protest against polluting projects in the country.[221]

As the governmental release of statistics on protests was stopped in 2010, the exact number cannot be given. However, the experts agree that the number of demonstrations has been rising in the past years.[222] A big concern for Chinese people about the environmental pollution and degradation became the Paraxylene (PX) chemical plants for the production of plastics and polyester with first protests appearing in 2007 as a result of the questioned adverse health and environmental effects of these chemical factories.[223] These factories are a part of the pollution issue adding up to air and water pollution China is dealing with, and that was analyzed in the previous section of the population capability.

The anti-PX movement, according to Hoffman and Sullivan, "reveals the paucity of options in the government's playbook."[224] The 2007 protests in the wealthy Xiamen city forced the government to relocate the construction plans of the PX plant from Xiamen to a smaller and poorer

[220] Jonathan B. Wiener, "Climate Change Policy and Policy Change in China," *UCLA Law Review* 55, No. 6 (2008): 1805.
[221] Li, "Hopes of Limiting Global Warming?" 51.
[222] Kennedy, "Environmental Protests in China on Dramatic Rise, Experts Say."
[223] Lee, and Ho, "The Maoming Anti-PX Protest of 2014," 33.
[224] Samantha Hoffman and Jonathan Sullivan, "Environmental Protests Expose Weakness In China's Leadership," *Forbes,* June 22, 2015, Accessed March 9, 2019, https://www.forbes.com/sites/forbesasia/2015/06/22/environmental-protests-expose-weakness-in-chinas-leadership/#5b84bf263241.

Zhangzhou where it would face less resistance.[225] Paradoxically, Zhangzhou became a site of PX explosion accident in 2013 where the army's anti-chemical warfare unit had to step in and relocate some 30,000 people.[226] Therefore the military capability had to be used to save China's different capability due to environmental disaster. This is an extra cost that could have been avoided through steps that tackle or prevent environmental degradation in the first place. This accident further created a public discontent resulting in violent clashes with police and disruption of production.[227]

Environmental and climate change protests are atomized in China, and large-scale movements have not appeared so far. According to Hoffman and Sullivan, this is mainly due to population acceptance of pollution as "inevitable consequence of welcomed economic growth, or they had been conditioned to feel powerless to do anything about it."[228] With the habit of fast changes, however, China cannot count on being able to avoid larger unrest in the country for too much longer as people are increasingly demanding the government to respond adequately to environmental degradation, pollution and consequently climate change.[229] The protests are uniting people all over the country, and with China having a population of over 1,4 billion people, the rise of such mass into widespread movement due to environmental grievances can pose a significant threat to political stability and challenge to the regime.[230]

The government, sensing this changing public mood, understands that economic gains are no longer so superior to the environmental and health costs that the country and people are experiencing. Chinese policymakers have an interest in maintaining stability, and the position of the communist party in China is slowly moving towards listing protection of the environment to the list of priorities.[231] As Held mentions, "politically, China is governed by a single party whose

[225] Hoffman, and Sullivan, "Environmental Protests Expose Weakness In China's Leadership."
[226] Ibid.
[227] Ibid.
[228] Ibid.
[229] Ibid.
[230] World Population Review, "China population 2019," Last updated April 2, 2019, Accessed March 16, 2019, http://worldpopulationreview.com/countries/china-population/; Samantha Hoffman and Jonathan Sullivan, "Environmental Protests Expose Weakness In China's Leadership."
[231] David Held, Eva-Maria Nag, and Charles Roger, *The Governance of Climate Change in Developing Countries: A*

legitimacy and authority rests on the consent of several key constituencies, the bureaucracies, the military and the mass public."[232] This is visible for example on the approach of the Chinese president Xi Jinping who especially since signing the Paris agreement responded to climate change and environmental degradation in a way that would appease the public discontent in China.

One of the examples are Xi Jinping's steps described in the previous chapter; the creation of the Central Environmental Inspection Team, also called "green team." This team is supposed to make sure that effective enforcement of environmental and climate change mitigation is promoted and that China will meet its climate mitigation targets.[233] Xi also pledged to "punish with an iron hand any violators who destroy China's ecology or environment."[234] The government this way also engages the concerned citizens as the inspection cooperates with them when searching for infractions and so engages the masses in beneficial activities that do not threaten the stability of the state.[235] The government gives people projects to focus on and direct their interest away from possible destabilization of the regime. The state also develops new capabilities such as green technologies that would allow the country to tackle the environmental issues that are increasingly the main grievance of Chinese citizens.

The short-term thinking of improving China's GDP by sacrificing the environment is no longer viable for the states stability and capacity to deal with its population capability. Ignorance of climate change and environmental degradation or superficial responses to protests connected to this issue can in the long term create a "risk of separate local protests turning into a coordinated, nationwide rebellion."[236] The political stability and capacity to deal with problems are to a large extent dependent on population. It is therefore rational and beneficial for the state to tackle climate change and environmental degradation since it will allow it to appease and preserve its population

Report on International and Domestic Climate Change Politics in China, Brazil, Ethiopia and Tuvalu, (France: STIN, 2012): 35.
[232] Ibid.
[233] Leign Wedell, "What Did China's 'Green Teams' Accomplish," *The Diplomat,* February 10, 2018, Accessed February 13, 2019, https://thediplomat.com/2018/02/what-did-chinas-green-teams-accomplish/.
[234] Hoffman, and Sullivan, "Environmental Protests Expose Weakness In China's Leadership."
[235] Wedell, "What Did China's 'Green Teams' Accomplish."
[236] Hoffman, and Sullivan, "Environmental Protests Expose Weakness In China's Leadership."

capability while also ensuring that it will not lose its political capacity capability. The next subchapter will introduce the number one capability that China develops to deal with climate change and environmental degradation as well as with the population grievances; green technologies.

4.3 Green Technologies

Green technologies are China's constantly developing capability that allows the country to improve other of its capabilities like energy security or economy, and at the same time improve the issues like pollution or population discontent. China has already engaged in green technologies to the extent that, based on the report of the Institute for Energy Economics and Financial Analysis (IEEFA), makes China dominate the technology for clean energy and is "setting itself up as a global technology leader."[237] Overall, taking steps to avoid climate change damages gives China "greater net benefits" than ignoring climate change.[238] The country has since 2014 become one of the biggest investors in renewable technologies.[239]

Along with investment into such technologies, China is also significantly advancing in science and technology (S&T), which is supported by the increased spending on research and development (R&D).[240] It has also supported the science and engineering education to the extent that it produces the highest number of undergraduates in this field in the world, specifically one-quarter of the global number.[241] The human capital that China possesses and that can take part in China's technological advancement is therefore significant and allows the country to improve its capabilities. Green technologies are part of this advancement and are expected to become the

[237] Institute for Energy Economics and Financial Analysis, "Ieefa Report: China in 2017 Continued to Position Itself for Global Clean Energy Dominance," January 9, 2018, Accessed January 23, 2019, http://ieefa.org/ieefa-report-china-continues-position-global-clean-energy-dominance-2017/.
[238] Wiener, "Climate Change Policy and Policy Change in China," 1805.
[239] Albert, and Xu, "China's environmental crisis."
[240] Veugelers, "China is the world's new science and technology powerhouse."
[241] Ibid.

dominant technology.[242]

According to Buckley, "it has become clear that renewables will be the dominant energy technology of the following decades with even the cautious International Energy Agency (IEA) accepting that renewables will receive the majority of energy investment going forward."[243] He added that despite China still has some coal projects left around the world; it will not fall behind the trend of increasingly moving its focus towards renewables and set "itself up as a global technology leader."[244] This again shows that China's shift to climate change mitigation and green technologies are not based on some developed moral values but on rationalist thinking about the benefits it can gain and capabilities it can protect or create. Considering that China is leading the world's clean energy investment and already is the biggest manufacturer of many kinds of green technologies including solar and wind turbines, the technological leadership seems to be a profitable step for the state.[245]

Looking closer at the specific technologies, China is currently producing 60% of the world's solar cell production.[246] It, therefore, became a dominant player in the photovoltaic industry not only within its borders but also outside it. The government's economic interest is clear and international as well as China's support for green technologies is ensuring a high demand for China manufactured solar panels.[247] Some of the biggest constructions of solar farms worldwide, for example in India or Egypt, have clear links to China and its companies.[248] The same applies to wind turbines industry where just as of 2015 China became the world's number one wind turbine manufacturer when one of its companies, Xinjiang Goldwind Science & Technology Co. Ltd.,

[242] Institute for Energy Economics and Financial Analysis, "Ieefa Report: China in 2017 Continued to Position Itself for Global Clean Energy Dominance."
[243] Ibid.
[244] Institute for Energy Economics and Financial Analysis, "Ieefa Report: China in 2017 Continued to Position Itself for Global Clean Energy Dominance."
[245] Jocelyn Timperley, "China leading on world's clean energy investment, says report," *Carbon Brief,* January 9, 2018, Accessed March 9, 2019, https://www.carbonbrief.org/china-leading-worlds-clean-energy-investment-says-report.
[246] Ibid.
[247] Chris Baraniuk, "How China's giant solar farms are transforming world energy," *BBC,* September 4, 2018, Accessed March 9, 2019, http://www.bbc.com/future/story/20180822-why-china-is-transforming-the-worlds-solar-energy.
[248] Ibid.

received orders for 7.8 gigawatts of new turbines.[249] Along with this company, four other Chinese companies ranked among the top 10 manufacturers in the world.[250] This comes as no surprise when, according to the Clean200 list of the 200 green energy technology companies, China leads with 71 companies on the list, leaving the US behind with only 41 companies.[251]

By 2020 China also plans to invest some USD 361 billion into renewable power which will, according to Reuters, provide some extra 13 million jobs just in the green energy sector itself.[252] Based on the data from the International Energy Agency (IEA), "36 percent and 40 percent of the world's growth in solar and wind energy in the next five years will come from China."[253]At the same time, the technological advances in China's entire green sector are significant and attract investment of foreign companies into China from the fear that they might be left behind technologically.[254] For example, China has been developing crucial components for solar panels for the past several years and as of 2014 it "broke the world record on the efficiency of multicrystalline-silicon solar cells.[255] As China is the most significant developer of renewable technology, foreign companies face the decision of being left behind or investing in China with a risk of their intellectual property being stolen without a right for compensation.[256] In any way, it is China who profits in both cases which makes the support of green technology a highly rational step.

Another example of China's shift to green technologies is the electric car industry as China is

[249] Daniel Cusick, "Chinese Wind Turbine Maker Is Now World's Largest," *Scientific American,* February 23, 2016, Accessed March 9, 2019, https://www.scientificamerican.com/article/chinese-wind-turbine-maker-is-now-world-s-largest/.
[250] Ibid.
[251] Clean200, "Carbon Clean 200™: Investing in a Clean Energy Future," 2018, Accessed March 9, 2019, https://www.asyousow.org/clean200.; Charlotte Middlehurst, "China dominates top 200 clean tech companies list,"*China Dialogue,* February 22, 2017, Accessed March 9, 2019, https://www.chinadialogue.net/blog/9626-China-dominates-top-2-clean-tech-companies-list/en.
[252] Josephine Mason, "China to plow $361 billion into renewable fuel by 2020," *Reuters*, January 5, 2017, Accessed March 9, 2019, https://www.reuters.com/article/us-china-energy-renewables/china-to-plow-361-billion-into-renewable-fuel-by-2020-idUSKBN14P06P.
[253] Dominic Chiu, "The East Is Green: China's Global Leadership in Renewable Energy," *Center for Strategic and International Studies,* Accessed March 9, 2019, https://www.csis.org/east-green-chinas-global-leadership-renewable-energy.
[254] Ibid.
[255] Ibid.
[256] Ibid.

both the biggest manufacturer and the biggest market for electric cars globally. By 2020, it plans to have five million new-energy (electric and hybrid) cars on the roads as a part of climate change mitigation plan.[257] China this way becomes a great competitor to companies like Tesla.[258] The same then applies to batteries for green cars where China also became one of the biggest manufacturers and plans to produce more battery capacity than Tesla by 2020.[259] Supply arrangements between China and car companies like BMW and Volkswagen also already exist.[260] The support of green technologies development is, therefore, a highly rational step that will allow China to increase its energy security and, at the same time, profit economically as the biggest exporter of green renewable technologies.

When looking at green technologies as an increasingly popular capability among the states, it becomes clear why China shifted its policies to promote the mitigation of climate change and environmental degradation. This shift allows China to turn towards the support of green technologies and their manufacturing which further creates new jobs, provides economic gains from abroad, attracts foreign investment, cleans air and other pollution that endangers China's population and political stability capabilities and finally, it helps China to manage its dependency on energy imports. The last point also makes the green technologies a bridge between the domestic and international drivers because such technologies offer a partial solution to all aspects of vulnerabilities and risks to China's capabilities. If China as a rational state sees the importance in protection and advancement of its capabilities to become more powerful and survive, the climate change mitigation policies in connection to promotion of green technologies is certainly a rational step to make.

[257] Dana Hull and Joe Deaux, "Elon Musk IS Squaring Off Against China for the Future of Tesla," *Bloomberg,* June 23, 2016, Accessed February 13, 2019."; Tim McDonald, "China powers up electric car market," *BBC News,* January 11, 2019, Accessed February 13, 2019.
[258] Timperley, "China leading on world's clean energy investment, says report."
[259] Timperley, "China leading on world's clean energy investment, says report."
[260] Ibid.

Chapter 5: The International Drivers of China's Climate Change Mitigation

After devoting the previous section to domestic drivers of China's climate change mitigation, where China's population, state capacity, and green technology capabilities were analyzed, this chapter looks at the international drivers, namely energy security together with green technology bridging the domestic and international aspect, and economic growth. This chapter analyzes the logic behind China's mitigation policies and what kind of costs it can avoid and benefits it can gain if it pursues the green development and mitigation. The energy security and economic capabilities are significantly connected to other state actors in the anarchic international system where China seeks to survive. Energy security is one of the main capability concerns as energy consumption in China grew with the economic growth that the country has been experiencing in the past decades.[261] The necessary bridge between the domestic and international drivers for climate change mitigation is then the green technology capability, such as technology for renewable energy production that in this chapter will be mentioned as part of the energy security subchapter. China's increased interest in green technologies exists precisely because it comes as a partial solution to its domestic and international capability concerns. The economic growth is closely connected and reflected in most of the other capabilities that this work analyzed.

These international capabilities like energy security and economic growth, therefore, need to be considered as part of the set of China's capabilities that the state is trying to protect and improve through the shift towards climate change mitigation and green technologies in order to sustain and increase its strong position in the world arena. This chapter, same like the previous one, demonstrates that China's shift to climate change mitigation and green technologies is not about moral awakening but about the reaction to the security threat that endangers the state's capabilities and therefore its strength, power, and survival.[262]

[261] Engels, "Understanding how China is championing climate change mitigation."
[262] Ibid.

5.1 China's energy security

China's energy security is one of the crucial drivers of China's strategic decision to support green technologies. China switched from an energy exporter to energy importer in 1993, as the available domestic coal was not sufficient to "satisfy the needs of the hyper-growth of industrial production in the 1990s, and the exploding numbers of motor vehicles increased the demand for oil."[263] This growing dependence mainly on oil imports made China lose its energy autonomy, which became a security concern for the government.[264] According to Downs, oil is a source of vulnerability rather than a source of influence which from the neo-realist point of view is the last thing the state wants if it wishes to survive in the anarchic international system.[265] Renewable sources of energy gained through increased support of green technologies in China are therefore a way to tackle the growing dependence on foreign sources of energy.

Looking deeper into the issue, China consumes the most energy in the world, accounting for 23% of the global consumption in 2017 and 33,6% of global consumption growth.[266] Also, even though China has managed to decrease its share of coal in the energy mix from 62% in 2016 to 58% in 2017, the number remains significant.[267] The economic growth rate in China has simply exceeded the domestic available energy supply, especially when considering that the oil yield in China is on the decline too. This is, according to Lifan Li, creating a "serious imbalance between supply and demand."[268] In addition, the efficiency of oil industry in China is lower than in Western countries, having the refined oil costs set to USD 1.50 per barrel while Western countries costs reach only USD 1.20 per barrel.[269] High demand for energy together with the inability to

[263] Engels, "Understanding how China is championing climate change mitigation."
[264] Leung GCK et al., "Securitization of energy supply chains in China," *Applied Energy 123* (2014): 316–326.
[265] Erica Strecker Downs, "China's Energy Security Activities" in *China's Quest for Energy Security* (RAND Corporation, 2006): 12.
[266] BP, "Country Insight – China," *BP p.l.c.,* Accessed February 13, 2019, https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/country-and-regional-insights/china.html; https://www.iea.org/weo/china/.
[267] Ibid.
[268] Li, "China's Energy Security and Energy Risk Management," *Journal of International Affairs* 69, No. 1 (Fall/Winter 2015): 86-97.
[269] Li, "China's Energy Security and Energy Risk Management."

effectively obtain domestic oil for a reasonable price is making China highly dependent on its coal and increasingly dependent on foreign oil, which creates a significant security risk.[270]

Another issue became the ineffective domestic handling of coal. Although China owns some 14% of the worlds' coal, over 70% of it is located far from coastal areas that grow in terms of energy needs the fastest.[271] The long-distance energy transmission created several energy shortages as well as blackouts between 2002 and 2008 that were caused by "imbalances in supply and demand, prompting coastal regions to begin importing coal from abroad, and making them relatively more reliant upon foreign sources of coal as well."[272] China being reliant on the other states with its coal and oil energy supplies is simply a strategic and security fail that needs to be tackled.

A strategic discomfort also became the fact that China is dependent on imports of oil that go through the Strait of Malacca, between Malaysia and Indonesia, which is safeguarded by the US Navy.[273] Some 80% of Chinese oil imports come through this Strait, which certainly creates a significant security challenge considering that the area is under the control of another great power.[274] China has been dealing with this issue of energy supply through diversification of import channels. The "Malacca Dilemma" meaning the overreliance on Malacca Strait is therefore under consideration of the Chinese government, and as a part of the Chinese Belt and Road Initiative it is developing new channels to reduce the dependency on routes under the control of the US.[275]

Looking more carefully at the regions from which China imports its energy sources, it is evident that the primary region is the Middle East from where it gets 51% of its imported oil. However, this

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[270] Li, "China's Energy Security and Energy Risk Management."
[271] David Held, Charles Roger, and Eva-Maria Nag, *Climate Governance in the Developing World,* (Cambridge: Polity Press, 2013).
[272] Ibid.
[273] Ibid.
[274] Ibid.
[275] "The initiative aims to strengthen infrastructure, trade, and investment links between China and some 65 other countries that account collectively for over 30 percent of global GDP, 62 percent of the population, and 75 percent of known energy reserves."; The World Bank, "Belt and Road Initiative," March 29, 2018, Accessed March 21, 2019, https://www.worldbank.org/en/topic/regional-integration/brief/belt-and-road-initiative.
B.A. Hamzah, "Alleviating China's Malacca Dilemma," *Institute for Security and Development Policy,* March 13, 2017, Accessed March 17, 2019, http://isdp.eu/alleviating-chinas-malacca-dilemma/.

region is also at inherent risk of conflicts and influence from the side of the US, which may disrupt the imports.[276] Other regions, from where China imports oil for its consumption are Russia, Africa, and South America. Especially in West Africa and Venezuela, China has invested a considerable amount of money into oil exploitation.[277] However, even these regions are at constant risk of, for example, political instability or competition from other states that have a high demand for oil consumption.[278]

From this point of view, it is clear that the instability and competition for energy resources create a great risk for China, as since 2009 it is the second biggest net importer of oil.[279] Lack of these imports would disrupt Chinese growth and make the state's economy vulnerable. The reason for that is China's manufacturing industry that accounts for the country's major GDP component and 60% of its total energy consumption.[280] Having all the international and domestic energy import issues listed, there is one last component to mention that worsens the entire situation; the increasing numbers of motor vehicles that further increase the demand for oil. Vehicles account for 19% of China's total energy consumption and keep growing.[281] It is estimated that in 2022 there will be over 200 million registered vehicles in China.[282] This is exactly where green technologies like electric cars come into play to slow down not only the disastrous pollution effects but also to manage the demand for oil that China simply does not have domestically available. The incentive to diversify its energy imports or preferably find new ways of obtaining energy that would decrease its dependence on energy imports is therefore clear.

The renewable sources of energy come to play as a solution to the increasing dependence on energy from abroad. According to Huang and Mathews, green energy has the potential of reducing

[276] Li, "China's Energy Security and Energy Risk Management."
[277] Ibid.
[278] Ibid.
[279] David King, Megan Cole, Sally Tyldesley, and Ryan Hogarth, *The response of China, India, and Brazil to climate change: A Perspective for South Africa,* (Oxford University, 2012), 35.
[280] Held et. al., *The Governance of Climate Change in Developing Countries,* 35.
[281] Held et. al., *The Governance of Climate Change in Developing Countries,* 35.
[282] Aaron Stone, "China vs. India: The Battle for Electrification World Domination," *F+L Magazine*, Accessed March 21, 2019.

this foreign oil dependence and hence improving China's energy security.[283] They added, "green power generation by 2017 was reducing the fossil fuel imports gap by 20%."[284] The strategic advantage is also the possibility of creating energy within its territory, which can make China less dependent on foreign energy and events. According to Pope, China understands the inevitability of renewable energy and acts in a way to eventually "dominate the markets in these new technologies" which will also allow it to influence the development patterns and energy trends.[285] The fact that, as he says, other major powers are either in denial of climate change or in atrophy, gives China even more advantage in becoming a world energy leader.[286]

Already now, China owns some of the largest solar module, wind turbine, and electric car manufactures in the world.[287] To add more, it is also dominant in the lithium sector, which in a broader sense means batteries and electric vehicles.[288] Adding smart grid investment and support of new renewable energy technologies, China is rationally exploring and leading a market that in the future will be demanded more than ever. The use of renewable energy and technologies are therefore not only securing Chinese energy stability and lowering its dependence from alien actors in the anarchic international system but also giving it a strategic advantage to states that are falling behind or denying the climate change mitigation.

Looking at the Chinese energy performance, China is the biggest energy consumer since 2016, and as of 2017, it accounted for 23% of the overall world energy consumption.[289] As of 2016, according to the International Energy Agency, China decreased the share of coal in the mix from

[283] John Mathews and Xin Huang, "China's green energy revolution has saved the country from catastrophic dependence on fossil fuel imports," *Energy post,* March 21, 2018, Accessed February 13, 2019, https://energypost.eu/chinas-green-energy-revolution-has-saved-the-country-from-catastrophic-dependence-on-fossil-fuel-imports/.
[284] Mathews and Huang, "China's green energy revolution has saved the country from catastrophic dependence on fossil fuel imports."
[285] Chris G. Pope, "China wants to dominate the world's green energy markets – here's why," *The Conversation,* January 12, 2018, Accessed March 10, 2019, http://theconversation.com/china-wants-to-dominate-the-worlds-green-energy-markets-heres-why-89708.
[286] Ibid.
[287] Ibid.
[288] Ibid.
[289] International Energy Agency, "World Energy Outlook 2017: China."

74% in 2007 to 58% in 2017.[290] It also reached a 20% share of hydropower, 9% of wind power and 5% solar power in its installed power generation capacity.[291] The plan for 2040 is then to reach 32% share of coal, 15% hydro, 18% wind and 22% solar power in this new installed capacity that should increase from 1,625GW (2016) to 3,188GW in 2040.[292] The low-carbon capacity should, therefore, make some 60% of the total energy capacity in 2040 with Solar PV leading this share.[293] This is due to the fact that "average solar PV projects in China become cheaper than both new and existing gas-fired power plants around 2020 and cheaper than new coal-fired capacity and onshore wind by 2030."[294] The costs have actually fallen by 80% in just five years thanks to the expansion of the market.[295] China's goals for its energy mix are not modest; in 2018 the National Development and Reform Commission even revised the plan for the percentage of renewables represented in the overall energy consumption by 2030. Initially, the plan was to have renewables account for 20% of the total consumption; this was changed to 35%.[296] The reasons are again to decrease its dependence on coal, foreign energy import and pollution that significantly impacts China's other capabilities such as the population.[297]

Overall, there is a clear trend in China's renewable energy creation and consumption. China as a rational actor decided to mitigate climate change through the increased application of green technologies like renewable energy technologies. This allows China to tackle CO_2 emissions, climate change and most importantly growing need for energy consumption and import of this energy. Becoming the biggest manufacturer of solar panels, wind turbines and other technologies for generation of renewable energy, China secures its strong position in the world arena as it protects and improves its capabilities. Firstly, through increased use of renewable energy China is

[290] BP, "Country Insight – China."
[291] International Energy Agency, "World Energy Outlook 2017: China."
[292] Ibid.
[293] Ibid.
[294] Ibid.
[295] Pope, "China wants to dominate the world's green energy markets – here's why."
[296] Feifei Shen, "China Steps Up Its Push Into Clean Energy," *Bloomberg,* September 26, 2018, Accessed March 20, 2019, https://www.bloomberg.com/news/articles/2018-09-26/china-sets-out-new-clean-energy-goals-penalties-in-revised-plan.
[297] Shen, "China Steps Up Its Push Into Clean Energy."

fighting pollution that has been crippling its population capability and its working ability that consequently has been causing economic losses. Secondly, China leads new green technology markets internationally and gains an advantage to other states that fall behind with its application and creation of green technologies and allows China to access other markets and earn economically. China's decision to mitigate climate change and set its path towards green technologies is therefore rationally deduced behavior that intents to protect and improve its capabilities, possibly gain an advantage to other actors in the anarchic international arena and survive.

5.2 China's Limits to Economic Growth

The final and crucial capability of China that is connected to many other capabilities is economic performance. According to Huntington, economic activity is a source of power that is "increasingly important in determining the primacy or subordination of states."[298] This becomes highly relevant when considering that China is currently the second biggest economy after the US.[299] With its economic growth, China has also been modernizing its armed forces and increasing its military spending that has in 2017 reached 1.9% of China's GDP.[300] The economic capability of the state can be, therefore, transformed into the most basic neo-realist capability: the military. This ability of the country to transform economic power and other capabilities to military power was already mentioned in the theory section of this work. Variables like economic power are a foundation of military power, which, however, also depends on the political capacity of

[298] Theodore H. Moran, "An Economics Agenda for Neorealists," *International Security* 18, no. 2 (1993): 211.
[299] Alex Gray, "The world's 10 biggest economies in 2017," *World Economic Forum,* March 9, 2017, Accessed January 24, 2019, https://www.weforum.org/agenda/2017/03/worlds-biggest-economies-in-2017/.; Mark N. Katz, "Great Powers in the Twenty-first Century," *Journal of International Relations and Sustainable Development,* No.10 (Winter 2018): 126.
[300] David Tweed, "China Defense Spending Set to Rise 7.5% as Xi Builds Up Military," *Bloomberg*, March 5, 2019, Accessed March 22, 2019, https://www.bloomberg.com/news/articles/2019-03-05/china-s-military-spending-slows-as-economy-cools.; The World Bank, "Military expenditure (% of GDP)," Accessed March 21, 2019, https://data.worldbank.org/indicator/MS.MIL.XPND.GD.ZS?locations=CN.

transforming the state's capabilities to this particular power.[301] At the same time, climate change and environmental degradation have adverse effects on many kinds of China's capabilities, which indirectly affects the economic performance of the country as well. In this particular case, it is mainly China's population capability that suffers from climate changes and environmental degradation.

Economy and population capability

As already described in the subchapter 4.1, the population capability is negatively affected by climate change and environmental degradation, which in turn negatively affects the economic capability of the state. Especially premature mortality and morbidity caused by several kinds of pollution have become an economic burden due to, for example, loss in production and increased costs in health services.[302] As of 2010, the economic loss attributable to mainly premature death from air pollution was estimated to be 341 billion Yuan.[303] Moreover, the RAND report from 2015 shows that lost labor productivity due to air pollution illnesses of the population reached some 6.5% of China's GDP annually between the years 2000 and 2010.[304] According to Viard, pollution is closely connected to the decrease in labor productivity as it influences people's health and their speed of work.[305] Missing work to take care of sick relatives or themselves, people are automatically decreasing labor productivity, which creates economic losses for the state. Costs to population and state's economy are also connected to acid rains that annually generate 30 billion

[301] Gregory S. Treverton, and Seth G. Jones, *Measuring National Power* (Santa Monica: RAND Corporation, 2005), 20.
[302] The Danish Energy Agency, "The Socio-economic Costs Related to Airpollution in China," https://ens.dk/sites/ens.dk/files/Globalcooperation/socioeco._scenario_studies_china_air_pollution.pdf.
[303] The World Bank, *Cost of pollution in China: Economic estimates of physical damages,* (Washington D.C.: The World Bank: 2007): xiii.; Haidong Kan, "Environment and health in China."
[304] Su-Mei Chen and Ling-Yun He, "Welfare Loss of China's Air Pollution: How to Make Personal Vehicle Transportation Policy," China Economic Review, Vol. 31 (Beijing: Chinese Economists Society, 2014), 106.
[305] Liu Sha, "The Real Cost of Air Pollution in China," *CKGSB Knowledge,* April 13, 2018, Accessed March 21, 2019, http://knowledge.ckgsb.edu.cn/2018/04/13/environment/economic-effects-of-pollution-china/.

Yuan costs on crop damage and other 7 billion Yuan in material damage.[306] The climate change and environmental pollution can, therefore, affect the quality of population capability and consequently affect the economic capability too.

Economy and green technologies

China with its history of rapid industrialization and transformation into a "world's production house" currently has an average of its GDP growth around 6.7 - 6.9%.[307] Especially the outsourcing of production to China made the country to put high importance on manufacturing that has as of 2017 made 29% of the value added in % of GDP.[308] According to the OECD, this rapid advance in the industry was associated with "over-investment and misallocation of resources, and has also generated enormous pressure on the environment."[309] Engels then mentions the old economic progress had a "disadvantageous structure and low innovation capacities and efficiency standards."[310] Technological development and leadership in, for example, renewable energy technologies would allow China to overcome such limitations to its economic progress.[311] This corresponds with China's necessity to, at least to a certain extent, mitigate climate change and environmental degradation to protect its capabilities, including the economic ones.

One way to do this is to support the development of green technologies that China has been doing to a greater extent around the time of Paris climate agreement. It has spotted the potential of gaining advantage from the production of these technologies and ever since has been "cementing its global dominance of renewable energy" and left behind many other significant players like the US,

[306] The World Bank, *Cost of pollution in China: Economic estimates of physical damages,* (Washington D.C.: The World Bank: 2007): xvii.
[307] Pham, "Is There a Secret Growth Hormone Added to China's Economy?"; The World Bank, "GDP growth (annual %): China."
[308] The World Bank, "Manufacturing, value added (% of GDP)," Accessed March 22, 2019, https://data.worldbank.org/indicator/NV.IND.MANF.ZS?locations=CN.
[309] OECD, "Industrial upgrading for green growth in China," *OECD, Development Research Center of the State Council,* June 2017, https://www.oecd.org/greengrowth/Industrial_Upgrading_China_June_2017.pdf.
[310] Engels, "Understanding how China is championing climate change mitigation."
[311] Ibid.

UK or Australia.[312] Chinese general logic is to invest in technology that will help it to move to a new era of development with increased effectiveness in productivity.[313] In addition to this, renewable technologies, like solar panels, are becoming cheaper than ever. Solar PV projects in China have become or are about to become cheaper than traditional gas or coal-fired power plants.[314] Cost of solar plants has in the past five years fallen some 80% thanks to the expansion of this market.[315] China, therefore, adapts to new incentives set by decreased costs of building renewable energy projects. According to the World Bank report, China will increasingly derive its gains in productivity from "technology absorption and adaptation supplemented by incremental innovation."[316] It is simply finding new ways to continue with its economic growth.

Economy and energy security

Energy security, as already mentioned in the previous subchapter, plays a strategic role in China's overall security and power. Chinese economic growth that is based on manufacturing requires a significant amount of energy consumption. China consumes 23% of the global energy consumption out of which 60% is used for manufacturing purposes and which China does not have domestically available.[317] The use of green technologies to produce green energy within its borders and without security risks from other international players then comes to mind. When considering the economic impacts of renewable energy, it plays a role in reducing the adverse effects of coal-based energy on the environment and subsequently economic costs of decreased quality of human capability. Furthermore, China is expected to grow its energy needs, which brought it to commit to

[312] Michael Slezak, "China cementing global dominance of renewable energy and technology," *The Guardian,* January 6, 2017, Accessed March 22, 2019, https://www.theguardian.com/environment/2017/jan/06/china-cementing-global-dominance-of-renewable-energy-and-technology.
[313] The World Bank, "China's Growth through Technological Convergence and Innovation*"* in *China 2030*, (World Bank, 2013), 163.
[314] The World Bank, "China's Growth through Technological Convergence and Innovation,*"163.*
[315] Pope, "China wants to dominate the world's green energy markets – here's why."
[316] Pope, "China wants to dominate the world's green energy markets – here's why."
[317] BP, "Country Insight – China."

investing in renewable sources of energy.[318] China's National Energy Administration (NEA), as well as the National Development and Reform Commission (NDRC), will by 2020 spend over USD 360 billion to development of renewable energy and creation of some 13 million jobs.[319] The biggest Chinese investment, based on the data from 2014, went into solar energy, where China spent "27% of the global total spent on solar in 2014."[320] The green energy sector is, therefore, an area to which China wishes to invest in order to stabilize or decrease its energy dependency.

Green Financial System

Finally, China as a rational actor in the international system recognizes that ignoring the adverse effects of climate change and environmental degradation brings losses to its already existing capabilities which China is trying to avoid. At the Third Plenum of the 18th Chinese Communist Party Congress (CPC), China actually recognized the necessity of the state to transition to a green growth model.[321] China also set environmental goals in its 13th Five-Year Plan which to be fulfilled would require China to invest annually at least USD 320 billion into the protection of the environment, clean energy, and transportation.[322] The Green Financial System and its guidelines were officially released for the first time in China in August 2016 and it "marked the official initiation of supply-side financial structural reforms aiming to promote green development."[323]

A green finance system would, according to the Green Finance Task Force, "allow China to attract private capital into green industry, reduce fiscal pressure, create a new growth area and enhance economic growth, stability and restructuring."[324] At the 19th CPC Congress in 2017, president Xi stated that China would work on economic modernization, and the promotion of,

[318] Chiu, "The East Is Green: China's Global Leadership in Renewable Energy."
[319] Ibid.
[320] Nicole Murray, "China's green growth agenda," *World Economic Forum,* September 8, 2015, Accessed March 23, 2019, https://www.weforum.org/agenda/2015/09/chinas-green-growth-agenda.
[321] Green Finance Task Force, "Establishing China's green financial system," *People's Bank of China, United Nations Environment Programme,* (2015): 18.
[322] Ibid.
[323] International Institute of Green Finance, Central University of Finance and Economics, *Establishing China's Green Financial System: Progress Report 2017*, (UN Environment, 2017), 13.
[324] Green Finance Task Force, "Establishing China's green financial system,"18

among others, "green and low-carbon economy."[325] China sees its future in improving its technological development, directing it towards green development that will allow it to advance its economy and mainly sustainability of its economic growth that has until now been a result of the sacrification of China's healthy environment.[326] According to the International Institute of Green Finance, "China is at a crucial stage of maintaining steady economic growth and promoting structural adjustments" while green development and ecological civilization became its "key national strategic objectives."[327] Overall, China understands the strategic importance of mitigating the environmental degradation and climate change while making sure that its economy and other capabilities do not suffer.

[325] Morrison, "China's Economic Rise," 45.
[326] Morrison, "China's Economic Rise," 45.
[327] International Institute of Green Finance, Central University of Finance and Economics, *Establishing China's Green Financial System: Progress Report 2017*, (UN Environment, 2017), 13.

Chapter 6: Conclusion

The focus of this work was China's shift to climate change and environmental degradation mitigation through the application of greener policies and increased support and development of green technologies with the use of the neo-realist theory and rational choice analysis. Starting with the neo-realist approach, this work identified that the state is a "capability container" where vital capability is not only the military that the state builds but also, for example, population, political capacity, technologic development, energy security or economic performance. [328] These capabilities contribute to the survival of the state and can often also be transformed into military power.[329] The capabilities as mentioned above are, therefore, part of the hard power the state possesses and that is necessary for its power collection and survival in the anarchic international system.[330]

As mentioned in this work, since power relations are changing with time, all the states, no matter how powerful, need to be cautious of other countries that might want to balance the power of the state or become more powerful.[331] The collection of different kinds of capabilities is crucial for assuring a long-term survival of the state. Additionally, military power, as mentioned above, is not the only capability states should have as variables because capabilities like, for example, the economy, technology and population "identify the great powers in the international system."[332] Simply, the state power is measured through the capabilities it has.[333]

China's capabilities and their quality are to a great extent influenced by climate change and environmental degradation that have become considered threat multipliers since they have the ability to worsen the already existing problems and vulnerabilities of the state. [334] This includes disruption of military supply chains but also water shortages, rising sea levels, droughts, air

[328] Treverton and Jones, *Measuring National Power*, ix.
[329] Treverton and Jones, *Measuring National Power*, 4.
[330] Treverton and Jones, *Measuring National Power*, 1.
[331] Freeman, "China as a Great Power: Remarks to China Renaissance Capital Investors."
[332] Treverton and Jones, *Measuring National Power*, 5.
[333] Treverton and Jones, *Measuring National Power*, 20.
[334] United Nations, "Climate Change Threatens National Security Says Pentagon."

pollution, adverse health effects on population, economic impacts and more.[335] Exposing vulnerabilities and issues of the state to other international actors would be from the neo-realist point of view a strategic fail, and so the state will take steps to decrease this vulnerability and eliminate or reduce the threat. In terms of climate change being a security challenge, the action of the state to reduce its vulnerability means climate change mitigation. In terms of China, climate change and environmental degradation are also security challenges to its capabilities. Especially air pollution, decreased quality of water, worsening health of the population capability and subsequent economic losses are just a few examples of negative impacts China faces because of climate change and environmental degradation.

The industrial development in China in the 20th and 21st century helped China to grow economically but has also made China to become the biggest emitter of the CO_2 worldwide, and pay for it in the form of environmental degradation in its territory.[336] Currently, China is by the Chinese National Development Commission considered to be one of the most vulnerable countries to adverse impacts of climate change.[337] China's significant shift to climate change mitigation has, however, occurred only around the year 2014/2015 with the signing of Paris climate agreement, despite the adverse impacts of climate change and environmental degradation that long preceded this agreement.[338] As of 2015, China, among other things, pledged to peak carbon emissions by 2030, reduce carbon intensity up to 65% from 2005 levels, and started developing and manufacturing green technologies to the extent that it currently dominates this field.[339] Wind and solar energy technologies, in particular, became the field dominated by China.[340] As this work showed, China has started favoring climate change and environmental degradation mitigation at the moment when it found more benefits to its capability collection than in ignoring the degradation.

[335] United Nations, "Climate Change Threatens National Security Says Pentagon."
[336] Global Carbon Atlas, "CO2 Emissions."; Albert, and Xu, "China's environmental crisis."
[337] Garnaut et al. "China's rapid emissions growth and global climate change policy," 171.
[338] Pan, "The evolution and transformation of China's climate change response strategy."
[339] Li, "Hopes of Limiting Global Warming?" 50.; NRDC, "The Road From Paris: Chinas Progress Toward Its Climate Pledge."
[340] NRDC, "The Road From Paris: Chinas Progress Toward Its Climate Pledge."; Institute for Energy Economics and Financial Analysis, "Ieefa Report: China in 2017 Continued to Position Itself for Global Clean Energy Dominance."

The deterioration of many kinds of capabilities could no longer be ignored. The incentives for China to mitigate are therefore capability gains or losses as China is a rational actor that chooses the best possible outcomes for it.

The development of China's approach to climate change mitigation and policy priority has shifted from forecasting of the negative impacts of climate change and reacting to disasters, to protection of its right to economic development on the expense of the degradation of its environment, and finally to today's mitigation of climate change and environmental degradation through the decrease of carbon emissions and support of development of green technologies.[341] China has in many ways fulfilled Obama's predictions that in the future the question will not be whether the industries will be based on clean energy but which country will create these industries and jobs. [342] This is basically a capability competition where China intends "to occupy the commanding heights in the new round of competition that is centered on green technology and economy."[343] China has simply started to consider the security and other kinds of implications and potential that climate change and environmental degradation have to the state's capability, power and survival.

In terms of capabilities, China as any other rational state wishes to protect and improve its capabilities in order to also strengthen its position in the anarchic international arena. If these capabilities are endangered or can be enhanced through some action, the state considers the benefits and costs and reacts accordingly. Such capabilities then become drivers of some action and, as this work showed, in case of China the drivers to mitigate climate change, and environmental degradation are, for example, population, state capacity, green technologies, energy security, and economic growth. These capabilities are interconnected as one influences the others and vice-versa.

[341] Pan, "The evolution and transformation of China's climate change response strategy."; Jan Burck et al., *Climate Change Performance Index: Results 2018*.
[342] "President Barack Obama Statement on the Energy Bill," June 25, 2009, Washington, D.C., The White House, Office of the Press Secretary, https://obamawhitehouse.archives.gov/the-press-office/remarks-president-importance-passing-a-historic-energy-bill.
[343] He, "China's Climate-Change Policy From Kyoto To Copenhagen," 18.

To put an example, if China improves its green technology capability, it will subsequently improve the environmental degradation in the country by decreasing the causes of this degradation like the CO_2 emissions. The improved environment has a positive effect on the health of China's population capability and their work effectiveness, which further has positive impacts on the state's economy. Green technologies also improve the energy security of the state, which is a crucial strategic advantage. These capabilities are, therefore, driving China to behave in a way that minimizes costs, maximizes benefits and allows for power and security improvement. Overall, climate change and environmental degradation mitigation is not a matter of China's moral awakening but a reaction to domestic and international challenges that are endangering China's capabilities and, in the end, its survival.[344]

This work looked into more detail to individual capabilities analyzing their development since the Kyoto protocol until today to show that China's incentives to mitigate or not mitigate changed in time based on the benefits it could gain from it. Providing this information showed why China finds itself in its current position of climate change and environmental degradation mitigator and what are the costs and benefits. Looking firstly into domestic drivers of China's mitigation, the population becomes a significant capability. This capability suffers significantly due to China's air and other pollution that leads to at least 1,1 million of early deaths annually.[345] What it means is that pollution debilitates and decreases China's capability in terms of numbers but also productivity. This also brings an economic burden for the state caused by premature deaths, loss of workforce or reduction of its working effectiveness.[346] The adverse effects of climate change and the connected environmental degradation also create discontent among the population that affects the state capacity.

The population's tolerance of environmental issues in China has decreased, and the number of

[344] Engels, "Understanding how China is championing climate change mitigation."
[345] Li Jing, "1.1 trillion yuan in economic losses from pollution in 2010, China report says."; Health Effects Institute, "*Over 7 Billion People Face Unsafe Air: State of Global Air 2018."*
[346] The World Bank, *Cost of pollution in China: Economic estimates of physical damages.;* China Power Team, "Is air quality in China a social problem?"

protests against polluting projects has increased in the past decades.[347] Although large movements have not appeared yet, this can be only a matter of time as until now the population has been accepting the pollution as an inevitable and acceptable sacrifice for the sake of the economic growth.[348] Even then, however, thousands of small protests take place in China, and more significant protests with an increasing impact appear. People are increasingly demanding adequate response to environmental degradation and climate change, and if China wishes to maintain its state capacity such as governmental stability, it needs to react adequately.[349] This state capacity like political stability and the ability to react to challenges and threats is also an important part of the state's security and survival. China responded well to the issue of population discontent by creating "green teams" and pushing for local enforcement of climate change mitigation and meeting of the targets. The state also included its population into the process of searching infractions and so partly redirected the population's focus towards projects that are not challenging the state's capacity and political stability.[350]

One of the solutions for domestic as well as international drivers to climate change mitigation are green technologies that present a possibility of reducing the carbon emissions, this way helping the health and other issues that China's population faces and also reducing China's energy dependence on other states and create and decrease economic costs of pollution. In 2014 China became one of the biggest investors to renewables, and currently, it is dominant in this field.[351] China is among solar panels and wind turbines also the biggest manufacturer of electric and hybrid cars and at the same time the biggest market for these technologies.[352] Application of these technologies within China is a highly rational step and part of the plan to mitigate climate change, increase its energy security and profit economically. Seeing that China is leading the investment

[347] Li, "Hopes of Limiting Global Warming?" 51.
[348] Hoffman and Sullivan, "Environmental Protests Expose Weakness In China's Leadership."
[349] Ibid.
[350] Leign Wedell, "What Did China's 'Green Teams' Accomplish."
[351] Institute for Energy Economics and Financial Analysis, "Ieefa Report: China in 2017 Continued to Position Itself for Global Clean Energy Dominance."
[352] Hull and Deaux, "Elon Musk IS Squaring Off Against China for the Future of Tesla."; Tim McDonald, "China powers up electric car market."

into clean energy technologies, is their biggest manufacturer and also invests into their application within the state, the rationality of this step needs to exist.[353] Especially energy security is an essential issue for China, and as a rational actor, it should take steps to decrease its energy dependency on other international actors.

With China's development, the need for energy consumption has also been increasing, and currently, it accounts for 23% of the overall global energy consumption.[354] China no longer has the ability to be self-sufficient in energy resources, however, adding renewable energy into China's energy consumption mix can decrease the share of coal and the energy dependency that China has built up since the 90s. In 2017 the fossil fuel imports gap decreased by 20% thanks to the renewables.[355] Also, as this work mentioned, oil is more of a source of vulnerability than a source of influence, and decreased dependence is a tremendous strategic and security success while it is also a success in the climate and environmental aspect. [356] China's growing interest in the development and application of green technologies exists precisely because they offer a partial solution to China's domestic and international concerns.

Finally, the economic performance of the state is also a capability that is crucial across many other capabilities, including military, population, state capacity, energy security as well as green technologies. China's rapid economic growth since the late 70s made the country industrialized, and subsequently, it became a production powerhouse for the entire world.[357] The manufacturing these days is over 30% of China's value added in % of its GDP.[358] As this work stated, economic activity gives the state a source of power that as Huntington mentioned is "increasingly important in determining the primacy or subordination of states."[359] Considering that China is the second

[353] Jocelyn Timperley, "China leading on world's clean energy investment, says report."
[354] BP, "Country Insight – China."
[355] Mathews and Huang, "China's green energy revolution has saved the country from catastrophic dependence on fossil fuel imports."
[356] Erica Strecker Downs, "China's Energy Security Activities" in *China's Quest for Energy Security*, 12.
[357] Pham, "Is There a Secret Growth Hormone Added to China's Economy?"
[358] The World Bank, "Manufacturing, value added (% of GDP)."
[359] Moran, "An Economics Agenda for Neorealists."

biggest economy in the world, this is a crucial piece of information.[360]

China is already known to be modernizing its armed forces together with increased military spending which only shows that different capabilities can be transformed and used to build a hard power such as military in order to increase its power, position, and security in the anarchic international system.[361] Additionally, improving China's technological development, such as the development of green technologies, will help China to have a sustainable economic growth that has until now been done based on scarification of a healthy environment.[362] China's investment into new technologies, mitigation of climate change and environmental degradation can, therefore, improve the economy and avoid financial losses that come with deterioration of capabilities like population and state capacity.

When analyzing the overall behavior of China towards climate change and environmental degradation mitigation through the neo-realist lenses based on the provided information, it becomes clear that China acts rationally with its decision to shift towards greener policies and mitigation. It got into position when mitigation means protecting its capabilities from further deterioration or creating a new capability that has the potential to give China an advantage compared to other states in the international system. If according to neo-realists states need their various kinds of capabilities in order to assure their security and survival, China's protection and improvement of its capabilities does indeed ensure both of it. The significance behind China's shift to climate change mitigation and application of green technologies is, therefore, its ability to rationally react to threat or challenge in the anarchic international system and also act in a way that it can possibly gain a strategic advantage compared to other states.

Considering that China is a rising great power and also a country that thinks big in many aspects including economic and military growth, investment to development including green technologies, production of technologies and their application, China has a great potential of gaining a significant

[360] Gray, "The world's 10 biggest economies in 2017."
[361] Tweed, "China Defense Spending Set to Rise 7.5% as Xi Builds Up Military."
[362] Ibid.

capability advantage on the expense of states that do not mitigate or take a lesser initiative in climate change mitigation and application of green technologies. This encompasses the many times mentioned capabilities of population, state capacity, energy security and economic performance including losses caused by environmental degradation. China as a rational actor in the anarchic international system, therefore, acts in a beneficial way for its capabilities and profit, which further ensure its power, security, and survival.

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