Making Environmental Governance Work in Emerging Economies:

A Case Study of China

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August 2019

A thesis submitted to McGill University in partial fulfillment of the requirements of the degree of Master of Laws

ABSTRACT

It has long been recognized that the resolution of global environmental problems is closely connected to differences in levels of economic development. While international law and policy tends to assert the compatibility of economic growth and environmental protection, developing countries continue to grapple with the challenge of growing their economies and combating poverty without causing significant harm to the environment. Given the unsatisfactory solutions offered by influential concepts that are predicated on the notion that economic development can be reconciled with improvements in environmental performance, such as sustainable development, green growth or the Environmental Kuznets Curve, the task of carrying out economic growth while avoiding ecological breakdown has become the pathway emerging countries must pursue. However, important questions arise against the backdrop of this new challenge. What are the challenges and opportunities for improving environmental governance in emerging economies? How and to what extent can emerging economies develop laws and policies that will enable them to decouple environmental degradation from the pursuit of economic growth?

China is one country where the complex relationship between economic development and environmental quality offers a rich context for examining the opportunities and challenges of improving environmental governance in a rapidly industrializing economy. Since 2007, there have been clear signs that China has continuously made efforts to reverse environmental degradation and improve the environment's quality. This thesis seeks to distill key findings from China's experience with environmental governance during the past two decades with a view to understanding how to strengthen environmental governance in emerging economies. The general context in which China's environmental governance arose, reasons for its recent pro-environmental intentions, and its unique features can all provide lessons for other emerging countries. At the same time, this thesis shows that there are limitations in replicating China's politically, economically, and geographically unique experience in environmental governance.

RÉSUMÉ

Il est reconnu depuis longtemps que le problème de la résolution des problèmes environnementaux mondiaux est étroitement lié aux différences des niveaux de développement économique. Alors que les lois et politiques internationales tendent à affirmer la compatibilité de la croissance économique et de la protection de l'environnement, les pays en développement continuent à faire face aux défis de la croissance de leur économie et de la lutte contre la pauvreté tout en évitant les dommages environnementaux. Compte tenu des solutions peu satisfaisantes offertes par des concepts influents fondés sur la notion que le développement économique peut être concilié avec l'environnement, telles que le développement durable, la croissance verte ou l'hypothèse de la courbe environnementale de Kuznets, la poursuite de la croissance économique sans dégradation de l'environnement est attendue des pays émergents. Cependant, d'importantes questions se posent dans le contexte de ce nouveau défi. Quels sont les défis et les opportunités pour améliorer la gouvernance environnementale dans les économies émergentes? Comment et dans quelle mesure les économies émergentes peuvent-elles élaborer des lois et des politiques leur permettant de dissocier la dégradation de l'environnement de la poursuite de la croissance économique?

La Chine est un pays où la relation complexe entre développement économique et qualité de l'environnement offre un contexte riche pour examiner les opportunités et les défis liés à l'amélioration de la gouvernance environnementale dans une économie en voie d'industrialisation rapide. Depuis 2007, il apparaît clairement que la Chine n'a cessé de poursuivre des efforts afin d'inverser la dégradation de l'environnement et améliorer sa qualité. Cette thèse cherche des conclusions tirées de l'expérience de la Chine en matière de gouvernance environnementale au cours des deux dernières décennies afin de comprendre comment renforcer la gouvernance environnementale dans les économies émergentes. Le contexte général dans lequel la gouvernance environnementale de la Chine a été créée, les raisons de ses récentes intentions en faveur de l'environnement et ses caractéristiques uniques peuvent tous fournir des enseignements pour les autres pays émergents. Cette thèse montre aussi qu'il est difficile de reproduire l'expérience unique de

la Chine sur le plan politique, économique et géographique en matière de gouvernance environnementale.

ACKNOWLEDGEMENTS

I would like to express my deepest thanks to my supervisor, Professor Sébastien Jodoin, for his expertise, guidance, and support throughout my Master's studies. With his extremely helpful comments, my studies and research have always progressed smoothly.

I am also grateful to my family and all my friends who have supported and gave me encouragement throughout my studies.

TABLE OF CONTENTS

INTRODUCTION

In December 1952, a four-day fatal fog, dubbed the 'Great Smog', smothered London in a yellow haze, caused 12 000 deaths and left more than 150 000 people hospitalized in the worst air pollution event in European history. It was the "first instance of a climatic phenomenon manufactured by industrial modernity and acknowledged as such".[1] Similar calamities occurred in the United States, where "killer smogs" made thousands ill.[2] These pollution incidents were not isolated events but rather inevitable by-products of intensive industrialization. Over time, the accumulated effects of pollution and environmental degradation have not only led to short-term social and health issues but also to the long-term deterioration of natural resources and the global climate.

The often-forgotten history of environmental problems in today's rich countries should have heightened awareness of environmental issues in countries with lower levels of prosperity about the potential for economic expansion to harm the environment. Yet, deadly pollution events have only proliferated, in varying degrees, in emerging countries. Environmental degradation continues unabated in the form of land degradation, impure air, contaminated water, toxic wastes, acid rain, desertification, deforestation, oil spills, soil erosion, and global warming. In 2013, Beijing's pollution reached 755 on a scale of 0 to 500 micrograms per cubic meter,[3] and the word 'airpocalypse' emerged to describe the smog crisis.[4] Similarly, the levels of fine particulate matter have gotten worse in India by

[1] Jesse Oak Taylor, *The Sky of Our Manufacture: The London Fog in British Fiction from Dickens to Woolf* (Charlottesville: University of Virginia Press, 2016) at 1.

[2] Roy Popkin, "Two 'Killer Smogs' the Headlines Missed", (December 1986), online: *United States Environmental Protection Agency* <https://nepis.epa.gov/Exe/ZyNET.exe/93000EN0.txt?ZyActionD=ZyDocument&Client=EPA&Index=1986%20Thru%201990&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D:\ZYFILES\INDEX%20DATA\86THRU90\TXT\00000029\93000EN0.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h|-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=29>.

[3] Edward Wong, "Beijing Air Pollution Off the Charts", *The New York Times* (19 October 2018), online: <https://www.nytimes.com/2013/01/13/science/earth/beijing-air-pollution-off-the-charts.html>.

[4] Anastasia E Thyroff & William E Kilbourne, "Understanding pro-environmental intentions through growth, competitiveness, and concern" (2017) 25 Australasian Marketing Journal 2 at 100.

13% between 2010 and 2015.[5] With the rise of an industrializing 'South' replicating the North's development model, the international community faces the prospect of global environmental disaster. In addition to renewed efforts to address environmental problems in industrialized countries, it is also necessary to reverse emerging patterns of unsustainable development across the developing world.

This challenge is especially acute in the field of climate change. Although the views on the optimal pathway and speed of change differ, it is widely accepted that significant emissions reductions are needed to avert a dangerous rise in global average temperatures. Many scientists and policymakers have advocated reducing greenhouse gas emissions by 60-80% by 2050.[6] Under the *Paris Agreement*, developing countries have shown willingness to reduce their national emissions and adapt to the impacts of climate change by submitting nationally determined contributions.[7] The success of climate mitigation initiatives in developing economies depends on various socio-economic factors such as economic growth, demographic expansion, energy demand, available renewable technologies, and implementation of climate and environmental protection policies.[8]

Indeed, it has long been recognized that the challenge of resolving global environmental problems is closely connected to differences in levels of economic development.[9] More

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[5] Madhulika Verma, "Smothered in Smog", (2 February 2017), online: *Greenpeace India* <https://www.greenpeace.org/india/en/story/1577/smothered-in-smog/>.

[6] Joeri Rogelj et al., "2018: Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development" in Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty, online (pdf): *IPCC* <https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_Chapter2_Low_Res.pdf>.

[7] UNFCCC, "Nationally Determined Contributions (NDCs)", online: *United Nations Climate Change* <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs>. The idea of "an international equitable burden-sharing arrangement to control and reduce carbon emissions based on multilaterally negotiated binding emissions targets" under the 1997 Kyoto Protocol was officially abandoned for the Paris Agreement. Raymond Clémençon, "The Two Sides of the Paris Climate Agreement: Dismal Failure or Historic Breakthrough?" (2016) 25:1 The Journal of Environment & Development 3.

[8] Sourangsu Chowdhury & Sagnik Dey, "Air Quality in Changing Climate: Implications for Health Impacts" in Rais Akhtar & Cosimo Palagiano, eds, *Climate Change and Air Pollution*, The Springer Climate book series (Cham: Springer, 2018) 9 at 14.

[9] For instance, the concept of common but differentiated responsibilities was enshrined as Principle 7 of the Rio Declaration: "In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities." *The Rio Declaration on Environment and Development,* 12 August 1992, A/CONF.151/26, art 7, 31 ILM 874 [Rio Declaration]. This concept allows countries of varying levels of development to contribute according to their ability.

than twenty years after Rio, developing countries continue to grapple with the challenge of reconciling the pursuit of economic growth with the need to protect the environment. Of course, there is a wide range of perspectives on whether more sustainable forms of development are desirable or even possible,[10] as was revealed by debates over the concept of a green economy in the Rio+20 Summit.[11]

Given the massive environmental and social costs of environmental harm on our increasingly unhealthy planet,[12] there is a need to critically evaluate the concepts and theories that assert that economic growth is compatible with achieving a decent environment for living. Most notably the hypothesis of the Environmental Kuznets Curve is a prominent and influential example of such theories. Likewise, influential concepts such as sustainable development or green growth are predicated on the notion that economic development can be reconciled with improvements in environmental performance.[13] However, scholars are increasingly skeptical of orthodox approaches to sustainability and studies have started to show that no absolute decoupling between continued economic growth and resource use have been achieved on a global scale.[14] Given the unsatisfactory solutions offered by pathways followed by developed countries, the task of carrying out economic growth while avoiding ecological breakdown has become the default pathway emerging countries have to pursue. However, important questions arise against the backdrop of this new challenge. What are the challenges and opportunities for improving environmental governance in emerging economies? How and to what extent can emerging economies develop laws and policies that will enable them to decouple environmental degradation from the pursuit of economic growth?

[10] Jennifer Clapp & Peter Dauvergne, *Paths to a Green World: The Political Economy of the Global Environment* (Mit Press, 2011).
[11] Holger Baer, Klaus Jacob & Stefan Werland, *Green Economy Discourses in the Run-Up to Rio 2012*, SSRN Scholarly Paper ID 2023052 (Rochester, NY: Social Science Research Network, 2012).
[12] UN Environment, ed. *Global Environment Outlook – GEO-6: Healthy Planet, Healthy People*, (Cambridge: Cambridge University Press, 2019).
[13] Jason Hickel & Giorgos Kallis, "Is Green Growth Possible?" (2019) 0:0 New Political Economy 1.
[14] *Ibid*. Shawkat Alam & Jona Razzaque, "Sustainable Development versus Green Economy:The Way Forward?" in Shawkat Alam et al, eds, *International Environmental Law and the Global South* (Cambridge University Press, 2015) 609.

China is one country where the complex relationship between economic development and environmental quality has attracted significant attention from scholars.[15] The importance of appropriately addressing the relationship between economic development and the environment was recognized relatively early in China. While it was also well aware of environmental concerns before its industrialization started, its environment continued to degrade despite a sophisticated environmental regulatory framework.[16] Today, China is a major economy that has industrialized rapidly within almost four decades and has established a relatively complete industrial system, particularly in heavy industries (coal, steel, cement, energy, etc.). At the same time, its industrialization is not yet complete as economic growth continues to play a dominant role in eradicating the high rates of poverty that remain in rural areas.[17] Moreover, new conditions such as renewable technologies, increased public awareness, and international cooperation on environmental concerns have created a new impetus for addressing environmental problems in the country. Indeed, there are signs that China could become a global environmental leader through a "Green Leap Forward"[18] as the Chinese environmental regulatory system has become more effective in the past decade.[19] Prime Minister Li Keqiang in March 2014 notably "declared war on pollution" and stated that "we must strengthen protection of the ecological environment and resolve to take forceful measures".[20] As a result, China offers a rich context for

[15] *See* ZhongXiang Zhang, "China in the transition to a low-carbon economy" (2010) 38:11 Energy Policy 6638; Yanqing Jiang, *Openness, Economic Development, and the Environment in Post-Reform China: A Model with Empirical Analysis* (2014); Ya Wu et al, "Decoupling China's economic growth from carbon emissions: Empirical studies from 30 Chinese provinces (2001–2015)" (2019) 656 Science of The Total Environment 576; Hossein Azadi, Gijs Verheijke & Frank Witlox, "Pollute first, clean up later?" (2011) 78:3–4 Global and Planetary Change 77.

[16] Xiaoying Ma & Leonard Ortolano, *Environmental Regulation in China: Institutions, Enforcement, and Compliance* (Lanham: Rowman & Littlefield, 2000); Gang Chen, "A Long Way to Go Green: Rethinking China's Environmental Policy, Laws and Governance" in *China's New Social Policy*, Series on Contemporary China Volume 20 (WORLD SCIENTIFIC, 2009) 141.

[17] Jikun Huang, Qi Zhang & Scott Rozelle, "Economic growth, the nature of growth and poverty reduction in rural China" (2008) 1:1 China Economic Journal 107.

[18] Robert V Percival, "China's 'Green Leap Forward' Toward Global Environmental Leadership" (2011) 12 Vermont Journal of Environmental Law 633 at 636.

[19] Jiexin Tang, Cheng Zhang & Wenli Zhou, "Environmental regulatory efficiency and its influencing factors in China" (2019) 12:4 Energy Efficiency 947.

[20] Keqiang Li, "Report on the work of the government: Delivered at the Second Session of the Twelfth National People's Congress on March 5, 2014" (5 March 2014), online: <http://online.wsj.com/public/resources/documents/2014GovtWorkReport_Eng.pdf>.

examining the opportunities and challenges of improving environmental governance in a rapidly industrializing economy.

This thesis proceeds as follows. Chapter I reviews key concepts and theories that have shaped the global understanding of the relationship between economic development and environmental issues. Chapter II begins with the background and context for environmental governance in China, mainly explaining the context in which environmental governance arose and some motivational reasons behind China's recent pro-environmental movement. It then examines two features of Chinese environmental governance, focusing specifically on its underlying legal and planning frameworks. While both were established at the early stages of the industrialization process, they were treated differently and had different effects on energy saving and emissions reductions. Chapter III specifically examines environmental targets in China's environmental plans. The plans and targets have provided a contrasting window on the resolution of economic growth *versus* environment conflict, helped establish priorities and address tradeoffs among goals in a given period of time, and thus have greatly contributed to environmental improvements. Chapter IV assesses the lessons and limitations of China's experience with authoritarian environmentalism for other developing countries and discusses whether and to what extent its system of governance and unique socio-economic context are transposable to other countries. Moreover, it also acknowledges that improvements in environmental performance have occurred only for a few pollutants. Thus, the conclusion of this thesis only serves as a partial recommendation for countries which seek to imitate China's progress in environmental governance or other fields, such as economic growth.

I. Approaches to Reconciling Economic Development and the Environment

1. The Global Race for Development

> "[W]e must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas"
>
> - President Harry Truman in his 1949 inauguration speech[21]

During the late 1940s and 1950s, the concept of "development" spread across the world and placed the nations on a linear track, where some moved faster and other slower, but all in the direction of being fully developed.[22] Rapid economic growth, urbanization, and mass production were held to increase national wealth and living standards. The image of economic successes became so ingrained in developing nations that joining the global development race seemed to be the only way to catch up the leading countries in the race. The task of "un-underdeveloping"[23] was hence embraced by nations as their primary aim. Development, especially economic development, was thus closely interconnected to the use of natural resources for "infrastructure and energy, electricity for lighting, heating, cooling and mechanical power, and oil-powered cars, trucks and aircraft for transportation of people and industrial food production" even if the price to pay was the deterioration of the natural world.[24]

Unlike industrialization in European countries, the American Industrial Revolution "occurred against the backdrop of seemingly unlimited land and natural resources" and this notion of unbounded resources made economic development seem to be without limit and

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[21] "Harry S. Truman: Inaugural Address. U.S. Inaugural Addresses. 1989", online: *Bartleby.com* <https://www.bartleby.com/124/pres53.html>.
[22] Wolfgang Sachs, "Global ecology and the shadow of development" in Wolfgang Sachs, ed, *Global ecology: A new arena of political conflict* (Halifax: Fernwood Books Ltd, 1993) 3.
[23] *Ibid* at 6.
[24] Mukul Sanwal, *The World's Search for Sustainable Development: A Perspective from the Global South* (Cambridge: Cambridge University Press, 2015).

allowed the countries to increase their economic power relentlessly.[25] But to give economic growth the central place it occupies today involves a considerable cost: overshooting. With the global population, industrialization, and resource depletion growing with unprecedented speed, many argue that limits to growth will be reached within the next one hundred years.[26] Growth is by no means open-ended. It was not long before the hegemonic development model of Western countries has foundered for deteriorating the environment and widening the gap between the rich and poor.[27] Further extinction of plant and animal species, desertification and soil erosion, the unsustainable use of fossil fuels for energy, and growing emissions of greenhouse gases are all examples of repercussions of economic development on the environment. Economic development has thus been questioned for its damage to the environment as increasing economic activities, along with excessive extraction of natural resources, accumulation of waste and concentration of pollutants would proportionately deteriorate the environment.[28]

This chapter discusses the concept of sustainable development and the hypothesis of the Environmental Kuznets Curve which have influenced many countries' environmental laws and policies. It concludes that these theories do not offer satisfactory solutions to prevent environmental damage or to reconcile economic growth and environmental protection, especially for developing countries.

2. The Concept of Sustainable Development

By the 1960s, concerns for growing environmental degradation and pollution around the world catalyzed industrialized countries to focus their attention on identifying and addressing environmental problems. Rachel Carson's book *Silent Spring* raised public awareness considerably about the environment and most importantly the human impact on

[25]Ruth Gordon, "UnsustainableDevelopment" in Shawkat Alam et al, eds, *International Environmental Law and the Global South* (Cambridge University Press, 2015) 50.
[26]Donella H Meadows et al, *The Limits to growth; a report for the Club of Rome's project on the predicament of mankind* (New York: Universe Books, 1972).
[27] John C Dernbach, "Sustainable Development as a Framework for National Governance" (1998) 49:1 Case Western Reserve Law Review, online: <https://papers.ssrn.com/abstract=1089413>.
[28] Donella H Meadows et al., *The Limits to growth; a report for the Club of Rome's project on the predicament of mankind* (New York: Universe Books, 1972).

the environment.[29] The development path chosen by the early runners of the development race has proven to be limited by the ecological carrying capacity. The Swedish government and later, the UN, called for an international conference to address environmental problems through international cooperation and agreement.[30] The United Nations Conference on the Human Environment (UNCHE), held in Stockholm in 1972, became thus the first intergovernmental conference to do just that.[31]

At Stockholm, developed countries generally championed the need to conserve the environment and ensure against any further degradation. They stressed that all countries are bound by the environment and called for global cooperation to resolve global problems. Their views were illustrative of their experience with industrialization and massive economic development. Yet it was difficult for developing countries to fully accept the responsibilities they were assigned. For countries that have not developed yet, the choices seem contradictory but obvious: carrying on development at the expense of the environment or refrain from developing and stay underdeveloped. Many participants questioned the role developing countries had to play as "most pollution was caused by industrialized countries and consequently they alone had responsibility for finding solution".[32] Some developing countries viewed the conference as a threat to "mir[e] them in poverty forever".[33] Environmental protection was viewed as a luxury which only the developed countries could afford. As such, before a country could reach developmental levels enough to afford such luxuries, its priority was to alleviate poverty.

For industrializing countries, the debate was to which extent they should champion environmental concerns at the expense of their development. As the Ugandan Delegation leader said at Stockholm,

> Developing countries face environmental problems different in degree from those encountered in developed countries of the world. Our fundamental

[29] Linda J Lear, "Rachel Carson's 'Silent Spring'" (1993) 17:2 Environmental History Review 23.
[30] Fred H Knelman, "What Happened at Stockholm" (1973) 28:1 International Journal: Canada's Journal of Global Policy Analysis 28.
[31] Edith Brown Weiss, "The Evolution of International Environmental Law" (2011) Georgetown Law Faculty Publications and Other Works, online: <https://scholarship.law.georgetown.edu/facpub/1669>.
[32] Sanwal, *supra* note 24 at 171.
[33] *Ibid* at 73.

> problem is how to raise the material standard of life of our people to levels that are humanly decent. In other words, we are not confronted with an environment that has degenerated into pollution as a result of development. On the contrary, we are faced with an environment many of whose inherent aspects are prohibitive to development and injurious to human comfort.[34]

The Ugandan representative's assertion represented what the Kenyan representative categorized as the distinction between the "environmental problems of poverty," and environmental problems deriving from "the excesses of affluence." [35] . While the developing states have recognized that environmental considerations should form part of their development policies, they continue to emphasize that their environmental problems are different from those of the developed countries.[36]

China's views differed even more drastically because of political concerns. As Geping Qu, a member of Chinese Delegation to the UNCHE in Stockholm, commented,

> China was in the midst of a decade of turmoil when the conference took place. People's minds were filled with extreme left emotions. The world's environmental problems were viewed as not affecting nor related to us. At that time, we believed that there was no world environmental or ecological crisis. There was only the crisis of the capitalist system; public hazard was the product of the capitalist system. The socialist system would not produce pollution. Whoever said pollution and public nuisance would discredit socialism. Environmental pollution will not disappear even if you deny it. However, China's industrial pollution, urban pollution, and river pollution were already quite serious.[37]

To secure the participation of developing countries in discussions for global environmental issues, the environmental problem was broadened and common grounds between the

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[34] Reference Stockholm Conference. M K Tolba, *Development without destruction: evolving environmental perceptions* (1982).
[35] John Ntambirweki, "The Developing Countries in the Evolution of an International Environmental Law" (1991) 14 Hastings Int'l & Comp L Rev 905.
[36] Tolba, *supra* note 34.
[37] Barbara Ward & Rene Dubos, *The care and maintenance of a small planet,* translated by Committee of foreign Hazard series (Jilin People's Publishing House, 1997) at 1-5 (my translation).

developed and developing countries were sought. Official debates and decisions were finally shaped around the potential conflict between economic development and environmental protection.[38] Sustainable development was advanced to provide a third and more appealing choice to all: that development is not incompatible with the environment.[39]

While the 1972 Stockholm conference resulted in bringing the challenge of sustainable development onto the global stage, the term was introduced later, by a pathbreaking publication entitled *World Conservation Strategy: Living Resource Conservation for Sustainable Development.* The document was to "help advance the achievement of sustainable development through the conservation of living resources".[40] The phrase was then popularized in *Our Common Future* which launched the concept of sustainable development and offered a definition for it: "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[41] The concept of sustainable development would be made "the *leitmotif* of international environmental policy" twenty years later at the United Nations Rio Conference on Environment and Development.[42] The principle appeared to mollify both developed and developing countries because the environment can thus be an "integral part" of the development process. Development and economic growth would also be able

[38] Edith Brown Weiss, "The Evolution of International Environmental Law" (2011) 54 Japanese Yearbook of International Law 1.

[39] The idea had been advanced prior to the Stockholm Conference at the Seminar on Environmental Development held in Founex, Switzerland, in 1971. The notion advanced was that environmental concerns should not be a barrier to development, but part of the process. The *Brundtland Commission Report* later brought the term 'sustainable development' to international institutions and defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." World Commission on Environment and Development (WCED), *Our Common Future (The Brundtland Report)* (Oxford: Oxford University Press: 1987). The Declaration of the United Nations Conference on the Human Environment, or Stockholm Declaration, recognized the relationship between development and environment by stating that "[e]conomic and social development is essential for ensuring a favorable living and working environment for man" (Principle 8) and that "States should adopt an integrated and coordinated approach to their development planning as to ensure that development is compatible with the need to protect and improve the environment for the benefit of their population". (Principle 13)

[40] International Union for Conservation of Nature and Natural Resources (IUCN), "World Conservation Strategy: Living Resource Conservation for Sustainable Development" (1980) IUCN, online: < https://portals.iucn.org/library/efiles/documents/wcs-004.pdf >.

[41] World Commission on Environment and Development, *Our common future* (Oxford; New York: Oxford University Press, 1987)..

[42] Edith Brown Weiss, "The Evolution of International Environmental Law" (2011) Georgetown Law Faculty Publications and Other Works, online: <https://scholarship.law.georgetown.edu/facpub/1669> at 10.

to alleviate poverty and underdevelopment which were identified as causes of environmental degradation. [43]

The concept was however criticized to be vague, meaningless, and "devoid of operational value".[44] The conflicting concerns between economic growth and the environment are said to be reconciled but are actually only "reconfigured and reshuffled".[45] With a slightly altered logic, poverty, environmental degradation, and social problems could all be averted with more economic growth as long as the environment is integrated into economic development. By keeping the language of developmentalism and emphasizing that it is a development which has to be sustained, the environment was arguably subordinated to economic gains again. More importantly, it means that developing countries would continue to subscribe to the notion that the industrialized world is their "implicit utopia".[46]

At the Rio+ 20 Conference on Sustainable Development in 2012, the concept of 'green growth', 'green economy' or 'sustained economic growth' was featured in *The World We Want.* [47] Despite the rise of other theories that posit that economic growth and environmental protection can be compatible with another, no new models of development were advanced for developing and underdeveloped countries. Sustainable development, for instance, is accomplished when "the environment is protected, the economy is developed, and social equity is achieved".[48] However, it does not resolve conflicts between environmental, social, and economic interests. Similarly, the concept of green growth has

[43] In the Rio Declaration on Environment and Development, the principle of sustainable development in international environmental law refers to four objectives: First, "environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it". (Principle 4) Second, "the right to development must be fulfilled so as to equitably meet development and environmental needs of present and future generations". (Principle 3) Third, the use of natural resources has to be sustainable. Fourth, natural resources should be preserved both within the present generation and for future generations (intra- and inter-generational equity). *See* Patricia Birnie, Alan Boyle & Catherine Redgwell, *International Law and the Environment*, 3rd ed (Oxford: Oxford University Press, 2009).
[44] Wilfred Beckerman, "Economic growth and the environment: Whose growth? whose environment?" (1992) 20:4 World Development 481 at 491.
[45] Arturo Escobar, *Encountering development: the making and unmaking of the Third World* (Princeton: Princeton University Press, 2012) at 194.
[46] Sachs, *supra* note 22 at 7.
[47] United Nations, "The Future We Want: final document of the Rio+20 Conference" (19 June 2012), A/CONF.216/L.1, online (pdf): *Rio+20* < http://rio20.net/wp-content/uploads/2012/06/N1238164.pdf>.
[48] Bruce Pardy, "In Search of the Holy Grail of Environmental Law: A Rule to Solve the Problem" (2005) 1:1 McGill International Journal of Sustainable Development Law & Policy 29 at 33.

been defined as "one that simultaneously grows income and improves human well-being 'while significantly reducing environmental risks and ecological scarcities'".[49]

The ambiguousness and vagueness of these theories make the implementation of environmental protection in developing countries even more difficult. As Gordon argues, "[a]s sustainable development emerged in international discourse", it did not "seriously interrogate […] the economic and environmental plight of the global South".[50] Moreover, Northern development models do not offer concrete examples of sustainable development. Instead, more scholars aligned with the view that economic activity is not necessarily damaging to the environment. Beckerman, in particular, argued that "although economic growth usually leads to environmental degradation in the early stages of the process, in the end, the best – and probably the only – way to attain a decent environment in most countries is to become rich".[51] As such, how to implement sustainable development remained unclear but pursuing economic development would certainly be concrete and beneficial, at least in alleviating poverty.

3. The Environmental Kuznets Curve

Following the emergence of sustainable development, a similar relationship between economic growth and the environment emerged in the literature: the environmental Kuznets curve (hereafter referred to as "the EKC"). The World Bank popularized the EKC in its 1992 *World Development Report.*[52] One of the reasons why scholars were increasingly interested in the EKC is that the answers to the effects of increasing economic growth on the environment would help resolve the possible incompatibility of economic development and environmental preservation.[53] Following the EKC hypothesis, the solution to environmental problems is to alleviate poverty. This initial conclusion has been extended to defend that economic growth is valuable for the environment: "economic

[49] Hickel & Kallis, *supra* note 13.
[50] Gordon, *supra* note 12 at 51.
[51] Beckerman, *supra* note 44 at 482.
[52] World Bank, *World Development Report 1992*, World Development Report (The World Bank, 1992).
[53] C-Y Cynthia Lin & Zachary D Liscow, "Endogeneity in the Environmental Kuznets Curve: An Instrumental Variables Approach" (2013) 95:2 Am J Agric Econ 268 at 268.

growth, whilst initially detrimental to the environment in developing countries, will ultimately be beneficial to the environment".[54] However, this position has also been criticized due to fears that policymakers might use the EKC theory to justify the preeminence of economic growth over the environment.[55]

The EKC posits a relationship between economic development and pollution. According to the EKC hypothesis, at early stages of development, pollution increases with rising per capita income. Then at higher levels of development, beyond a turning point, environmental degradation will decrease with further increases in per capita income. This relationship gives rise to an inverted U-shaped curve relating economic growth to environmental degradation. It resembles the inverted-U relationship postulated by Simon Kuznets between development and income inequality, hence the name the environmental Kuznets curve.[56] The inverted U-shaped curve was first observed by Grossman and Krueger when they investigated possible impacts of the North American Free Trade Agreement on the environment.[57] They expected the environmental quality to deteriorate continuously with increases in per capita income (as an indicator of economic development) but instead found that pollution levels fall at higher levels of income.

The EKC model has elicited conflicting opinions from scholars. Some studies confirm the inverted U-curve relationship[58] and suggest that the basic EKC could even become

[54] Anton Nahman & Geoff Antrobus, "The Environmental Kuznets Curve: A Literature Survey" (2005) 73:1 South African Journal of Economics 105; Bruce Bartlett, "The high cost of turning green" Wall Street Journal, online: <https://www.academia.edu/1421033/The_high_cost_of_turning_green> (Bartlett went even further by claiming that environmental regulation hinders economic growth and reduces environmental quality).

[55] David I Stern, "The environmental Kuznets curve after 25 years" (2017) 19:1 J Bioecon 7 ("The EKC literature might encourage policy-makers to incorrectly de-emphasize environmental policy and pursue growth as a solution instead" at 24); Susmita Dasgupta et al, "Confronting the Environmental Kuznets Curve" (2002) 16:1 Journal of Economic Perspectives 147 ("In developing countries, some policymakers have interpreted such results as conveying a message about priorities: Grow first, then clean up" at 147); Kenneth Arrow et al, "Economic growth, carrying capacity, and the environment" (1995) 15:2 Ecological Economics 91; David I Stern, Michael S Common & Edward B Barbier, "Economic growth and environmental degradation: The environmental Kuznets curve and sustainable development" (1996) 24:7 World Development 1151.

[56] Simon Kuznets, "Economic Growth and Income Inequality" (1955) 45:1 The American Economic Review 1.

[57] Gene M Grossman & Alan B Krueger, *Environmental Impacts of a North American Free Trade Agreement*, Working Paper 3914 (National Bureau of Economic Research, 1991).

[58] Nemat Shafik & Sushenjit Bandyopadhyay, *Economic Growth and Environmental Quality: Time-series and Cross-country Evidence* (World Bank Publications, 1992); Thomas M Selden & Daqing Song, "Environmental Quality and Development: Is There a Kuznets Curve for Air Pollution Emissions?" (1994) 27:2 Journal of Environmental Economics and Management 147; William T Harbaugh, Arik Levinson &

flattered or shift to the left, reflecting a decrease of pollution at lower income levels.[59] On the other hand, scholars report that the EKC does not hold for all pollutants.[60] Critics also argue that the downward-sloping part of the EKC misleads people to think that pollution decreases. Instead, by relocating to developing countries, the "dirty" industries stopped contributing to the environmental degradation of developed countries but continued to do so in developing countries.[61] With the increase of empirical studies on the EKC, the basic EKC is challenged by new shapes of the EKC. Dasgupta et al. summarized the different shapes into three new kinds: 'revised EKC', 'race to the bottom', and 'new toxics'.[62] The revised EKC is representative of the view of the optimistic critics who believe that pollution can fall at lower income levels. The second shape resulted from critics who argue that a "race to the bottom" in environmental standards will lead the curve to rise to a horizontal line. Lastly, some scholars believe that new toxins are continuously created by the industries, thus the whole curve is lifted.

Scholars have provided many explanations for EKC. According to Grossman and Krueger, environmental quality improves at higher levels of per capita income because "as nations […] experience greater prosperity, their citizens demand that more attention be paid to the noneconomic aspects of their living conditions".[63] As a result, the government will also respond with more stringent environmental regulations.[64] Other authors incorporated other factors in their analysis of the EKC. Stern, for example, argued that

> "[a]t very low levels of economic activity environmental impacts are generally low but as development proceeds the rates of land clearance, resource use, and waste generation per capita increase rapidly… [however] at higher levels of development, structural change towards information-intensive industries and services,

David Molloy Wilson, "Reexamining the Empirical Evidence for an Environmental Kuznets Curve" (2002) 84:3 The Review of Economics and Statistics 541.
[59] Dasgupta et al, *supra* note 55.
[60] David I Stern, "The Environmental Kuznets Curve" (2003) International Society for Ecological Economics 18.
[61] Gene M Grossman & Alan B Krueger, "Economic Growth and the Environment" (1995) 110:2 Q J Econ 353.
[62] Dasgupta et al, *supra* note 55 at 148.
[63] Grossman & Krueger, *supra* note 61 at 372.
[64] *Ibid*.

> coupled with increased environmental awareness, enforcement of environmental regulations, better technology, and higher environmental expenditures, result in [a] levelling off and gradual decline of environmental degradation".[65]

Dasgupta et al. put it differently:

> "[i]n the first stage of industrialization, pollution…grows rapidly because people are more interested in jobs and income than clean air and water, communities are too poor to pay for abatement, and environmental regulation is correspondingly weak. The balance shifts as income rises. Leading industrial sectors become cleaner, people value the environment more highly, and regulatory institutions become more effective. Along the curve, pollution levels off in the middle-income range and then falls toward pre-industrial levels in wealthy societies."[66]

A number of studies have introduced additional variables to explain the EKC.[67] Factors such as political freedom,[68] output structure,[69] and trade,[70] along with environmental regulation, awareness, and education, are referred to as "underlying causal factors".[71] They do not necessarily play primary roles in lowering and flattening the EKC/to the downturn of the EKC, but they increase demand for improved environmental quality.[72] Among these factors, regulation is generally held as key to reducing environmental degradation at higher income levels.[73]

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[65] David I Stern, "Progress on the environmental Kuznets curve?" (1998) 3:2 Environment and Development Economics 173 at 174.
[66] Dasgupta et al, *supra* note 55 at 147.
[67] Hemamala Hettige, Muthukumara Mani & David Wheeler, "Industrial pollution in economic development: the environmental Kuznets curve revisited" (2000) 62:2 Journal of Development Economics 445 at 455.
[68] Mariano Torras & James K Boyce, "Income, inequality, and pollution: a reassessment of the environmental Kuznets curve" (1998) 25:2 Ecological economics 147.
[69] Theodore Panayotou, "Demystifying the environmental Kuznets curve: turning a black box into a policy tool" (1997) 2:4 Environment and Development Economics 465.
[70] Vivek Suri & Duane Chapman, "Economic growth, trade and energy: implications for the environmental Kuznets curve" (1998) 25:2 Ecological economics 195.
[71] Stern, *supra* note 60.
[72] Nahman & Antrobus, *supra* note 54 at 108.
[73] *Ibid* at 152.

In the late 1990s, Panayotoufound that effective policies and institutions can reduce environmental degradation at low-income levels and improve the environment at higher-income levels.[74] De Bruyn also investigated the roles of structural change and environmental policy in explaining the EKC hypothesis.[75] His findings for SO_2 pollution suggest that environmental policy help explain the downward-sloping part of the EKC. They also help explain why CO_2 and solid wastes, "for which environmental policy is still in its infancy",[76] monotonically increase with income. Finally, Hettige, Mani and Wheeler, in their study of industrial water pollution, concluded that the decline of pollution intensity is mainly attributable to stricter environmental regulation.[77] Their conclusion supports the view that regulation plays a critical role in the inverted-U shape of the EKC, contradicting authors who "argued that the downturn will happen automatically at higher income levels".[78]

Another important piece of the EKC literature is Esty and Porter's study in which they have tried to identify the key policy options that improve environmental performance.[79] Even if they were unable to confirm definitive causalities, a few interesting relationships emerged from their statistical study. One main finding was that there are dramatic differences in environmental performance even between countries with similar levels of economic development.[80] According to the authors, "[t]his finding suggests that environmental results are not merely a function of economic development but also a consequence of policy choices."[81] Their results suggest that the rigor, structure, and enforcement of environmental regulations significantly affect environmental performance. While a rigorous, structured and well-enforced regulatory structure tends to produce less pollution, subsidies for natural resources leading to mispriced resources will lead to higher levels of pollution. In essence, some countries have adopted advanced environmental regulations that are ahead of their

[74] Panayotou, *supra* note 69.
[75] Sander M De Bruyn, "Explaining the environmental Kuznets curve: structural change and international agreements in reducing sulphur emissions" (1997) 2:4 Environment and Development Economics 485.
[76] *Ibid* at 499.
[77] Hettige, Mani & Wheeler, *supra* note 67.
[78] *Ibid* at 471.
[79] Daniel C Esty & Michael E Porter, "National environmental performance: an empirical analysis of policy results and determinants" (2005) 10:4 Environment and Development Economics 391.
[80] *Ibid* at 393.
[81] *Ibid*.

level of economic development, while others have led their economic progress outpace their environmental regulatory quality.

A crucial shortcoming in the EKC literature is the lack of data because environmental data generally trace back only to the 1960s.[82] It has restrained many previous EKC studies to capture both the increasing and decreasing stages of pollution in developed countries.[83] The availability of data on China's industrialization process, environmental conditions, and environmental governance are important "for those seeking to expand existing regulatory theory beyond its current Western confines."[84] "The question for China is whether it can trace an abbreviated trajectory along the environment/development curve and avoid some of the environmental damage that the United States and Europe experienced in their industrial revolution."[85]

Dasgupta et al., mainly using evidence from China, show that developing countries can achieve lower levels of environmental damage than developed countries that have already experienced the up and down of the EKC.[86] Other studies have come to similar conclusions. Gallagher finds that, after adopting European standards for pollution emissions from cars, China has a smaller lag in pollution than income per capita compared to European levels.[87] It also appears that the overall turning point in air pollution has been achieved at a per capita income level lower than the income level at which European countries reached.[88] Some authors have also shown that some Chinese policies have helped reduce sulfur emissions and even carbon emissions in recent years.[89] According to Xie, Xu, and Liu, the

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[82] Jie He, "China's industrial SO2 emissions and its economic determinants: EKC's reduced vs. structural model and the role of international trade" (2009) 14:2 Environment and Development Economics 227.
[83] *Ibid*.
[84] Carlos Wing-Hung Lo, Gerald E Fryxell & Benjamin Van Rooij, "Changes in Enforcement Styles among Environmental Enforcement Officials in China" (2009) 41:11 Environ Plan A 2706 at 2706.
[85] Steven F Hayward, "The China Syndrome and the Environmental Kuznets Curve" (2005) American Enterprise Institute for Public Policy Research, Washington, online: <http://www.aei.org/wp-content/uploads/2011/10/20051221_19411EPONov_Dec2005_g.pdf>.
[86] Dasgupta et al, *supra* note 55.
[87] Kelly Sims Gallagher, "Development of cleaner vehicle technology? Foreign direct investment and technology transfer from the United States to China" (2003) United States Society for Ecological Economics 2nd Biennial Meeting, Saratoga Springs NY, May 2003.
[88] James Roumasset, Kimberly Burnett & Hua Wang, "Environmental Resources and Economic Growth" in Loren Brandt & Thomas GEditors Rawski, eds, *China's Great Economic Transformation* (Cambridge University Press, 2008) 250.
[89] Mark Diesendorf, "Sustainable Development in China" (2003) China connections 18; Can Wang, Jining Chen & Ji Zou, "Decomposition of energy-related CO_2 emission in China: 1957-2000.

turning point of the EKC in China corresponds to an income of 25, 336.47 yuan and most cities have already reached this threshold point of the curve.[90]

The EKC theory in general, however, faces the inability to apply to all pollutants, and the EKC for China is no exception. For some observers, China has followed the EKC,[91] while others show that China's growth is sustainable.[92] Though the EKC results for China are not definitive, irreversible environmental degradation has drawn the attention of many scholars and environmentalists. In his study of 'eco-communities' in China, Liu argues that "[e]ven if the EKC is applicable in certain cases, an EKC is not the optimal growth path to sustainability because an EKC means worsening environmental degradation before the turning point and high environmental impact until later stages of development".[93] Some Chinese regions have already proven fragile; irreversible environmental degradation has made them unsuitable for human habitation and caused the ecological environment to collapse.[94] These ecologically fragile parts of China cannot wait for the EKC turning point. If the environment becomes irrecoverable, the EKC will simply never happen.[95]

Given the urgency of the climate change challenge as well as the vulnerability and fragility of many developing countries' ecological environments, no country should misinterpret the EKC as the solution to the challenge of reconciling development and environmental goals. Instead, many authors have concluded that the improvement of environmental quality should not and cannot wait until per capita income rises to a high level. Lorente and Álvarez-Herranz observed that as pollution will not automatically disappear with economic growth, there is a strong need for countries to develop environmental regulation as early as possible to avoid severe environmental damage.[96] They recommended environmental

[90] Qichang Xie, Xin Xu & Xiaqing Liu, "Is there an EKC between economic growth and smog pollution in China? New evidence from semiparametric spatial autoregressive models" (2019) 220 Journal of Cleaner Production 873.
[91] Yi Jiang, Tun Lin & Juzhong Zhuang, "Environmental Kuznets Curves in the People's Republic of China" in Tun Lin & Timothy Swanson, eds, *Economic growth and Environmental Regulation: The People's Republic of China's path to a brighter future* (New York: Routledge, 2010) 66.
[92] Roumasset, Burnett & Wang, *supra* note 88.
[93] Lee Liu, "Sustainability Efforts in China: Reflections on the Environmental Kuznets Curve Through a Locational Evaluation of 'Eco-Communities'" (2008) 98:3 Annals of the Association of American Geographers 604 at 622.
[94] Ren and wang 2004. X wang 2006. Shengtai yimin 2007.
[95] Fabien Prieur, "The environmental Kuznets curve in a world of irreversibility" (2009) 40 Econ Theory 57.
[96] Daniel Balsalobre Lorente & Agustín Álvarez-Herranz, "Economic growth and energy regulation in the environmental Kuznets curve" (2016) 23 Environ Sci Pollut Res 16478 at 16492.

regulations which focus on providing incentives for innovation and adoption of abatement technologies and energy policies which focus and innovation measures.[97]

4. Industrialized and Industrializing Countries Under Different Macroeconomic Contexts

Both international and domestic concerns for the environment have induced developed and developing countries to establish programs and pass regulations to protect the environment and have new government agencies responsible for environmental affairs. Mainly as a result of the Stockholm Conference, developing countries have had general environmental-related laws and regulations before beginning industrialization.[98]

Even though initially many developing nations saw environmental protection "as a goal conflicting with developmental priorities" and "a ploy to divert them from achieving their own economic development",[99] new attitudes which recognized that environmental protection and economic development could be compatible, interdependent, and mutually reinforcing were developed. Prime Minister Indira Gandhi at the time, for instance, said in her inaugural address in 1983: "[T]he preservation of the environment is an economic consideration since it is closely related to the depletion, restoration, and increase of resources. In any policy decision and its implementation we must balance present gains with likely damage in the not too distant future…"[100]

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[97] *Ibid*.

[98] "Environmental issues have entered the political agenda in Indonesia since the mid-1970s and in particular after the participation of Indonesia in the Stockholm Conference of 1972." Takdir Rahmadi, "Toward integrated environmental law: Indonesian experiences so far and expectations of a future Environmental Management Act" in Michael Faure & Nicole Niessen, eds, *Environmental Law in Development: Lessons from the Indonesian Experience* (Massachusetts: Edward Elgar Publishing, 2006) 128.

[99] Kilaparti Ramakrishna, "The Emergence of Environmental Law in the Developing Countries: A Case Study of India" (1984) 12 Ecology LQ 907 at 908. "Brazil and other developing countries such as South Korea, Singapore, and Mexico, saw environmental degradation not as a problem, but as an inevitable cost of industrialization." "The surprisingly rapid build-up in pollution began to alarm government officials and raised the fear that Brazil was losing a critical component of its stock of natural wealth. In 1973 Minister of the Interior Jose Costa Cavalcanti called for "industrial development adjusted to the preservation of the environment" in Ingo Walter & Judith L Ugelow, "Environmental Policies in Developing Countries" (1979) 8:2/3 Ambio 102.

[100] Gandhi, *Address of the Prime Minister, Shrimati Indira Gandhi, at the Inaugural Session of the Seventh*

By 1980, 102 developing countries had established "governmental agencies with environmental management responsibility, whereas only eleven Third World governments had such agencies in 1972".[101] Compared to developed countries, environmental awareness was much more present in developing countries on the eve of industrialization. Around the time the Stockholm Conference was held, many developing countries had still yet to industrialize.[102] In contrast, many industrialized countries were already experiencing downward per capita emissions when the Stockholm Conference was held, or soon after.[103] This difference meant that the notion of protecting the natural environment and addressing environmental degradation generally emerged before the industrialization process began for low-income countries.

Despite the number and comprehensiveness of environmental laws and institutions that appeared in developing countries, some earlier than their industrialization process, many developing countries have still followed the "grow first clean after" pattern and pollution is worsening in most.[104] Resosudarmo et al. predicted that "it is only a matter of time before CO_2 emissions from fossil fuels overtake those from deforestation. […] China has been much more successful than Indonesia in reducing CO_2 intensity of GDP and of industry, despite the fact that its energy mix is more dependent on coal."[105]

In many developing countries, the influence of Northern legal models has resulted in ineffective systems of environmental governance.[106] Part of the problem with unsuccessful

Conference of Heads of State or Government of Non-aligned Countries: New Delhi, March 17, 1983, 23 Indian J Intl L 301 at 304 (1983).

[101] H Jeffrey Leonard & David Morell, "Emergence of Environmental Concern in Developing Countries: A Political Perspective" (1981) 17 Stan J Int'l L 281. Citing Center for International Environment Information, Government Agencies with Environmental Responsibilities in Developing Countries, April 15, 1980.

[102] Nobuya Haraguchi, Bruno Martorano & Marco Sanfilippo, "What factors drive successful industrialization? Evidence and implications for developing countries" (2019) 49 Structural Change and Economic Dynamics 266.

[103] Testing Canada, USA, Israel, Japan, Saudi Arabia, Singapore, Austria, Belgium, Finland, France, Germnay, Italy, Luxembourg, Netherlands, Norway, Switzerland, and New Zealand, their turning point was estimated to have happened between 1960 and 1984. Eugenio Figueroa B & Roberto Pastén C, "Country-Specific Environmental Kuznets Curves: A Random Coefficient Approach Applied to High-Income Countries" (2009) 36:1 Estudios de economía 5.

[104] Leonard & Morell, *supra* note 11 at 284.

[105] Michael T Rock, "What can Indonesia learn from China's industrial energy saving programs?" (2012) 48:1 Bulletin of Indonesian Economic Studies 33.

[106] Michael Faure, Morag Goodwin & Franziska Weber, "Bucking the Kuznets Curve: Designing Effective Environmental Regulation in Developing Countries" (2010) 51 Va J Int'l L 95.

environmental laws is that they are not sufficiently supported by administrative capacity,[107] fail to take into account the specificities, needs, and priorities of the countries into which they were imported,[108] and lack technical knowledge and funds to adequately enforce them.[109] Similarly, corruption is often cited as affecting the enforcement process and the judiciary as ineffective at preventing breaches and punishing violators. Its likelihood is also increased with the presence of natural resource wealth and the absence of robust environmental and managerial institutions.[110] Besides, many post-colonial countries inherited environmental management approaches from the colonial period, which have often been linked to environmental mismanagement and affected by the legacy of regulations passed to facilitate exploitation of natural resources rather than sustainable management with the participation of colonial subjects.[111] As such, the pertinence of developed countries' experience in environmental protection for developing countries should be questioned. In comparison to the need of developing countries to grow, developed countries are more concerned with cleaning up the environment and protecting what remains of nature" whereas developing countries are preoccupied with "the reallocation of the existing natural resources to achieve a more just distribution of the benefits arising from them rather than for the preservation or conservation of those resources *per se*".[112] As such, environmental laws in the developed countries do not address economic development directly,[113] especially during the stages when economic growth is soaring.

A key element missing in some environmental legislation models is a proactive aspect and the ability to rapidly adapt and evolve to changing circumstances. These elements are crucial to mitigating environmental problems that result from the industrializing demands

[107] *Ibid*.
[108] *Ibid*.
[109] Michael G Faure, *Enforcement Issues for Environmental Legislation in Developing Countries*, Working Paper 19 (The United Nations University, Institute for New Technologies (UNU/INTECH), 1995).
[110] UNEP, "Environmental Rule of Law: First Global Report" (2019).
[111] *See* Benjamin J Richardson, Ikechi Mgbeoji & Francis Botchway, "Environmental Law in Post-colonial Societies: Aspirations, Achievements and Limitations" in Benjamin J Richardson & Stepan Wood, eds, *Environmental Law for Sustainability: A Reader* (Oxford: Hart Publishing, 2006).
[112] Terri Mottershead, ed, *Environmental Law and Enforcement in the Asia-Pacific Rim* (Sweet & Maxwell Asia, 2002) at 210.
[113] Oran R Young et al, "Institutionalized governance processes: Comparing environmental problem solving in China and the United States" (2015) 31 Global Environmental Change 163.

in the context of developing countries and the increasing pace of technological change. In the past five decades, too much focus has been on building a comprehensive system of environmental laws, but "efforts to cling to a highly predictable, stable, rule-habituated system of law undermine the ability of law to its changing subject matter [the environment]", which consists of complex adaptive systems found "throughout nature (*e.g.,* the weather, ecosystems, earthquakes, genetics, and evolution) and throughout human organizational behavior (*e.g.,* in economic activity, politics, and technological development".[114] The rapid and continuing decline in the quality of the environment in developing countries should be dealt with a system that also reflects the upsurge or decline of environmental and pollution problems. Thus, reproducing Northern models could be insufficient; developing countries must adapt ideas and laws to different sensibilities or use other notions of sustainability if necessary.

While developing countries were less engaged in global environmental governance due to historical reasons, it could also be argued that there are more incentives for them to act now. Visible pollution and environmental problems should motivate the political will to fight against pollution and climate change. Although developing countries were not the initial "*demandeurs* of global environmental governance",[115] it is critical that developing countries act proactively for global climate change and to avoid environmental deterioration as an inevitable step to industrialization.[116]

[114] J B Ruhl, "Thinking of Environmental Law as a Complex Adaptive System: How to Clean Up the Environment by Making a Mess of Environmental Law" (1997) 34 Hous L Rev 933 at 942, 1000.
[115] Adil Najam, "Developing Countries and Global Environmental Governance: From Contestation to Participation to Engagement" (2005) 5:3 Int Environ Agreements 303.
[116] Gordon, *supra* note 25.

II. Background & Context: Environmental Governance in China

In this chapter, I begin by providing a general context for China's environmental governance and four reasons for China's recent pro-environmental intentions. I then discuss two keys features of China's environmental governance: environmental laws and plans, and their contribution to efforts to improve energy efficiency and reduce emissions. Analysis of Chinese environmental governance is incomplete without investigating China's planning system which spans to almost all domains of public policy. Multiyear comprehensive and sectoral plans are central to China's mechanism for coordinating and implementing policy across national ministries and local governments. While they are overall arrangement and implementation schemes for environmental protection within the administrative bodies, they have contributed largely to the successes in environmental improvement in China. Environmental laws, on the other hand, apply to local governments, enterprises, and individuals.[117]

1. The Evolving Relationship between Environmental Issues and Economic Development in China

China "emerged from World War II as [a] shattered giant".[118] Having suffered several years of turmoil and lost its former international status, China vowed to "fight for national rejuvenation".[119] The economic gaps between China and Western industrialized countries "heighten[ed] [the Chinese leaders'] sense of urgency for change".[120] The country was thus interested in building up "its industrial capacity, and to enable the country to achieve an industrial ranking on a par with other advanced countries by the turn of the century."[121] In

[117] Article 6, *Environmental Protection Law* (effective January 1st, 2015), available: http://zfs.mee.gov.cn/fl/201404/t20140425_271040.shtml.
[118] Peter E Robertson, "Clash of the Titans: Chinese and Indian growth compared" in Jane Golley & Ligang Song, eds, *Rising China: Global Challenges and Opportunities* (ANU Press, 2011) 223 at 223.
[119] Yan Xuetong, "The Rise of China in Chinese Eyes" (2001) 10:26 Journal of Contemporary China 33.
[120] Alvin Y So, *China's Developmental Miracle: Origins, Transformations, and Challenges* (Florence, United Kingdom: Routledge, 2003) 33 at 34.
[121] Alice Shiu & Pun-Lee Lam, "Electricity consumption and economic growth in China" (2004) 32:1 Energy Policy 47.

1978, shortly after the death of Chairman Mao in 1976, Chinese leader Deng Xiaoping redirected the country on a socialist economic development pathway, in the hope that this would significantly increase economic development and catch up the Western economies.

Since the late 1970s, China's economic reforms led to unprecedented rates of growth, averaging almost 10% in annual GDP growth.[122] Between 1981 and 2004, China lifted more than 600 million people out of poverty.[123] The rapid urbanization and economic growth have generated massive opportunities for people with low living standards of life,[124] which in turn expanded the middle class and brought about much higher living standards of life for the Chinese population.[125] The economic achievements of China has been an inspiration to many globally. Many developing countries have turned to the "Chinese development model […] in search of solutions to their own developmental quagmires".[126]

The rise of this 'economic miracle' was however not without cost. Joining the economic race meant taking the Western industrial example, fueling "much of the glorious rise in productivity […] by a gigantic throughput of fossil energy, which requires mining the earth on the one side and covering it with waste on the other".[127] By using coal as the major energy source and specializing in heavy industry to spur its economic growth, China chose an energy- and pollution-intensive growth path that has been characterized as "a 'coarse' […], low-quality form of economic growth dependent on" heavy industries, like steel, cement, paper, glass, and chemicals.[128] The single goal of economic growth, exemplified by production targets, dominated the state planning strategies. For almost 30 years, China was living a chaotic era burdened by decisions and policies which were devastating for the

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[122] World Bank, "The World Bank in China Overview", online: *World Bank* <http://www.worldbank.org/en/country/china/overview>.
[123] World Bank, "Results Profile: China Poverty Reduction", (19 March 2010), online: *The World Bank* <https://www.worldbank.org/en/news/feature/2010/03/19/results-profile-china-poverty-reduction>.
[124] *See* Chen Chen & Bo Qin, "The emergence of China's middle class: Social mobility in a rapidly urbanizing economy" (2014) 44 Habitat International 528.
[125] *See* He Li, "Emergence of the Chinese Middle Class and Its Implications" (2006) 33:2 Asian Affairs: An American Review 67; Shujie Yao, "Economic Development and Poverty Reduction in China over 20 Years of Reforms" (2000) 48:3 Economic Development and Cultural Change 447.
[126] Leo Horn-Phathanothai, "Challenging the China model", (19 December 2008), online: *Chinadialogue* <https://www.chinadialogue.net/article/show/single/en/2643-Challenging-the-China-model->.
[127] Sachs, *supra* note 22.
[128] Alex L Wang, "The Search for Sustainable Legitimacy: Environmental Law and Bureaucracy in China" (2013) 37 Harv Envtl L Rev 365.

environment[129] and was widely criticized for its "reckless" policy of "growth-at-all-costs".[130] China's unprecedented economic growth has indeed brought a staggering amount of environmental damage. Pollution alone costs at least 8 to 15% of China's GDP each year.[131] Despite its early experience in international environmental conferences and formulation of a series of environmental protection laws, policies, and measures, China became the world's largest emitter of greenhouse gases and biggest energy consumer and its environmental degradation and associated social and economic problems have been ranked the most pressing challenges nationally and globally.[132]

Since the 1980s, some officials and the Chinese Premier, Wen Jiabao, were already warning that the path of "grow first clean after" taken by many developed countries must be avoided.[133] Qu, a prominent environmentalist and former director of the SEPA, repeatedly called for officials at all government levels to stop following that path.[134] However, it was clear that the conflict between economic growth and environmental protection was not apparent yet. According to Xia, Pei & Yang, the economic growth of China was only in its light industry phase before 1992.[135] Environmental problems were regional and little known to people residing outside of heavy industrial cities. The Chinese industrialization and urbanization accelerated in the 1990s to take full speed at the turn of the 21st century. Industries such as steel, electricity, and manufacturing were the main drivers of economic growth. Consumption of coal in China was about one-third of the

[129] 1949-1976 is referred as the Maoist era, when events such the Great Leap Forward and the Cultural Revolution had devastating consequences on the nation's environmental protection. Critics of this era refers it as the *Mao's War Against Nature*. *See* Shapiro, Judith. *Mao's War against Nature: Politics and the Environment in Revolutionary China*, ed, Studies in Environment and History (Cambridge: Cambridge University Press, 2001).

[130] Genia Kostka & Chunman Zhang, "Tightening the grip: environmental governance under Xi Jinping" (2018) 27:5 Environmental Politics 769.

[131] Ran Ran, "Perverse Incentive Structure and Policy Implementation Gap in China's Local Environmental Politics" (2013) 15:1 Journal of Environmental Policy & Planning 17.

[132] "China: World's Largest Energy Consumer and Greenhouse Gas Emitter", (20 May 2015), online: *IER* <https://www.instituteforenergyresearch.org/fossil-fuels/coal/china-worlds-largest-energy-consumer-and-greenhouse-gas-emitter/>.

[133] Lee Liu, "Environmental poverty, a decomposed environmental Kuznets curve, and alternatives: Sustainability lessons from China" (2012) 73 Ecological Economics 86.

[134] Geping Qu, "State from the Environmental Kuznets Curve (EKC)" (2006) 16:4 Journal of the Environmental Management College of China 1.

[135] Guang Xia, Xiaofei Pei & Xiaoming Yang, "Economic growth and environmental protection in the People's Republic of China" in Tun Lin & Timothy Swanson, eds, *Economic Growth and Environmental Regulation The People's Republic of China's path to a brighter future* (New York: Routledge, 2010) 35.

world's consumption of coal before the 2000s. In almost a decade, China was consuming almost as much as the rest of the world combined.[136]

It then became clear that the Chinese economic model could no longer be sustained. Growing protests, water crisis, air pollution, and environmental incidents sent the Chinese leadership a clear wake-up call. Thousands of pollution accidents, such as the algae outbreak in the Taihu lake which resulted from surrounding chemical plants and severe water pollution in the Songhua river due to a petrochemical corporation's explosion, were only hints of the daily deterioration of the environment.[137] Desertification increases by about 2,500 square kilometers each year and costs about US$3 billion annually.[138] Water crisis leaves about sixty million people in difficulties to find enough to drink and about six hundred million's water contaminated.[139] Fewer than 1% of the 500 largest Chinese cities met the WHO's recommended air quality standards.[140] In addition to evidence of mounting environmental problems, at least four other concerns would explain China's new determination to reverse environmental degradation.

Efforts to strengthen environmental incentives have been part of the policies since the 1980s, but they have not been effective because of the low priority assigned to environmental factors. While economic growth has mostly been enhanced by China's central policy implementation mechanism – cadre evaluation system which evaluates the performance of cadres in delivering economic development, environmental concerns and targets were highly prioritized only starting in 2006. As early as 1989, environmental targets have been incorporated into the system and leading governmental officials, not just environmental protection bureaus, were directly responsible for environmental

[136] Siqi Zheng & Matthew E Kahn, "A New Era of Pollution Progress in Urban China?" (2017) 31:1 Journal of Economic Perspectives 71.
[137] There were 1,921 pollution accidents in 2002 alone. Canfa Wang, "Chinese Environmental Law Enforcement: Current Deficiencies and Suggested Reforms" (2007) 8 Vermont Journal of Environmental Law 160.
[138] Chen, *supra* note 16.
[139] Elizabeth C Economy, *The River Runs Black: The Environmental Challenge to China's Future, Second Edition*, 2d ed (Cornell University Press, 2010).
[140] Qingfeng Zhang & Robert Crooks, *Toward an Environmentally Sustainable Future: Country Environmental Analysis of the People's Republic of China*, Publication RPT113974 (Mandaluyong: Asian Development Bank, 2012).

performance.[141] However, these environmental incentives were marginalized by the overarching importance of economic targets.

Another radical effort undertaken to elevate environmental mandates was to incorporate environmental costs into GDP calculations, that is to use "green GDP" instead of GDP based on economic growth alone to evaluate the performance of cadres. The United Nations have proposed a similar system since the 1990s to integrate "environmental and economic accounting",[142] and China further proposed to use a single metric for both economic and environmental growth and holding government leaders accountable. The project was ultimately canceled as it would affect cadres' political careers who have long been rewarded for economic growth.[143] Nonetheless, these incentives allowed using bureaucratic incentives to motivate environmental aims to take root in the traditional cadre evaluation system.

In addition to the overarching importance of economic growth and resistance from officials, I argue that the environmental incentives before 2006 were unsuccessful because China had not moved to a level of economic development high enough to trigger substantial environmental awareness and regulations. In other words, assuming at this point that China has generally followed an EKC curve, it had to wait beyond the turning point to have enough political will for significant environmental protection initiatives and fully experience increasing effectiveness of the environmental governance. The build-up to the turning point was an incremental process and involved several concerns that built up to the turning point.

A first concern is the need to improve energy efficiency and ensure energy security. Just as China's unprecedented economic growth has increased the demand for energy, the energy sector has increasingly been stressing the environment. As a country rich in coal and heavily dependent on coal, China's adequacy of energy supply is not assured nor sustainable. Moreover, coal is the largest contributor to carbon emissions, which means

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[141] Carlos Wing-Hung Lo & Shui-Yan Tang, "Institutional Reform, Economic Changes, and Local Environmental Management in China: the Case of Guangdong Province" (2006) 15 Envtl Politics 190.
[142] United Nations et al., Handbook of National Accounting: Integrated Environmental and Economic Accounting, 2003, available at http://unstats.un.org/unsd/envaccounting/seea2003.pdf.
[143] Wang, *supra* note 128.

that China could be one of the worst-impacted by climate change if it does not find a way out. Maintaining a high-speed economy development and supplying enough energy for the large population cause energy insecurity and expose the country to dependence on foreign energy supplies. Both threaten an energy secure future for China. Massive blackouts and factories brought to a standstill signaled the urgent need of increasing energy efficiency and deploying renewable energy.[144]

A second concern is public pressure that resulted from extreme pollution and environmental degradation. Complaints to the EPBs raised from 247 741 in 2000 to 616 122 in 2006.[145] The number of mass protests for environmental issues has increased by 29% each year since 2002.[146] Citizens have sued local EPBs and other enforcement authorities for failing to carry out their enforcement duties. Damage to China's reputation by media coverage of events such as the 2008 Summer Olympic Games, apps and weather forecasts that show real-time air pollution data, or Chai Jing's millions-views documentary *Under the Dome* all indicate "a new era in both the Chinese authorities' and the public's engagement in the topic of air pollution".[147] Public dissatisfaction also threatens social stability which is a key objective of the State.

A third concern emanates from the environmental pressure on the growing economy. China seeks to optimize the structure of its economy and a resource- and labor-intensive economic structure is a threat to a sustainable economy. China is interested in molding environmental protection to work with development. The report of the 18th National Congress of the Communist Party of China and the new leaders has put forward the principles 'environmental protection priority' *baohu youxian*, 'development in environmental protection' *baohu zhong fazhan*, and 'environmental protection in development' *fazhan zhong baohu*. "How to integrate these principles into environmental protection laws will truly lay the foundation to improve China's environment."[148]

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[144] Kong Bo, *Institutional Insecurity*, China Security (the World Security Institute, 2006).
[145] Benjamin van Rooij, "The People vs. Pollution: understanding citizen action against pollution in China" (2010) 19:63 Journal of Contemporary China 55.
[146] Ran, *supra* note 131.
[147] Mette Halskov Hansen & Anna Lisa Ahlers, "Air Pollution: How Will China Win its Self-Declared War Against it?" in Eva Sternfeld, ed, *Routledge Handbook of Environmental Policy in China* (New York: Routledge, 2017) 83 at 84.
[148] The National People's Congress, "Yi Wang: Environmental Protection Targets Responsibility System

Lastly, environmental degradation has threatened the regime legitimacy. While China's regime legitimacy has rested largely on performance in delivering economic development and social stability, the development model has created severe and growing obstacles, extreme environmental degradation among other things, to a healthy economy and social stability. Wang thus argued that "the most plausible way to understand China's elevation of environmental priorities" is the state concerns about declining regime legitimacy.[149] Chinese authorities thus responded by including environmental protection policies in the traditional cadre evaluation system "in a way not seen anywhere else in the world",[150] by using tools such as environmental targets. Consequently, elevated environmental policies have mainly served to transform China's economic model rather than reflected the preeminent demand for environmental quality, human health, and ecosystem protection priorities typically present in developed countries.

Faced with these challenges on top of mounting environmental problems and international pressure, China has been compelled to reform its economic model around a green growth path. Building a 'green' China has become urgent and of utmost importance, with sustainable development at the top of the priorities in the country. As the tension between economic development and the environment has grown, China has had to constantly renew its efforts to balance these two interests. Recently, a new openness to environmental issues and the pursuit of sustainable development combined with ambitious plans in developing renewable energy have even generated praise for China as a "green entrepreneurial state".[151]

These efforts have also been bolstered by an increasingly favorable macroeconomic context. As is discussed further in chapter V, China has experienced greater levels of industrial production overcapacity since the late 2000s to early 2010s. As such, China is reforming its economy to adjust production and increase the service industries.[152]

Should Be More Specific and Stricter 王毅：环保目标责任制应该更加具体、严格", (2013), online: *npc.gov.cn* <http://www.npc.gov.cn/npc/xinwen/2013-10/25/content_1811549.htm>.

[149] Wang, *supra* note 128.

[150] *Ibid*.

[151] Mariana Mazzucato, "The green entrepreneurial state" in Ian Scoones, Melissa Leach & Peter Newell, eds, *The Politics of Green Transformations*, 1st ed (London: Routledge, 2015) 134.

[152] For instance, the 13th Five-Year Plan (applicable for the years 2016 to 2020) "envisions a transition to service-led development". Barry Naughton, "Is China Socialist?" (2017) 31:1 Journal of Economic

Accordingly, a decrease in the production of several industries, generally related to coal, has been observed since 2013 (see figures in Annex A). These phenomena, coupled with increased demand for a better environment, and more effective environmental governance, have induced a gradual decline of environmental degradation, as Stern and Dasgupta have predicted.[153]

2. Environmental Law in China

The weak enforcement and implementation of Chinese environmental laws are well-known. However, to truly assess the action or inaction of China in solving environmental problems, environmental laws do not offer the full picture of the Chinese environmental governance. In practice, the law has not played a dominant role in China, whether in the traditional Chinese thought or in the "reform and opening" period that began in the 1970s.[154] As a result of the low status historically accorded to the law in China, legal institutions generally lack capacity, laws are vague and easily open for interpretation, and symbolic conformity with international legal obligations has prompted the creation of laws. Furthermore, when in conflict with key state objectives or when supportive of such objectives, it is marginalized or implemented with more vigor respectively. Thus, despite China's comprehensive environmental law and administrative structure that would stand up well in comparison to many developed countries, widespread disregard for it dates to the late 1970s.

China's environmental legislation first emerged in the 1970s in response to the emergence of international environmental law and efforts to protect the environment around the world. The 1972 UNCHE in Stockholm was a turning point for Chinese environmental governance, as it was the case for many other participating countries. International discussions on environmental issues and the development of environmental legislation

Perspectives 3; *See also* Yun Zhong & Yehua Dennis Wei, "Economic Transition, Urban Hierarchy, and Service Industry Growth in China" (2018) 109:2 Tijdschrift voor economische en sociale geografie 189.
[153] See Section II.3.
[154] *See* William Alford, *To Steal a Book is an Elegant Offense: Intellectual Property Law in Chinese Civilization* (Stanford: Stanford University Press 1995).

gave new impetus to the State leaders to incorporate the environment in the national planning process. Three events indicated this: the First National Environmental Protection Conference in 1973, the 1978 amendment of the Constitution, and the promulgation of the 1979 Environmental Protection Law (for Trial Implementation).

At the 1973 National Environmental Protection Conference, environmental problems were recognized and *Some regulations on protecting and improving the environmental (Provisional draft)* passed. According to these regulations, the State Council established, under its authority, the Leading Group of Environmental Protection in 1974 to be in charge of efforts to protect the environment. In 1978, the Constitution of the People's Republic of China already stipulated that "the State protects the environment and natural resources as well as prevent pollution and other hazards".[155] It was then amended in 1982 to include the protection of "the living environment and the ecological environment" in addition to the prevention and control of pollution and hazards.[156] This provision laid the constitutional foundation for the country to establish a special environmental protection law. The period from 1973 to 1978 could be qualified as the emerging phase of environmental awareness.

In 1979, the Environmental Protection Law (for Trial Implementation) was the first national framework environmental law passed in China.[157] It was amended in 1989 to become a formal law. It was symbolic not only for being one of the first ten national laws to be passed but also for its avant-garde articles. While the Law for Trial Implementation was only embryonic, with the newly added articles in 1989, the Environmental Protection Law included environmental standards, monitoring, planning, pollutant discharge declaration and registration, pollution control, environmental responsibilities, and administrative, criminal, and civil liabilities.[158] In 1982, the Constitution of the PRC was amended again to recognize that the State should "protect and improve the environment in which people live and the ecological environment", "prevent and control pollution and other public hazards", and "organize and encourage afforestation and the protection of

[155] Constitution of the People's Republic of China (1978) (expired), Art. 11.
[156] Constitution of the People's Republic of China, Art 26.
[157] Zhilin Mu, Shuchun Bu & Bing Xue, "Environmental legislation in China : Achievements, Challenges and Trends" (2014) 6 Sustainability 8967 at 8969.
[158] Bo Zhang et al, "A New Environmental Protection Law, Many Old Problems? Challenges to Environmental Governance in China" (2016) 28:2 J Environmental Law 325.

forests". [159] Since then, about 30 laws for environmental protection and resources conservation have been passed by the National People's Congress, the highest legislative authority.

Laws covering marine environment, water pollution, forestry, grassland, fisheries, mineral resources, land administration, atmospheric pollution, water, wildlife, urban and rural planning, water and soil conservation, solid waste, coal industry, electric power, noise pollution, flood, energy conservation, desertification, sea areas, renewable energy were passed between the 1982 and 2005.[160] In addition to national environmental laws, China has participated in several international conventions. For instance, China adhered to the International Convention for the Regulation of Whaling in 1980,[161] joined the Convention on the International Trade in Endangered Species (CITES) in 1981,[162] and ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage in 1985. [163] By the end of the 1980s, China has woven a relatively complete set of environmental laws.

Although China has manifested increasing environmental awareness by 'massively producing' environmental laws and slowly improving the enforcement of environmental legislation and policy, it failed at reversing increasing patterns of environmental degradation. Environmental laws in China are generally known as having "low legislative quality, too many principles, being very basic and difficult to actually enforce". [164] Professor Jin Wang qualified China's environmental legislation as having "no big mistakes but also no obvious effects".[165] Environmental laws in China are also said to be "general

[159] Constitution of the PRC Art. 26.
[160] Zhilin Mu, Shuchun Bu & Bing Xue, "Environmental legislation in China : Achievements, Challenges and Trends" (2014) 6 Sustainability 8967 at 8969-8970.
[161] International Whaling Commission, "Membership and Contracting Governments", online: <https://iwc.int/members>.
[162] CITES, "List of Contracting Parties", online: <https://www.cites.org/eng/disc/parties/chronolo.php>.
[163] UNESCO World Heritage Centre, "States Parties Ratification Status", online: *UNESCO World Heritage Centre* <https://whc.unesco.org/en/statesparties/>.
[164] Yana Jin, Henrik Andersson & Shiqiu Zhang, "Air Pollution Control Policies in China: A Retrospective and Prospects" (2016) 13:12 Int J Environ Res Public Health, online: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5201360/>.
[165] Jin Wang, "Thirty Years' Rule of Environmental Law in China: Retrospect and Reassessment" (2009) 9:5 Journal of China University of Geosciences 3.

and often intentionally ambiguous"[166] so to allow the central and local governments and authorities flexibility in interpretations. When it comes to finding a concrete solution to a specific problem, it would often be difficult to find the appropriate solution in the provisions of Chinese environmental laws. Even more important, environmental agencies never retained enough influence over environmental interests. As Qu said, "my experience as the Director of the National Environmental Protection Agency is that with a little bit of power, I can promote it, or with more money, I can give it impetus. I obtained neither."[167]

3. Environmental Planning in China

China, as a "socialist state"[168] with Chinese characteristics, attributes particular importance to long-term multiyear planning in its development policy. While China has many environmental laws, the prevailing process in environmental governance is state planning.[169] The central government is mainly composed of the Central Committee of the Chinese Communist Party, the State Council, and the National People's Congress. The National People's Congress and its Standing Committee exercise the State's legislative power.[170] The State Council formulates administrative regulations, including policies and national plans, and "is the executive body of the highest organ of state power".[171] Local governments also "ensure the observance and implementation of the Constitution and other laws and the administrative regulations".[172]

At the center of the state planning process are the five-year plans (FYP). The plans set overall goals for the country, provide structural guidance for macroeconomic activities,

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[166] Xiaoying Ma & Leonard Ortolano, *Environmental Regulation in China*, (New York: Rownman & Littlefield Publishers, 2000) at 15.
[167] Lili Wang 王莉丽, *Environmental Communication in China 中国环保传播研究* (Beijing: Tsinghua University Press 清华大学出版社, 2005) at 207.
[168] Constitution of the PRC Chapter 1 Article 1.
[169] Young et al, *supra* note 113.
[170] "Legislation Law of the People's Republic of China (2015 Amendment)", (15 March 2015), online: *北大法宝 en.pkulaw.cn* <http://en.pkulaw.cn/display.aspx?id=f114cc1b1de00de0bdfb&lib=law>. (article 7 para. 1).
[171] (article 56 para. 1) and (article 85).
[172] (article 99 para. 1).

and include specific targets to "reinforce party influence over administrative action".[173] They also coordinate national and local actors as well as among goals if tradeoffs are necessary. The FYP are not single plans but a web of plans that spans almost all domains that affect the overall development of the economy and society and across three main levels of government: central, provincial,[174] and municipal or county-level. The FYP start with a guideline approved by the Central Committee of the Communist Party of China (CPC) and an outline or "vision statement"[175] drafted by the State Council and approved by the National People's Congress. The 'Guideline' confirms the CCP's strategies for the country and the 'Outline' clarifies objectives and policy strategies, but both remain brief and vague. They are then executed through hundreds of sectoral plans and sub-national plans for all levels of government. Local FYP are developed independently by local governments.

Each national FYP is unique as it reflects the priorities of the specific period for which it is devised. And "because the FYP are based on guidelines provided by the Central Committee of the CPC, they also reflect the views of the leadership of the CPC. As a result, they have the support of the dominant political institutions in Chinese society."[176] By providing clear national strategies and directions, the FYP are "synoptic but time-limited",[177] embody the idea of "progressing by degrees, or developing step by step."[178] They are one of China's fundamental approaches to "governmental macro-regulation"[179] and have been key drivers behind China's economic progress in recent decades.

In the early years of the People's Republic of China, the plans generally prioritized economic growth. Whether it was for expanding energy production and consumption,[180]

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[173] Sebastian Heilmann & Oliver Melton, "The Reinvention of Development Planning in China, 1993–2012" (2013) 39:6 Modern China 580.
[174] There are twenty-two provinces, five autonomous regions, and four municipalities (Beijing, Shanghai, Tianjin, and Chongqing) directly under the central government control. They are all referred in this paper as "provinces" for simplicity. Hong Kong and Macau are special administrative regions; they are under separate regulatory regimes from Mainland China.
[175] Barry Naughton, "Is China Socialist?" (2017) 31:1 Journal of Economic Perspectives 3 at 12.
[176] Young et al, *supra* note 113.
[177] *Ibid*.
[178] An-Gang Hu & Jiaochen Liang, "China's green era begins", (8 March 2011), online: *Chinadialogue* <https://www.chinadialogue.net/article/show/single/en/4149-China-s-green-era-begins->.
[179] Angang Hu, "The Distinctive Transition of China's Five-Year Plans" (2013) 39:6 Modern China 629.
[180] The first ten FYP covering the years 1953 to 2005 had specific goals of coal production and sometimes energy production. Xueliang Yuan & Jian Zuo, "Transition to low carbon energy policies in China—from the Five-Year Plan perspective" (2011) 39:6 Energy Policy 3855.

growing heavy industries,[181] or pursuing the development of a market economy,[182] central planning efforts gave little consideration to the sustainable use of natural resources and minimization of pollution, at least in the national plans. Following the first National Environmental Protection Conference in 1973, the 5th FYP (1976 – 1980) incorporated planning for the environment.[183] The Environmental Protection Commission of the State Council aimed at controlling pollution within five years and resolving pollution within ten years.[184] Despite the good intention, the objectives were not met due to underestimation of the complexity, persistence, and difficulties revolving pollution problems.[185] Starting with the 6th FYP (1981-1985), an entire chapter would be dedicated to environmental protection. This change, however, did not improve the environmental situation of China.[186] "[R]esource shortage, fragile ecology and environment […], increasingly prominent contradiction between economic growth and resources and environment constraints",[187] have all become roadblocks and restraining factors to the development of China's economy and society.

During the 9th FYP period (1996-2000), major changes took place in the formulation of China's national economic and social development planning. The 9th FYP emphasized the overall balance of economic, social and environmental interests.[188] The concept of sustainable development, with its origin in China's participation in the Rio Earth Summit in 1992, was integrated into the national plan following the formulation of China's Agenda 21.[189] However, intense industrial activities and environmental pollution simultaneously arising from regions all over China resulted in insignificant improvement of the

[181] In the 2nd FYP (1958-62).
[182] With the entering of the reform and opening period from 1976.
[183] Jin Wang, *Environmental Law* (Peking University Press: Beijing, 2018).
[184] Dangshi, "历次五年规划（计划）资料库", online: <http://dangshi.people.com.cn/GB/151935/204121/index.html>.
[185] Jiahai Yuan et al, "Energy conservation and emissions reduction in China—Progress and prospective" (2011) 15:9 Renewable and Sustainable Energy Reviews 4334.
[186] Dangshi, *supra* note 184.
[187] NDRC, "The 11th Five-Year Plan: targets, paths and policy orientation", (23 March 2006), online: *National Development and Reform Commission (NDRC)* <http://en.ndrc.gov.cn/newsrelease/200603/t20060323_63813.html>.
[188] Renmin, "第九个五年计划", online: <http://www.china.com.cn/guoqing/shisanwu/2017-01/17/content_40119604.htm>.
[189]Chapter 9 is entitled *Implementing the strategy of sustainable development and promoting the all-round development of social undertakings*. *Ibid*.

environment. This post-Rio period, like the post-Stockholm period, could be said to have failed at addressing the conflict between economic growth and environmental protection. It was nonetheless a critical moment for environmental governance in China. According to Jinnan Wang, the Vice President of the Chinese Journal of Environmental Management, the large-scale pollution control in China started with the sulfur dioxide treatment of the Huaihe River and the 'Two Control Zones' policy which set limits on total emissions for acid rain and sulfur dioxide.[190] Moreover, it was the first time that the State Council approved a National Five-Year Plan for Environmental Protection. This kind of plan is more detailed and focused on environmental issues and are generally developed by the Ministry of Environmental Protection (MEE) (previously the MEP and SEPA). It specifies how the environmental objectives contained in the FYP are to be realized.[191]

During the 10th FYP (2001-2005), the economic growth rate reached 10.2%, followed by 5% annual increase in energy intensity whereas China was experiencing an average of 5% annual reduction in energy consumption per unit of GDP between 1980 and 2002.[192] To reestablish the energy efficiency during the 9th FYP and reduce emissions of pollutants such as SO_2, the 10th Environmental Protection Plan contained fourteen major targets.[193] However, only half of them were achieved and SO_2 emissions have increased by 28% instead of reduced by 10% as planned.[194] Having poorly performed the 10th FYP, the government set up ambitious goals to improve energy efficiency during the 11th FYP (2006 to 2010). The national plan specified that the energy consumption per unit of GDP will have to decrease by around 20% and included mandatory targets of reducing SO_2 and COD emissions by 10%.[195] The 11th FYP, in terms of environmental protection, was

[190] Jinnan Wang, Hongqiang Jiang & Nianlei Liu, "Strategic Ideas on the 13th Five-Year Plan of National Environmental Protection 关于国家环境保护'十三五'规划的战略思考" (2015) 7:2 Chinese Journal of Environmental Management 中国环境管理 1.淮河治污和"两控区"（酸雨控制区、二氧化硫污染控制区）的二氧化硫治理

[191] Jing Cao, Richard Garbaccio & Mun S Ho, "China's 11th Five-Year Plan and the Environment: Reducing SO2 Emissions" (2009) 3:2 Rev Environ Econ Policy 231.

[192] Lynn Price et al, "Assessment of China's energy-saving and emission-reduction accomplishments and opportunities during the 11th Five Year Plan" (2011) 39:4 Energy Policy 2165.

[193] MEE, "全国生态环境保护'十五'计划", online: <http://sts.mee.gov.cn/stbh/js/200203/t20020328_90731.shtml>.

[194] Cao, Garbaccio & Ho, *supra* note 191; Jeremy J Schreifels, Yale Fu & Elizabeth J Wilson, "Sulfur dioxide control in China: policy evolution during the 10th and 11th Five-year Plans and lessons for the future" (2012) 48 Energy Policy 779.

[195] NDRC, *supra* note 187. Targets for wastewater, garbage treatment, forest coverage rate, and other

unprecedented. For the first time, binding energy saving and emissions reduction targets were included in the national FYP.[196] The incorporation of mandatory environmental targets signaled to local leaders the renewed importance the central government attaches to addressing environmental problems.

If the 11th FYP could be qualified as "the first time that the national government has been so strongly committed to the environment",[197] the 12th FYP (2010 to 2015) marks the beginning of China's "green development era".[198] It built directly on the 11th FYP by further pursuing energy intensity and emissions reduction targets. Not only were the targets in the previous national FYP renewed, but additional targets were also added (see Table 1). Three key themes were found in the 12th FYP: economic restructuring, social equality, and environmental protection. The plan stressed the importance of 'comprehensive and coordinated sustainable development',[199] which concretely means the economy had to be restructured so as to increase energy efficiency, higher-value sectors, environmental protection, and the service sector. The green and low-carbon industries were promoted as important pillars for growth. More importantly, an entire chapter was dedicated to climate change issues to control greenhouse gases, increase adaptability to climate change, and launch international cooperation. In 2009, China committed to responding to climate change at the United Nations Climate Change Conference in Copenhagen and to work with the world to limit global temperatures. In the same year, the Chinese government formally

environmental issues were also covered, but this Thesis will mainly focus on targets in energy conservation and emissions reduction. The 10th FYP was criticized for having achieved rapid economic growth at the expense of resources and environment. (NDRC, *supra* note 10) Comparing the 10th and 11th FYP, the numerical targets and the choice of language were two main differences. In the 10th FYP, improvement of ecological conservation and environmental protection was one of the main objectives in the Outline. However, no targets were specified and vague expressions such as "greater efforts need to be exerted to […] protect" and "need to do more to protect" were used. "Report on the Outline of the Tenth Five-Year Plan for National Economic and Social Development (2001)", (5 March 2001), online: *Gov.cn* <http://www.gov.cn/english/official/2005-07/29/content_18334.htm>.

[196] Targets in FYP for Environmental Protection appeared long before the 11th FYP for Environmental Protection. The 10th Environmental Protection Plan included, for instance, a 10 percent decrease in SO_2 below the 2000 level of emissions. However, the target was instead exceeded by more than 40%. As such, this poor performance could have caused the SEPA to limit the number of targets in the Environmental Protection Plan. Cao, Garbaccio & Ho, *supra* note 191.

[197] Barry Naughton, "The new common economic program: China's eleventh five year plan and what it means" (2005) 16:2 Cina Leadership Monitor 1 at 5.

[198] Hu & Liang, *supra* note 178.

[199] "China's Twelfth Five Year Plan (2011-2015) - the Full English Version", online: *China Direct* <https://cbi.typepad.com/china_direct/2011/05/chinas-twelfth-five-new-plan-the-full-english-version.html>.

put forward its 40% to 45% reduction targets in energy intensity and generation of 15% of energy from non-fossil fuel sources, both with the baseline of 2005 to be met in 2020. As three FYP (the 11th, 12th, and 13th) cover the period from 2005 to 2020, they are crucial for achieving the 2020 targets. As such, the 13th FYP further built on the previous plans and was the first FYP to include $PM_{2.5}$ targets, symbolizing China's pivot to more sustainable development.[200]

While economic growth has generally come out ahead of environmental protection in the past, environmental protection has been slowing elevated to "a level of priority previously reserved only for the most important party-state mandates, such as economic growth, social stability, and the one-child policy".[201] The focus on economic growth has been gradually reduced to ensure that the country progresses towards green development and other objectives such as reducing poverty and improving the environment. From the 6th to the 12th FYP, economic indicators have dropped from 60.7 to 12.5 percent.[202] In the 13th FYP, resource and environmental indicators amounted to more than one-third of the total indicators.[203] These changes speak to the strong commitment of the government towards pursuing a more sustainable model for development.

Table 1 Selective comparison of energy-saving and emissions reduction targets in the 11th, 12th, and 13th FYP

Indicator	**11th FYP**	**Achieved**	**12th FYP**	**Achieved**	**13th FYP**
Energy consumption	20% (mandatory)	19.1%	16% (mandatory)	18.2%	15%

[200] "The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China 2016-2020" Central Compilation & Translation Press.
[201] Wang, *supra* note 128.
[202] Hu, *supra* note 179.
[203] The main economic and social development indicators for the 13th FYP include GDP, Overall labor productivity, urbanization, value-added of the service-sector, research and development expenditure, patents, contribution of scientific and technological advances to economic growth, Internet access, growth in disposable income per capita, average length of education received by the working-age population, new urban employment, rural population lifted out of poverty, basic old-age insurance coverage, rebuilt housing, average life expectancy, arable land, increase in land newly designated for construction, water use reduction per 10, 000 yuan of GDP, energy consumption reduction, non-fossil energy, CO_2 emissions reduction, forest growth, air quality, surface water quality, and aggregate major pollutant emissions reduction. note 200.

reduction per unit of GDP					
CO_2 emissions reduction per unit of GDP	NA	NA	17%	20%	18%
Aggregate major pollutant emissions reduction					
Chemical oxygen demand (COD)	10%	12.45%	8%	12.9%	10%
Sulfur dioxide (SO_2)	10%	14.29%	8%	18%	15%
Ammonia nitrogen	NA	NA	10%	13%	10%
Nitrogen oxide	NA	NA	10%	18.6%	15%
Air quality					
Reduction in $PM_{2.5}$ intensity in cities at and above the prefectural level missing the target	NA	NA	NA	NA	18%

Source: Compiled from data on the Ministry of Ecology and Environment of the People's Republic of China.

On June 2nd, 2019, a forum focusing on "High-quality Development and Green Transition during the 14th FYP Period" took place.[204] Jun Lu, Director General of the Chinese Academy of Environmental Planning, said that China has initiated the preparation of the 14th FYP.[205] The principles of ecological priority, green development will be incorporated throughout the Plan. Ganjie Li, Minister of the Ministry of Ecology and Environment, pointed out that planning should be strategic and extend to 2035 to build a beautiful China.[206] The 14th FYP promises a new era for improvement after China has overall achieved its objectives by 2020. It will also serve as a critical period to achieve 2035. From 2021 to 2035, targets for improving environmental quality could expand to include new environmental problems, especially related to water, soil, air, and climate change. Last not but least, green consumerism and lifestyle will be promoted and China's participation in

[204] 彪 Li 李, "The '14th Five-Year' eco-environmental plan will highlight the green development of the Ministry of Ecology and Environment: to carry out basic research on green GDP '十四五'生态环境规划将凸显绿色发展 生态环境部：要开展绿色 GDP 基础性研究", *每日经济新闻* (4 June 2019), online: <http://www.nbd.com.cn/articles/2019-06-03/1339271.html>.
[205] *Ibid*.
[206] *Ibid*.

global environmental governance will be improved.[207] "Wellbeing, quality and sustainability" will be at the center of the 14th FYP.[208]

4. The Roles of Plans and Laws in China's Environmental Governance

The relationship between environmental laws and environmental plans is a complex one. All plans that are authorized by law-making bodies, the State Council and the National People's Congress for instance, legally bind all provincial and local governments.[209] However, even if they are legally binding, they are quite different from laws. Laws are compulsory and long-term whereas plans can be compulsory or not, long-term or short-term, and with guiding principles.[210] The scope of most plans is limited in time and to specific issues. When in conflict with laws, "the laws are sometimes marginalized or ignored by those responsible for implementing the provisions of the plans and meeting specific targets".[211] When compared with policies, both policies and plans can have objectives and goals, but plans can also have targets and projects.[212]

Most importantly, the plans also reflect the views and priorities of the Communist Party of China. The plans are thus closely followed by the government's institutions and local governments. Laws are sometimes only used as criteria for meeting the objectives in the

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[207] *Ibid.*

[208] Isabella Neuweg & Nicholas Stern, "China's 14th Plan, sustainable development and the new era", (7 May 2019), online: *Grantham Research Institute on climate change and the environment* <http://www.lse.ac.uk/GranthamInstitute/publication/chinas-14th-plan-sustainable-development-and-the-new-era/>.

[209] Article 59 Clause 5 of the Organization Law of the People's Republic of China for Local People's Congresses at All Levels and Local People's Governments at All Levels (2015 Amendment).

[210] Jinjian Tian, "规划指标的设计与计算 Designing and calculating plans targets" in Weimin Yang, ed, *发展规划的理论和实践 Theory and practice of development planning* (Beijing, P.R. China: 清華大學出版社, 2010) 145. The guiding principles generally derives from the CPC leader's speeches and the CPC. In the 13th FYP, some guiding principles derived from Xi Jinping's major addresses. They are, for example, to "uphold the principal position of the people", "remain committed to an appropriate development approach", and "continue to deepen reform". note 200.

[211] Young et al, *supra* note 113.

[212] Weimin Yang, "发展规划概论 Introduction to development planning" in Weimin Yang, ed, *发展规划的理论和实践 Theory and practice of development planning* (Beijing, P.R. China: 清華大學出版社, 2010) 1.

plans.[213] Thus, despite a relatively complete set of environmental laws that China has woven in the past decades, it was mainly the environmental plans "that should claim the largest share of credits for the success."[214] In comparison, environmental laws in China were more reactive to international pressure and have not reflected the internal need and demand for the environmental regulatory system. In contrast to environmental plans, environmental laws have occupied a less prominent position in Chinese environmental governance. During the period when most of the environmental laws were enacted, political attention was highly concentrated on promoting rapid industrialization.[215] In comparison, the changes in environmental planning in China have instead reflected the internal demands for environmental quality.

With the renewed interest in environmental concerns, illustrated by the changes made in environmental planning, environmental laws also gained status. In November 2013, "law-based thinking", the rule of law, and "the need to accelerate the process of building institutions on ideas of ecological civilization" were reiterated at the third plenum of the 18th Chinese Communist Party Central Committee.[216] On January 1st, 2015, the *Amendment to the Environmental Protection Law* took effect. The new *Environmental Protection Law* was intended to harmonize economic and social development with environmental protection and provide a more effective basis for building an ecological civilization. It has been qualified as the "most stringent law in China's environmental protection history".[217] Specific articles were included to tackle smog, set higher environmental standards for enterprises, and toughen punishments and penalties for environmental offenses. All the new changes speak to the strong resolution to control pollution, protect the environment, and allocate more importance to rules-based governance.

Similarly, the increasing authority vested in environmental administrative institutions to implement laws and policies indicates the central government's interest in environmental

[213] *See infra* Chapter IV Section 1 table 2 and 3.
[214] Xiaoliang Li et al, "Authoritarian environmentalism and environmental policy implementation in China" (2019) 145 Resources, Conservation and Recycling 86.
[215] Rui Mu, "Coupling of Problems, Political Attention, Policies and Institutional Conditions: Explaining the Performance of Environmental Targets in the National Five-Year Plans in China" (2018) 10:5 Sustainability 1477.
[216] Zhang et al, *supra* note 158.
[217] *Ibid*.

protection. While initially devoid of substantial power, the national environmental protection bureau, later known as the National Environmental Protection Agency (NEPA), gained its vice-ministerial level to finally get promoted to ministerial status and renamed the State Environmental Protection Administration (SEPA) in 1998.[218] This promotion symbolically indicated that the central government has increased its attention to environmental protection. In 2008, the SEPA was elevated to the Ministry of Environmental Protection (MEP) which represented greater progress in empowering environmental agencies.[219] In 2018, the MEP was dismantled to be replaced by the Ministry of Ecology and Environment (MEE), a larger and potentially much more powerful ministry. The power under the MEE is consolidated by being responsible for environmental and ecological issues, pollution control, as well as climate change.

One possible criticism despite China's rapid improvements in environmental management and governance over the past decade is that these changes have not come rapidly enough. Despite the formulation of many environmental laws before the 2000s, successful results in large-scale pollution control only started to show in the 2010s. As Wang argues, "China's system of bureaucratic performance targets through the explicit prioritization of economic objectives over environmental aims […] implicitly ratified widespread disregard for China's environmental law for most of the first three decades of the 'reform and opening' period that began in the late 1970s."[220] Had China seized the opportunity before the 1990s to effectively implement its environmental laws, it could have avoided severe environmental deterioration and unusually high levels of pollution. Hence, China has failed at incorporating environmental concerns within economic growth. In the next chapter, one particularly important tool in the planning system, targets, is examined for the implementation of national planning to the local levels.

III. Environmental Targets: Energy Saving and Emissions Reduction

[218] *See* Abigail R Jahiel, "The Organization of Environmental Protection in China" (1998) 156 The China Quarterly 757.
[219] *See* Guizhen He et al, "Changes and challenges: China's environmental management in transition" (2012) 3 Environmental Development 25.
[220] Wang, *supra* note 136 at 386-387.

The FYP of the 'green era' (since 2006) are also distinguished by the inclusion of binding environmental targets. While the guiding principles in the plans provide only general directions for future development, targets concretize development plans and provide metrics for evaluation of achievements. The formulation of quantifiable targets is thus indispensable in Chinese planning and environmental management and control.[221] Setting targets alone, however, does not guarantee favorable results. The successes the targets have achieved mostly resulted from their enforcement and incorporation into systems that already work locally. Binding targets are incorporated into the target responsibility system (*mubiao zeren zhi*), wherein the central government subdivides and reallocates them to lower-level governments and key energy-consuming enterprises.[222] This top-down policy mechanism (*zhengce zhixing jizhi*) ensures that central policies are implemented at each level of the government (*cengcengluoshi*).[223] Binding targets are built into the cadre evaluation system, a top-down governance and bureaucratic personnel evaluation structure characterized by upward accountability rather than downward accountability to the electorate.[224] It allows the central government to sign contracts for achieving targets (*mubiao zerenshu*) with subordinate governmental entities, monitors and evaluates the performance of cadres.[225]

Since the beginning of the 'reform and opening' period, local governments were given strong incentives to boost economic growth. Economic performance was strongly linked with the career of cadres. A significant component of performance measurement is using targets to evaluate cadres' actual work performance and concrete achievements. The perfect example of a quantifiable target is the growth rate of GDP. "GDP has been the source of power [in China]. […] The center will favor those local leaders that generate

[221] Tian, *supra* note 210.
[222] Qingjun Wang, "文本视角下的环境保护目标责任制和考核评价制度研究 Wenben shijiaoxiaode huanjing baohu mubiao zerenzhi he kaohe pingjia zhidu yanjiu" (2015) 17:1 J of Wuhan Uni of Sci & Tech (Social Science Edition) 68.
[223] *Ibid.*
[224] Jiaqi Liang & Laura Langbein, "Performance Management, High-Powered Incentives, and Environmental Policies in China" (2015) 18:3 International Public Management Journal 346.
[225] Cadres can be defined as "party-state bureaucrats, which in the Chinese system include bureaucrats in state agencies and bureaus, state-owned enterprise workers, and staff in a range of other state institutions". Alex L Wang, "The Search for Sustainable Legitimacy: Environmental Law and Bureaucracy in China" (2013) 37 Harv Envtl L Rev 365 at 368.

GDP."[226] The overemphasis the central government placed on economic growth led local governments to sacrifice other targets such as environmental protection, especially when they conflicted with economic development. Even if the local governments did not receive direct disincentives on environmental protection, the implicit prioritization of economic development over environmental objectives in China's targets system exacerbated China's environmental problems.[227]

While not meeting targets of priorities for the most important party-state mandates, such as economic growth, social stability, and the one-child policy could previously lead to consequences, cadres' performance in ensuring environmental quality has been increasingly affecting the performance and promotion of the local officials.[228] Environmental targets had been incorporated into national FYPs as of the 1990s.[229] They were however not given priority by the central government, not until the 11th FYP. For the first time, the performance of cadres for environmental quality was explicitly linked with the promotion or removal of officials from governmental positions. Under the 11th FYP, failing SO_2 and COD targets, for example, "could be used to veto the promotion of officials from sub-national governments".[230]

In 2014, environmental targets were also formalized in the new Environmental Protection Law for performance evaluation of government officials.[231] The amendments led to Article 26 which stipulates that:

> The State adopts environmental protection target accountability and performance evaluation system. People's governments at or above the county level shall incorporate the fulfillment of environmental protection target as an appraisal criteria into the performance evaluation system for the departments with environmental supervision responsibilities at the same level government and their

[226] *Ibid* at 388.
[227] *Ibid* at 386-387.
[228] Huimin Li et al, "China's numerical management system for reducing national energy intensity" (2016) 94 Energy Policy 64.
[229] Mu, *supra* note 215.
[230] Liang & Langbein, *supra* note 224.
[231] The National People's Congress, "The Third Draft Amendment of the Environmental Protection Law: Clear, Comprehensive, and In-Depth Revision 环境保护法三审 ： 明确全面深入修改", (12 December 2013), online: *npc.gov.cn* <http://www.npc.gov.cn/npc/zgrdzz/2013-12/12/content_1816460.htm>.

responsible persons, as well as performance evaluation for the lower level governments and their responsible persons. The evaluation results shall be made public.[232]

With the introduction of binding environmental targets, a number of positive outcomes have resulted, but undesirable and unanticipated problems were also generated. The following sections will examine the evolution, problems, and setting process of environmental targets since the 11th FYP and their implementation in the Chinese planning system. Lessons are captured to guide future decisions on how to control environmental pollution.

1. The Evolution of Environmental Targets

With the changes made in the 11th FYP, binding "energy saving and emissions reduction" ("ESER" *jieneng jianpai*) targets were imposed on local governments and enterprises through performance contracts for environmental protection.[233] The contracts contain clear goals and targets to be signed and met by local governments. Local governments and targeted enterprises became thus the primary political stakeholders accountable for meeting the targets and controlling pollution in their area. Performance contracts are adjusted over time to reflect changing circumstances and priorities of the central and local authorities.[234] By holding local governments and enterprises accountable for meeting quantitatively measurable and time-bound goals, the attainment of energy-saving and emissions reduction objectives has been expedited.[235]

Three types of policies of different priorities can generally be found in China. With the least implementation significance are general policies which are broad and aspirational. They often have soft targets (*yiban zhibiao*) and are seen in cultural and social development.

[232] "Environmental Protection Law of the People's Republic of China (2014) (Unofficial translation)", *EU - China Environmental Governance Programme* (2014), online: <https://www.tandfonline.com/doi/full/10.1080/00094609.2004.11036399>.
[233] Liang & Langbein, *supra* note 224.
[234] Maria Edin, "State Capacity and Local Agent Control in China: CCP Cadre Management from a Township Perspective" (2003) 173 The China Quarterly 35.
[235] Rock, *supra* note 105.

Then come specific policies that are quantifiable and measurable. They usually have tard targets *(ying zhibiao)* which can be expected or binding. Expected targets are those that are anticipated to be achieved while binding targets are those that are imposed and must be met. Policies could also be accorded 'veto power' (or 'one veto vote' *yipiao foujue)* if they reflect the top priorities of the central government.[236] Failing to meet them could render all other work performance and achievements null and void.[237] Examples of past top priorities include social stability and the one-child policy. Pollution control became policy with veto power since the mid-2000s.[238] The targets nomenclature is a signal of central leaders' priorities to local cadres as to how to prioritize their work.

In the Chinese political system, government officials who seek promotion to higher positions are responsive to the policy preferences of higher-level governments.[239] Career prospects are thus effective incentives to motivate cadres to fully implement policies.[240] The performance of cadres is evaluated based on five main criteria of evaluation: integrity, competence, diligence, achievements, and absence of corruption. Environmental protection, as well as resource conservation and sustainable development, were clearly identified as comprising achievements. Moreover, meeting targets is also a key component of the performance system evaluating local leaders and enterprise managers.[241] Each year, local governments are assessed based on targets accomplishment and changes in environmental quality. Positive evaluation results are highly valued not only because they are crucial for career advancement but are also used to determine rewards and penalties. Rewards include year-end bonuses and honorary titles and penalties could be losing promotion opportunities or even careers.[242] Generally speaking, to receive desirable evaluation results, local cadres

[236] Genia Kostka, "China's local environmental politics" in Eva Sternfeld, ed, *Routledge Handbook of Environmental Policy in China* (Oxon: Routledge, 2017) 31.
[237] *Ibid*.
[238] Liang & Langbein, *supra* note 224.
[239] Ran, *supra* note 131.
[240] Sarah Eaton & Genia Kostka, "Authoritarian Environmentalism Undermined? Local Leaders' Time Horizons and Environmental Policy Implementation in China" (2014) 218 The China Quarterly 359.
[241] Xuehua Zhang, "Implementation of Pollution Control Targets in China: Has a Centralized Enforcement Approach Worked?" (2017) 231 The China Quarterly 749.
[242] Genia Kostka, "Command without control: The case of China's environmental target system" (2016) 10:1 Regulation & Governance 58.

have to strictly comply with policies with veto power and place more emphasis on specific and measurable targets.[243]

Since the 11th FYP, by obtaining binding status, environmental targets became decisive factors in determining the performance evaluation of officials. The intention was to incentivize and prioritize environmental protection at each layer of governmental administration. Most of these hard and binding targets also have veto power, meaning that, if these targets are not met, officials will automatically fail the performance evaluation which in turn could lead to consequences to their career prospects.[244] Other consequences include reduction, suspension or withholding of major investment projects. If necessary, the region would fall under environmental protection supervision.[245] The sanctions serve as incentives for local officials to improve energy saving and emissions reduction within their territory. If the objectives are failed, they may face the risk of being removed from their original positions to some less significant ones. On the other hand, successful goal attainment is an important achievement and could contribute to the leaders' promotion. This also applies to the heads of state-run enterprises and local government companies in the Top-1000 Program.[246]

The evaluation criteria for energy saving in 2007 is given in Table 2. The total scoring system is on 100 points and 40 points are attributed to meeting the targets. It is also worthwhile that laws and regulations are only attributed 3 points compared to 40 points for meeting targets.

Table 2 Partial Evaluation Criteria of the Energy Saving Target[247]

Category	**Points allocated to and details of tasks (total: 100 points)**
Energy-saving target (40 points)	40 points for meeting the target, 3 extra points for exceeding the targets by 10%, maximum of 9 extra points

[243] Kostka, *supra* note 236.
[244] China State Council No. 18. State Council Notification on General Working Group of Energy Saving and Emission Reduction and Response Climate Change, State Council [2007] No. 18. Beijing; 2007 [in Chinese].
[245] The State Council of the PRC, "The 13th Five-Year Plan for Energy Saving and Emission Reduction 国务院关于印发'十三五'节能减排综合工作方案的通知", (5 January 2018), online: *Gov.cn* <http://www.gov.cn/zhengce/content/2017-01/05/content_5156789.htm>.
[246] Zhen Jin, Takeshi Kuramochi & Jusen Asuka, "Energy and CO2 Intensity Reduction Policies in China: Targets and Implementation" (2013) 17:1 Global Environmental Research 19.
[247] Kevin Lo, "How authoritarian is the environmental governance of China?" (2015) 54 Environmental Science & Policy 152 at 155.

Target decomposition (3 points)	1 point for assigning target to lower levels of government 1 point for evaluating the fulfillment of energy-saving target 1 point for publishing energy consumption statistics
Industrial restructuring (20 points)	4 points for increasing the proportion of the tertiary industry 4 points for increasing the proportion of the high-tech industry 4 points for establishing and implementing a system to evaluate the energy impact of investment projects 8 points for meeting the Obsolete Capacity Retirement Programme targets
Energy conservation technologies (9 points)	
Energy-intensive enterprises (8 points)	3 points for ensuring the energy-intensive enterprises meeting their energy saving targets 1 point for monitoring energy-saving activities 4 points for achieving a 100% compliance rate of energy efficiency standards for new buildings
Laws and regulations (3 points)	1 point for formulating local regulations in accordance with the Energy Conservation Law 1 point for enforcing the Energy Conservation Law 1 point for enforcing the energy efficiency standards for energy-intensive products
Capacity building (5 points)	

Similarly, energy-saving and emissions reduction targets are assigned to enterprises through the Thousand Enterprises Energy Conservation Programme (2006-2010) in the 11th FYP and, later in the 12th FYP, known as the Ten-Thousand Enterprises Energy Conservation Low-Carbon Programme (2011-2015). Taking the latter as an example, the Programme regulated 16 018 enterprises which annually consumed more than 10 000 tonnes of coal. They collectively were responsible for approximately 60% of the total energy consumption of China. [248] Targeting enterprises, particularly state-owned enterprises, is that they are usually massive, energy- and pollution-intensive. The leaders of these enterprises were mainly appointed by the central and local governments. As such, they would receive direct commands from the central government and have to respond with conformity to the requirements of their superior.

[248] *Ibid*.

The Programmes during the 11th and 12th FYP mainly aimed at state-owned enterprises owned by the central government and by the local governments as well as some private enterprises. Local governments were tasked with implementing both within their jurisdictions, including allocating energy savings targets to relevant enterprises, tracking and supervising enterprise-level progress, and examining the performance of these enterprises. Because they are in direct control by the governments, their response to energy saving and emissions reduction programmes have generally been immediate and significant.[249] As Lo's empirical evidence shows, state-owned enterprises by the central government have become leaders in energy saving and emissions reduction because they are effectively controlled by the central government, specifically the State-Owned Assets Supervision and Administration Commission (SASAC).[250] The SASAC would directly incorporate an energy or environment-related component into the annual performance of the enterprise's leaders, making it one of the most important social responsibility assessment criteria. Moreover, many state-owned enterprises have taken initiatives in establishing an energy management system, investing in energy-efficient projects, and complying to energy and emissions related targets.

As shown in Table 2, a performance by energy-intensive enterprises is equally taken account in the target responsibility system. If the targets are not met, future projects would be suspended.[251] As such, cadres have incentives to ensure that the targets assigned to those enterprises are met. Directly managing pollution-intensive enterprises and including them in the national movement of reducing energy consumption and pollutants emissions, the government has greatly reduced China's energy use.[252]

[249] Differences exist between state-owned enterprises owned by the central and local governments. The difference in their response will be explained later.
[250] Lo, *supra* note 247.
[251] The State Council of the PRC, *supra* note 245.
[252] Qiang Wang & Yong Chen, "Energy saving and emission reduction revolutionizing China's environmental protection" (2010) 14:1 Renewable and Sustainable Energy Reviews 535.

Table 3 Partial Evaluation Criteria of the Ten-Thousand Enterprises Programme[253]

Category	Points allocated to and details of tasks (total: 100 points)
Energy-saving target (40 points)	40 points for achieving the energy-saving targets; 1 extra point if exceeding the target by 10%; 2 extra points if exceeding the target by 20%
Employee incentives (6 points)	2 points for assigning energy saving targets to employees 2 points for conducting a regular performance evaluation 2 points for establishing appropriate rewards and penalties
Energy-saving technologies (15 points)	3 points for establishing a dedicated energy conservation fund for energy-saving technologies 4 points for making and implementing a plan for energy-saving technologies 4 points for researching, developing, and adopting energy-saving technologies 1 point for contracting energy service companies to adopt energy-saving technologies
Laws and regulations (8 points)	2 points if no energy conservation laws and regulations are broken 2 points for complying with relevant product energy-efficiency standards 2 points for conducting energy impact assessment for new projects 2 points for implementing new projects according to the recommendations of the energy impact assessment

Scholars have found that cadres are more likely to implement a clear and quantifiable 'hard target' with veto power' than a vague 'soft target'.[254] Vague goals could be deleterious on performance while binding targets are easier metrics against which government performance can be tracked and measured. Work which was impossible to quantify were often invisible to higher officials.[255] In the past, the target-based approach has delivered desirable outcomes for family planning and investment growth.[256]

Targets are also a flexible tool that adapts and evolves with changing circumstances. The Chinese government has continuously changed the total number of targets and the value of

[253] Lo, *supra* note 247.
[254] Ran, *supra* note 131.
[255] Graeme Smith, "Measurement, promotions and patterns of behavior in Chinese local government" (2013) 40:6 The Journal of Peasant Studies 1027.
[256] Yasheng Huang, "Central-local relations in china during the reform era: The economic and institutional dimensions" (1996) 24:4 World Development 655.

targets to improve their efficacy. First, because the government realized that the total number of targets does not guarantee quality and benefit for developmental purposes, the number of targets has constantly changed. There were around 150 targets in the 7th FYP, around 100 in the 8th and 9th, and only 38 and 39 in the 10th FYP and the 11th FYP respectively.[257] Targets in emission control, more specifically, declined from eleven in the 9th FYP, five in the 10th FYP, to finally only two in the 11th FYP (SO_2 and COD as previously mentioned). In both the 10th and 11th FYP, SO_2 emissions reduction target was determined to be 10%. However, emissions at the end of the 10th FYP increased by 28% rather than decreasing while emissions at the end of the 11th FYP achieved a reduction of 14%. A focus on a smaller number of targets was believed to have contributed to better results, especially in environmental improvement.[258] Once the smaller number of targets has all been achieved, the number has increased to add in new ones. For example, in the 12th FYP, reduction of ammonia nitrogen and nitrogen oxide was added and the 13th FYP added further $PM_{2.5}$ reduction.[259]

Second, the value of the targets is constantly reassessed for realistic consideration of feasibility. Since the 11th FYP, because the government established stringent yet realistic targets, they have been mostly met. Past performance can inform future decisions and local solutions can serve as lessons for national-level policymaking.[260] For instance, the energy-saving target in the 12th FYP was set to be 16%, as compared to 20% in the 11th FYP because of a bigger challenge by the fact that most cheap and quick energy-saving measures, such as closing small power plants and steelmakers, have been exhausted. There were fewer outdated facilities to shut down after the 11th FYP so the government had to find new solutions to achieve energy efficiency.[261] Targets have thus served as an adaptive learning

[257] Tian, *supra* note 210.
[258] Schreifels, Fu & Wilson, *supra* note 194.
[259] Pan Zhang & Jiannan Wu, "Impact of mandatory targets on PM2.5 concentration control in Chinese cities" (2018) 197 Journal of Cleaner Production 323.
[260] Xiaofan Zhao & Liang Wu, "Interpreting the Evolution of the Energy-Saving Target Allocation System in China (2006–13): A View of Policy Learning" (2016) 82 World Development 83.
[261] "An interesting debate centers on the extent to which the turnaround between the 10th and 11th FYPs constitutes evidence of the strengths of the planning process or is simply attributable to ad hoc considerations (e.g. a focus on ''low hanging fruit'' within the capacity of existing technology whose adoption could be financed and overseen by government resources). The resolution of this debate has important implica-tions for efforts to meet the ambitious targets for reductions in PM 2.5 articulated in the September 2013 Air Pollution Prevention and Control Action Plan conceived in response to air pollution crises in Beijing and

tool. This aspect will be discussed thoroughly in the third section of this chapter. In brief, targets of quality should enhance supervision and guidance of planning. Unrealistic or over-stringent goals may "dampen the hope of attainment and actually discourage pollutant mitigation".[262] By making environmental targets binding and successively adding new ones in national FYPs, the central government has added teeth to its sustainable development ambitions.

Targets can offer continuity between past and future objectives. Since the emergence of environmental targets in the FYP, they have been building on past targets. But it is also easy to rely too much on the past and ignore creativity. Hence, a balance between inheriting and innovating must be achieved. Jinjian Tian, who has participated in the drafting of the 9th, 10th, and 11th FYP, pointed out that as the understanding and meaning of development changes and evolve over time, plans and targets have reflected its changes and should do so.[263] Before the 6th FYP, development meant solely economic development and targets were for economic growth and production output. Since the 7th, the concept of development enlarged to embrace much more contents than mere economic growth. The 9th and 10th clearly indicated strategies to achieve sustainable development and correspondingly, targets involving population, resources, and environment occupied an increasingly important position.[264]

Targets have not only achieved at reducing emissions and saving energy but also at driving the development of renewable wind energy. According to Zhang who confirms the positive effects of mandatory energy intensity targets on wind energy generation capacities, outcome-oriented targets provided more flexibility for the provinces to choose their own

other cities as well as for the goal announced in the November 2014 China-US Climate Agreement of reaching peak emissions of carbon dioxide around 2030." Schreifels, Fu & Wilson, *supra* note 194..

[262] Yuan Xu, "The use of a goal for SO2 mitigation planning and management in China's 11th Five-Year Plan" (2011) 54:6 Journal of Environmental Planning and Management 769..

[263] Tian, *supra* note 210.

[264] *Ibid*. Tian presented five phases of development. Each phase added an element to the previous phase. In the fourth phase, development meant economic growth, structural improvement, social progress, and development of future generations. In the last phase, scientific development from a Chinese perspective was added to the interests listed in the fourth phase.

paths in achieving them. As such, provinces with higher potential in renewable wind energy were incentivized to develop and install more. [265]

2. Implementation Gap in Using Targets

While the environmental drive was assessed as broadly successful,[266] several negative effects have also resulted from environmental targets, particularly in the distinctive institutional arrangement of China. Sometimes seen as an anachronism, the Chinese planning and targets system seems "divorced from the reality of an increasingly freewheeling economy and local governments whose behavior on the ground often veers far from the ideals mandated in the capital".[267] Given the size of China and the development disparity between eastern and western provinces, local officials respond to policies differently.

As O'Brien and Li have observed, an obsession with quantification does have an impact on the way local governments operate, and how officials allocate their time. By investigating "why an implementer who is responsible for a range of policies executes some well and others poorly",[268] O'Brien and Li identified an interesting correlation between the ability to quantify a target, and how 'hard' or 'soft' it is in the eyes of implementing officials. As discussed in the previous section, quantified targets build accountability by providing precise measurements to responsibilities and achievements. Furthermore, the 'one-level-down management' (*xiaguan yiji*), which makes officials immediately responsible to the officials directly above them, insulates officials from social pressure and allows them to disregard popular demands.[269] As such, it could be said that environmental aims are compatible with the current stage of development and the

[265] Pan Zhang, "Do energy intensity targets matter for wind energy development? Identifying their heterogeneous effects in Chinese provinces with different wind resources" (2019) 139 Renewable Energy 968.
[266] Heilmann & Melton, *supra* note 173.
[267] Oliver Melton, China's Five-Year Planning system: Implications for the Reform Agenda" (2015) Testimony for the US-China Economic and Security Review Commission.
[268] Kevin J O'Brien & Lianjiang Li, "Selective Policy Implementation in Rural China" (2017) Critical Readings on Communist Party of China 437.
[269] *Ibid*.

achievements have thus been immediate and significant. On the other hand, as argued by Xu & Faure, China's environmental disaster also stems from its governance style, under which "the government is immune from the consequences of decision failures".[270] When the "popular" "grow first" strategy had precedence over all other policies, environmental problems were exacerbated by the disregard for the "unpopular" environmental policies.

Because officials are directly accountable to their superior, it is often assumed that the officials' performance would always enhance the central governments' productivity. However, empirical evidence has shown that local governments in China have not been effectively controlled by the central government.[271] Implementing the central government's environmental policies at local levels has been a real challenge. While the central government usually shows greater awareness of environmental problems and interest in pursuing sustainable development, local authorities have mostly failed at giving concrete effect to environmental policies.[272] Economy argues that local authorities have been given too much authority and the central government retained too little control over policy implementation.[273] When local authorities' interests are in conflict with the central government's interests, national regulations or policies are poorly implemented and enforced.[274]

Another problem is that rigid targets have not been able to provide incentives for local governments to go beyond minimal compliance. As environmental targets were often seen as conflicting with the fulfillment of other targets, such as economic growth, meeting the minimum requirement is sufficient to avoid any consequences on officials' performance.[275] Moreover, the very few environmental targets set forth in the FYP, which are mainly on pollution reduction and few about environmental protection, are heavily criticized.[276] Even

[270] Guangdong Xu & Michael Faure, "Explaining the Failure of Environmental Law in China" (2016) 29:1 Colum J Asian L 1 at 90.
[271] Kevin Lo, "China's low-carbon city initiatives: The implementation gap and the limits of the target responsibility system" (2014) 42 Habitat International 236.
[272] Kostka, *supra* note 242.
[273] Economy, *supra* note 139.
[274] Benjamin Van Rooij, "Implementation of Chinese Environmental Law: Regular Enforcement and Political Campaigns" (2006) 37:1 Development and Change 57.
[275] Lo, *supra* note 247.
[276] Cao, Garbaccio & Ho, *supra* note 191.

if there has been a gradual expansion of targets in the FYP, they are not enough. Another criticism is that only the most visible air pollutants emissions were reduced.[277]

It was assumed that promoting environmental targets to hard targets with veto power would improve implementation, but "data manipulation has become routine for local cadres due to pressure from upper-level officials as well as their own interest in promotion and economic gain."[278] If faced with too many hard targets, local officials have sometimes been unable to meet them all. However, because all hard targets must be met, meeting targets turned into a "numbers game" in some provincial governments.[279] One of the reasons why local officials were able to report fake data is because the central government has no effective institutional mechanism for verifying all the statistical data. Furthermore, the provincial governments are responsible for "establishing a statistical system to track the progress of energy-saving efforts in their jurisdictions and reporting regularly to the central government".[280] The regulation and monitoring of targets by the NDRC are abstract, complicated, and without national standards. Because different methods for measuring the achievement of targets can be used, local authorities can use whichever method they prefer or the one that is most beneficial to them. As an official put it: "[i]t won't be very hard to meet those targets once you know how to play the numbers game with the central government".[281] Thus, critics have argued that the targets were relatively easily met because of measurement and monitoring inaccuracies. During the 11th Five-year Plan, however, the government began experimenting with different policy instruments and enforcement regimes. This effort was undertaken at all levels of government and in addition to market-based tools and command-and-control instruments, a unique set of Chinese administrative and political instruments emerged to promote compliance.[282]

In the 1990s, due to lack of regulations, many small and inefficient production facilities were constructed. The high demand for energy-intensive products provided a reason for

[277] Liang & Langbein, *supra* note 224.
[278] Ran, *supra* note 131; Xi Chen, "State-Generated Data and Contentious Politics in China" in Allen Carlson et al, eds, *Contemporary Chinese Politics: New Sources, Methods, and Field Strategies* (New York: Cambridge University Press, 2010) 15.
[279] Ran, *supra* note 131.
[280] Jin, Kuramochi & Asuka, *supra* note 246. (State Council Document No. 29).
[281] Ran, *supra* note 131 at 25-26.
[282] Schreifels, Fu & Wilson, *supra* note 194.

their survival.[283] During the shutting down process which began in 1999, some local governments sheltered local factories from closure because they contribute to revenues and employment. This has since been argued to be a negative consequence of the overemphasis on economic development.[284] In 2006, efforts were made to mandatorily shut down some enterprises in an additional 12 energy-intensive industries. In 2007, China's State Council announced a *Comprehensive Working Plan of EC and ER* to accelerate the closing of small plants and outdated capacity in high energy-consumption industries: electric power, iron-making, steel-making, electrolytic aluminum, ferroalloy, calcium carbide, coking, cement, coal, plate glass, pulp and paper, alcohol, monosodium glutamate, and citric acid.[285]

In 2011, 19 industries in total were affected by the forced closure program. Although funding was provided to local governments to help affected enterprises and workers, funding became less available since the 11th FYP. In total, the 11th FYP saw 72, 000 million watts of coal-fired power generators, 122 million tons of iron production capacity, 70 million tons of steel production capacity and 330 million tons of cement production capacity retired.[286] In contrast to the 9th and 10th FYP with the average closed capacity rate of negative 4%, the 11th FYP achieved 115%. Price et al. estimated that "total net energy savings (the difference in energy consumed by the small, inefficient plants and the energy consumed by more modern facilities that presumably replaced the closed plants) from the replacement of inefficient capacity with more efficient facilities resulted in" saved estimated 76% of the total goal in the first three years, ahead of schedule.[287] One of the reasons why the high targets in the 11th FYP were still met is that these outdated and small enterprises were shut down. However, this is not a long-term solution, not to say a pathway to sustainable development. The change that occurred from this massive shutdown movement of plants is that the targets in the following national plans, especially in energy-saving, were smaller in number and harder to be met.

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[283] Price et al, *supra* note 192.
[284] Rock, *supra* note 105.
[285] State Council, 2007. State Council Document [2007] 15. Comprehensive Working Plan of Energy Conservation and Emission Reduction. May 23, 2007.
[286] NDRC, "11th FYP Energy Conservation and Reduction Review: Eliminating Outdated Facilities Achieved Significant Results [十一五"节能减排回顾：淘汰落后产能成效显著]", (10 March 2011), online: *Gov.cn* <http://www.gov.cn/gzdt/2011-03/10/content_1821724.htm>.
[287] Price et al, *supra* note 192.

It must be pointed out that some last-minute shutdowns of plants across a number of provinces at the end of 2010 to meet energy intensity targets generated unexpected social impacts and negative perception by public opinion, as a result of the distortion of central government's policy goals at the local levels as well of the lack of intra-sectoral coordination.[288] For instance, some small enterprises were simply bought off by larger state-owned enterprises. Some private investors never recovered their costs and capitals. Some local governments, pressured to meet the targets, have forced replacement of coal-fired boiler in private homes, increasing their expenses for winter heating, or banned the use of coal to heat homes when it has been the main source of heating for decades. The main cause of such poorly executed policies is the lack of directives from the central government.[289] Even though the national objectives sound ambitious, they were criticized for letting the local governments find the solutions to meet them.

3. Central-Local Targets Setting Process

Though the advantages and disadvantages of using targets to achieve environmental objectives could be debated, the disaggregation of national targets to local governments is also critical for the overall national environmental performance. The central government has the power to dictate and distribute goals to local governments mainly because China is a centralized state.[290] Following the release of the national ESER targets in the 11th FYP in 2006, the targets were further decomposed into provincial targets. For the 11th FYP, provinces were asked to first propose a target they aspire to achieve. Four provinces aimed their targets at above 20%, 15 proposed 20%, and 12 proposed below 20%. The lowest was Hainan's request to actually increase its energy intensity by 7.5%. The huge disparity

[288] Jun Li & Xin Wang, "Energy and climate policy in China's twelfth five-year plan: A paradigm shift" (2012) 41 Energy Policy 519.
[289] *E.g.* Hao Feng, "China softens approach to home heating switch | China Dialogue", (6 December 2018), online: *Chinadialogue* <https://www.chinadialogue.net/article/show/single/en/10964-China-softens-approach-to-home-heating-switch>; Chuck DeVore, "It's Cold in China, And Environmental Central Planning Has Turned Off The Heat", (23 January 2019), online: *Forbes* <https://www.forbes.com/sites/chuckdevore/2019/01/23/its-cold-in-china-and-environmental-central-planning-has-turned-off-the-heat/#707cdbad6929>.
[290] The central and local governments do not regulate on matters separately and the central government is the main policymaking body.

between the proposed targets could mainly be explained by the potential conflict between economic development and energy-saving or environmental protection directives.[291] As to why some of the provinces proposed targets higher than the national one, one hypothesis is that officials are motivated by political incentives.[292] The provinces with officials who have higher likelihoods of being promoted "tend to play the role of 'leading models' and accept higher environmental obligatory target aspiration".[293] Another possibility is that it was a relatively new experience for both the central and local governments and some of the proposed targets were thus the results of overestimation of local governments' capability.

The initial propositions of all the provinces were however altogether insufficient to meet the national targets. Therefore, the National Development and Reform Commission first immediately approved the four targets that were above 20%.[294] It then negotiated with the 12 low-target provinces for six months to finally raise 11 provincial targets.[295] Factors such as regional development levels, industrial structure, total or per capita energy consumption, historical energy intensity, and energy self-sufficiency were evaluated for the revised targets.[296] It turned out later that such an evaluation should have been mandatory even for the provinces that proposed targets above 20%. Out of the four provinces that promised higher voluntary targets, three attempted to lower their targets due to difficulties in meeting their goals.[297]

The provincial targets were further disaggregated into annual targets. For example, a 20% five-year target could translate into a 4.4% per year target.[298] Despite this relatively small reduction goal, most of the provinces failed to meet their yearly targets one year after the targets have been implemented. The provinces then chose to adopt their own annual targets.

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[291] Zhao & Wu, *supra* note 260.
[292] Pan Zhang & Jiannan Wu, "Performance-Based or Politic-Related Decomposition of Environmental Targets: A Multilevel Analysis in China" (2018) 10:10 Sustainability 3410.
[293] *Ibid* at 13.
[294] Zhao & Wu, *supra* note 260.
[295] D Zhou & C Yu, "A study of approaches and methods to meet the 20% target by local governments" in China Sustainable Energy Research Group (Ed), A Study of approaches and methods to meet China's 20% energy efficiency target for 2020 (2008) Science Press 39.
[296] *Ibid*.
[297] Zhao & Wu, *supra* note 260.
[298] *Ibid*.

25 set their new annual targets lower than the default one and their *target performance* was drastically improved.[299] However, choosing lower annual targets also jeopardized the fulfillment of the national targets set in the 11th FYP. The NDRC consequently adopted *progress targets* in the assessment of target performance. "The purpose […] is to urge [provinces] to make **continuous** progress toward energy intensity reduction and to discourage them from taking extreme actions."[300] [my emphasis]

Similar "burden-sharing schemes"[301] were used to achieve the national targets of 10% reduction of SO_2 emissions and COD for emissions reduction. The 10% SO_2 reduction target was determined after a scientific study determined that approximately 40% or 12 Mts emissions have to be reduced within 4 FYP periods to ensure minimum environmental quality.[302] The central government planned to reduce SO_2 from 2549 Mts (total emissions of 2005) to 2294 Mts and COD from 1414 Mts (total emissions of 2005) to 1273 Mts. The principle in allocating emissions reduction goals to subnational levels is to treat the different regions differently while ensuring that the national targets are met. Consideration is given to factors such as environmental quality, capacity, emissions, economic development, reduction capacity, etc. As such, a wide range of reduction targets (0% to 20%) was attributed to the provinces to meet the national targets of 10%. Some provinces are given as examples in Table 3.

Table 4 Energy saving targets in selected provinces

Some provinces as examples	**Pledged target (in %) in the 11th FYP (national target 20%)**	**Pledged target (in %) in the 12th FYP (national target 16%)**
Beijing	20	16
Shanxi	22	16
Hainan	8	10
Guangdong	20	18
Xinjiang	10	10

[299] National Development and Reform Commissions, "Announcement of the National Development and Reform Commission of the People's Republic of China No. 55", (2008), online: <http://www.ndrc.gov.cn/zcfb/zcfbgg/200807/t20080730_228138.html>.
[300] Zhao & Wu, *supra* note 260.
[301] Xu, *supra* note 262.
[302] Xinxing Yang et al, "The exploration and initial assessment of total amount control method for SO2 emissions in China" (1999) 12 Research of Environmental Sciences 17.

Heilongjiang	18	16
Gansu	16	15

Data collected from the Ministry of Ecology and Environment of the PRC[303]

According to governmental reports, China's GDP energy intensity declined by 19.1%, SO_2 emissions by 14.29%, and COD by 12.45% by the end of the 11th FYP according to data from the Chinese government.[304] These results are significant compared to the 10th FYP which targeted the same SO_2 reduction percentage as the 11th FYP but instead increased by almost 28%. Discrepancies exist between official data from the government and independent research, but both confirmed that SO_2 emissions in China increased substantially during the 10th FYP and has decreased continuously since 2006.[305]

The finalized targets were however criticized to be overly uniform as they did not consider the provinces' disparate levels of economic and social development.[306] All targets exceeding 20% were automatically granted because most proposed targets were at or below 20% and the national target would not be met if the National Development and Reform Commission did not elevate some of the proposed targets.[307] Many local governments hence viewed such system "as exploitative of those provinces with stronger senses of a mission for energy saving that were revealed by their higher voluntary target proposals, while rewarding provinces that were not particularly motivated to improve energy efficiency."[308] The fact that the central government did not properly assess the capability of the provinces in meeting their targets led to a significant readjustment of the after the plan was implemented.[309]

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[303] http://www.mee.gov.cn/xxgk/zcfgjd/201605/t20160522_343416.shtml.
[304] Schreifels, Fu & Wilson, *supra* note 40; Jiahai Yuan et al, "Energy conservation and emissions reduction in China—Progress and prospective" (2011) 15:9 Renewable and Sustainable Energy Reviews 4334; *See also* Premier Wen Jiabao's speech at the annual conference of the National People's Congress in March 2010.
[305] Z Lu et al, "Sulfur dioxide emissions in China and sulfur trends in East Asia since 2000" (2010) 10:13 Atmospheric Chemistry and Physics 6311. SO_2 emissions increased by 53% between 2000 and 2006 (the 10th FYP period) and continuously declined since 2006. According the authors, the main source of the SO_2 emissions decline is the widespread installation of devices in power plants enforced by the central and local governments since the 11th FYP.
[306] 20 out of 31 provinces were assigned the target of 20%. Zhao & Wu, *supra* note 260.
[307] Kevin Lo & Mark Y Wang, "Energy conservation in China's Twelfth Five-Year Plan period: Continuation or paradigm shift?" (2013) 18 Renewable and Sustainable Energy Reviews 499.
[308] Zhao & Wu, *supra* note 260 at 85.
[309] The targets of Jilin, Shanxi, Inner Mongolia, and Shandong provinces, initially at 30%, 25%, 25%, and 22% respectively, were all lowered to 22%. Daisheng Zhang et al, "Energy Intensity Target in China's 11th

Recognizing the numerous shortcomings of the target setting process used for the 11th FYP, the central government turned to high-level energy experts for the 12th FYP. Instead of asking for voluntary targets from the provinces, experts conducted a study on the economic and social levels of the provinces and decided the targets for them. Experts from think tanks, universities, and local government agencies were invited to propose an improved methodology. The experts gathered first-hand information and solicited input from local officials to "improve policy legitimacy and the effectiveness of its implementation" and used 41 indicators to determine the targets.[310] The general principle for deciding what value to assign targets was that provinces with higher energy consumption, stronger financial capacity, and higher energy intensity would have to assume more responsibility in terms of energy saving.[311] As a result, the targets were much more diversified as those in the previous plan, varying from 10 to 18% to meet the national target of 16%. Above all, they reflected better the regional differences and capabilities of the provinces.

The experts' opinions were however not final. The provinces could still negotiate with the NDRC to adjust the targets assigned to them. For instance, Shandong argued that it should not bear the burden of meeting the highest target in both FYP. The NDRC thus lowered its target by 1%. In 2011, the State Council issued the *Comprehensive Work Plan for Energy Saving and Emissions Reduction for the 12th FYP Period* and officially announced the final targets for each province. The national energy-saving target of the 12th FYP builds directly upon the 20% target in the 11th FYP, setting its target to reduce energy intensity by an additional 16% by 2015. The national target was reduced to 16% in the 12th FYP from 20% in the 11th FYP because the latter one was considered too ambitious. Intense bargaining between the central and provincial governments had likely lowered the 12th FYP target.[312] While this seemed less ambitious than the 20% target in the 11th FYP, it represented a much more challenging target for China to achieve.

Five-Year Plan Period - Local implementation and achievements in Shanxi Province" (2011) 39 Energy Policy 4115.

[310] Zhao & Wu, *supra* note 260.

[311] *Ibid*.

[312] Lo & Wang, *supra* note 307.

Given these points, the target setting process in Chinese national plans has proven to be a constant negotiating process which evolves and adapts to changing circumstances, takes account of regional performance capacities, and also holds key stakeholders responsible for meeting them. China is currently considering how to quantify GHGs emissions reduction in the plans. The 11th FYP mentioned the need for it but has not specified specific targets. Transforming reduction targets based on energy intensity to total emissions caps were also considered for the 13th FYP but was delayed due to potential effects on economic development, especially for inland regions which are poorer. [313] Nonetheless, China is progressively formulating more comprehensive energy and climate policies which are easily comparable to international standards. The government has formulated the *China National Climate Change Program*, clarifying the objectives, principles, key fields and policies for tackling climate change.[314]

[313] Li et al, *supra* note 228.

[314] NDRC, "China's National Climate Change Programme" (2007), online : < http://en.ndrc.gov.cn/newsrelease/200706/P020070604561191006823.pdf>.

IV. Making Environmental Governance Work in Emerging Economies: The Experience of China

In this chapter, I discuss the advantages of China's experience with authoritarian environmentalism, namely a policy process which is non-participatory and dominated by a relatively autonomous central state with the ability to pursue long-term environmental objectives. I also acknowledge the numerous limitations of Chinese authoritarian environmentalism. The last section of this chapter identifies three main characteristics of Chinese governance: the use of targets, environmental awareness enhanced by the unique political regime in China, and policy experimentation. Despite China's unique political regime, lessons for other countries can be learned.

1. The Promise of Chinese Authoritarian Environmentalism

China has been able to pursue long-term development goals, "rather than chop and change as political parties with differing stances succeed one another",[315] mainly because of the uniqueness of its political system. Characterized as a 'unitary or centralized state'[316] with a "hierarchical political system",[317] the Chinese system has attracted significant interest, especially from scholars in environmental governance.[318] There is an extensive literature comparing democratic and authoritarian approaches to environmentalism.[319] For some scholars, 'authoritarian environmentalism' could be the response to intensifying environmental challenges.[320] Authoritarian environmentalism is argued to have efficiency

[315] Angang Hu & Jiaochen Liang, "China's green era begins" in China's Green Revolution Energy, Environment and the 12th Five-Year Plan (Chinadialogue) at 19.
[316] Young et al, *supra* note 113.
[317] Lingxuan Liu, Bing Zhang & Jun Bi, "Reforming China's multi-level environmental governance: Lessons from the 11th Five-Year Plan" (2012) 21 Environmental Science & Policy 106.
[318] *See* Mark Beeson, "The coming of environmental authoritarianism" (2010) 19:2 Environmental Politics 276; Bruce Gilley, "Authoritarian environmentalism and China's response to climate change" (2012) 21:2 Environmental Politics 287; Eaton & Kostka, *supra* note 240.
[319] Beeson, *supra* note 318; Gilley, *supra* note 318; Eaton & Kostka, *supra* note 240; Jedediah Purdy, "The Politics of Nature: Climate Change, Environmental Law, and Democracy" (2010) 119:6 The Yale Law Journal 1122.
[320] Beeson, *supra* note 318.

and effectiveness – the ability to produce a rapid response and to mobilize state actors – to address pressing environmental problems, particularly in the context of a growing climate crisis.

Authoritarian environmentalism encompasses mainly two dimensions: a policy process which is non-participatory and dominated by a relatively autonomous central state and limitation of "public consultation, grassroots activism, civil litigation, and lobbying" and a preference for command-and-control policies.[321] Gilley argues that authoritarian environmentalism could also be provisionally defined as encompassing "executive agencies manned by capable and uncorrupt elites seeking to improve environmental outcomes".[322] China's environmental governance is typically treated as a key case of authoritarian environmentalism, but "how authoritarian is the environmental governance of China"[323] has also been raised in several studies.[324] Proponents of China's approach admire its ability to quickly issue and implement environmental policies and compel business and citizens to comply with stringent environmental regulations. In comparison to democratic systems which often seem "paralysed by interminable negotiations at the international level and the ceaseless pressure of lobby groups and high-consuming voters",[325] Chinese environmentalism's purported advantage is having "eco-elites enjoy greater freedom of action owing to their relative autonomy from interest groups."[326]

The abilities of the central government to set top-down and non-participatory policies and programmes quickly without fear of political backlash are indeed hallmarks of authoritarian environmentalism.[327] As discussed earlier, the top-down governance and bureaucratic personnel evaluation structure are characterized by upward accountability rather than downward accountability to the electorate. Among the tools the central government uses to control and monitor local officials are a periodic rotation of officials as well as political and economic incentives. Because governmental positions are prescribed for short terms (3.8 years on average for municipal Party secretaries according

[321] Lo, *supra* note 248 at 152.
[322] Gilley, *supra* note 318.
[323] Lo, *supra* note 247.
[324] Kostka, *supra* note 242.
[325] Eaton & Kostka, *supra* note 241 at 359.
[326] *Ibid* at 379.
[327] Lo, *supra* note 247.

to Eaton & Kostka) and results are evaluated at the end of the term,[328] policy implementation is greatly affected by chances of promotion or risks of demotion. The environmental policies accorded with 'veto power'[329] impact the benefits and opportunity of local officials and thus their preference to comply with these policies increases. As Eaton & Kostka have criticized, local officials are motivated by political and economic interests more than the objective directives such as environmental protection. As a consequence, some officials tended to select "cheap and quick approaches to environmental policy implementation".[330]

2. The Limitations of Chinese Authoritarian Environmentalism

China's top-down and non-participatory policy environment along with the Chinese Communist Party's managerial role in public servant affairs, the authority to appoint, promote, and transfer personnel,[331] have indeed been critical in stimulating the low-carbon transition drive and seems to have exhibited authoritarian features. However, the Chinese experience does not unquestionably lead to the purported effectiveness of authoritarian environmentalism. A core problem to authoritarian environmentalism is a selective implementation of local governments that overly focus their attention on the attitude of the central government rather than the needs of the citizens.[332] More specifically, environmental goals allocated by the central government, especially those that appear in the FYP, created incentives to solve some of the urgent environmental challenges but implicitly ratified disregard for other environmental challenges, often different between local communities.[333]

Besides, Chinese governance has not always only exhibited centralized and authoritarian features and the developmental phase in China as well as the degree of freedom and

[328] Eaton & Kostka, *supra* note 240.
[329] Policies accorded with 'veto power' (or 'one veto vote' *yipiao foujue)* reflect the top priorities of the central government. Failing to meet them could render all other work performance and achievements null and void. *See* Chapter III Section 1.
[330] *Ibid* at 378.
[331] Jin, Kuramochi & Asuka, *supra* note 246.
[332] Li et al, *supra* note 214.
[333] *Ibid.*

flexibility of local governments have also influenced the policy environment. According to Mu, in the late 1990s, during the period of the Reform, the political system was experiencing decentralization – the central government gave decision power and autonomy to local governments and regulatory power to sectoral authorities. This is best illustrated with the fate of the state-owned enterprises and enterprises owned by local governments. While state-owned enterprises have played a critical role in the Chinese economy and the environment, as introduced in Chapter III, the control of the central government over enterprises owned by local governments and private enterprises has been much more ambiguous. During the period of the Reform, many state-owned enterprises were relieved from the central government's direct control and the opening of the market accessibility led to the increase of private-owned enterprises. Despite the government's motivation to "improve management effectiveness and operation efficiency by pursuing cost-saving and profit-making and responding to price and other market signals",[334] the environmental condition of China deteriorated rapidly. The economic reform led to fierce competition and profit-oriented operation which in turn caused many reductions in environmental pollution control costs. Several environmental protection programs under the previously planned economy context became dysfunctional.

Most importantly, the emergence of small and dispersive private enterprises in a short period of time made it difficult to control and obtain information on the polluting sources. Consequently, environmental disasters and accidents erupted. Decentralization has been argued to have diverged the goals of the central and local governments, thus leading to the underachievement of the environmental targets in the 9th and 10th FYP. As such, local enterprises have been much less immediate and effective in their implementation of energy and emissions related programmes. Even though smaller in size, local governments' enterprises, and privately-owned enterprises are far greater in number. Not only are there less monitoring and evaluation resources but also no punishment for failing targets.[335] It is not rare to find local governments that view environmental targets as incompatible with their objective, which is mainly "to help local enterprises to solve problems, rather than to

[334] Mu, *supra* note 215.
[335] Lo, *supra* note 247.

harm them […] and […] not punish [them].”[336] The frequent noncompliance of policies or targets by local governments or enterprises was described by some scholars as ‘de facto neoliberal environmentalism’ or ‘command without control’.[337]

The central government tried to regain its power back since 2007 but much power has already been delegated to local governments. The realization of national policy was highly dependent on local resources and qualities of local officials.[338] Because some local officials even acted as protective umbrellas for enterprises that commit illegal environmental acts, the central government had to strengthen its power. The planning system and targets are political tools that help shape the priorities and incentives of the diverse ministries and local governments. [339] Also driven by domestic environmental deterioration and international pressure on climate change, stronger political attention was paid to balance economic development and environmental sustainability.

3. Lessons from China: use of targets, environmental awareness, and policy experimentation

Despite the purported advantages and disadvantages of quick responses to environmental crises and the relative autonomy from lobby groups, it is important to recognize that particular aspects of environmental governance that helped improve environmental protection rather than the institutional arrangement itself should be replicated. All forms of environmental governance discourse could “produce successes under some conditions and failures under others”.[340] A worthwhile lesson that can be drawn from China’s experience with pollution control is that incorporating environmental concerns in the local system that has worked for other policies, especially economic policies, could enhance effective environmental governance. By incorporating targets, elevating them to high priorities, and

[336] *Ibid* at 156.
[337] *Ibid*; Kostka, *supra* note 242.
[338] Lo, *supra* note 247.
[339] Wang, *supra* note 128.
[340] Young et al, *supra* note 113.

making local governments accountable for meeting energy saving and emissions reduction policies, China has attempted an approach to environmental protection suited to the country.

Furthermore, the experience of China with targets could serve as a reference on how to translate targets from across national and regional levels of governance. With rising concerns for climate change, the international community has agreed to reduce greenhouse gas emissions in order to limit "the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursu[e] efforts to limit the temperature increase to 1.5 °C above pre-industrial levels."[341] The Paris Agreement (PA) is featured as a "historic agreement to combat climate change"[342] and yet condemned as a failure.[343] Especially in terms of commitments to the PA, Parties to the PA have been slow in translating their Nationally Determined Contribution targets in national laws and policies. China's efforts in limiting carbon emissions, on the other hand, have produced positive results by increasing renewable energy and decreasing the production and consumption of coal.[344] A review of the climate action tracker concluded that "China's CO_2 emissions appear to have peaked more than a decade ahead of its Paris Agreement NDC commitment to peak its CO_2 emissions before 2030."[345]

Environmental awareness, both from the public and the government, has also prompted the effectiveness of environmental governance. A precondition for the benefits of authoritarian environmentalism is the political will to protect the environment. The political will for environmental protection does not stem from a particular governance discourse but arise, according to the EKC, at higher economic levels. Following the EKC theory, when a country reaches higher levels of development, structural change towards service industries increased environmental awareness, and better technology would all become rationales for more effective environmental governance and the gradual decline of environmental

[341] *Paris Agreement* Art. 2.1(a); the PA's goals in this text will refer to the 2°C and 1.5°C goals.
[342] UNFCCC, "Historic Paris Agreement on Climate Change: 195 Nations Set Path to Keep Temperature Rise Well Below 2 Degrees Celsius", online: <https://unfccc.int/news/finale-cop21>.
[343] "Signing the Paris climate deal was the easy part. We're failing at the hard part.", online: *MIT Technology Review* <https://www.technologyreview.com/f/612585/signing-the-paris-climate-deal-was-the-easy-part-were-failing-at-the-hard-part/>.
[344] *See* Anita Engels, "Understanding how China is championing climate change mitigation" (2018) Palgrave Communications 4:101.
[345] Climate Action Tracker, "China", online available at: Climate Action Tracker < https://climateactiontracker.org/countries/china/>.

degradation. Even in China's highly centralized political system, the central government's authority and high-powered incentives appear to be no panacea to produce desirable outcomes as local officials have responded to some targets and not to all of them.

As such, transplanting environmental governance with the wrong features of authoritarian environmentalism could result in complete disregard to the environment rather than the opposite. An important question that emerging economies should ask is how a country can generate environmental awareness and political will when environmental problems are not widespread or severe yet.

Another ingredient of China's economic and environmental success is learning from experimentation. Rather than establishing a pre-set path, China is able to explore possibilities and to improvise along the way and respond flexibly and pragmatically to unforeseen events. All major policy changes in China were the results of the process of trial and error on a smaller scale. Successful experiments are then scaled up and rolled out across the country. For instance, the establishment and success of four special economic zones in the 1980s were a crucial precursor to the raft of market-oriented reforms that followed. Likewise, low-carbon cities were piloted in several cities before lessons were learned and passing to the national level. Policy innovations or experiments to resolve environmental issues have been mostly enacted through the "experimentation under hierarchy" framework,[346] or "[t]he combination of decentralized experimentation with ad hoc central interference, which results in selective integration of local experiences into national policy-making".[347] In June 2019, China has started a new recycling campaign and Shanghai is the first city to implement and experiment with the new program. Successful components will be exported to other cities. In answering and re-answering to questions such as "how to achieve sustainable development?" or "what is the best shape of an environmental legal framework for developing countries?", taking risks along the way through experimentation could be the solution.

[346] Kyoung Shin, "Environmental policy innovations in China: a critical analysis from a low-carbon city" (2018) 27:5 Environmental Politics 830.
[347] Sebastian Heilmann, "Policy Experimentation in China's Economic Rise" (2008) 43:1 St Comp Int Dev 1.

CONCLUSION

On days in 2017, the Mongolian capital Ulaanbaatar's total $PM_{2.5}$ emissions surged to 855 micrograms per cubic meter in comparison to 20-25 micrograms as the acceptable standard according to the World Health Organization.[348] The city's air on some winter mornings, clouded with toxic smog, was far worse than Beijing's infamous smog. Economic growth via industrialization is generating more water and air pollution, deforestation, deteriorated air quality, accumulation of urban and industrial wastes and loss of biodiversity, all of which are dangerous for the survival of human life. Increasing population, over-extraction from land and ocean resources, along with climate change issues add to the challenges of a rapidly industrializing and urbanizing world.

This thesis makes several contributions to the literature. With respect to the EKC literature, China has likely shortened the EKC process, or 'shifted it to the left' as Dasgupta et al. have suggested,[349] as it took China about 30 years to go through the process worth of a century-long in developed countries. The experience of China has shown that following the "grow first clean later" path is not the optimal growth path. The costs of rapid industrialization are ecological breakdown, prevalent water and air pollution, land degradation, contamination of the environment, and loss of biodiversity. Thus, it could hardly be said that China has achieved lower levels of environmental damage as Dasgupta et al. also speculated.[350] Countries that look up to China for its impressive achievements in economic development should be wary of its environmental consequences. Even if environmental soundness might be achieved at higher economic levels, communities would have to first suffer decades of pollution and environmental problems.

This study has also opened up questions on the assumption that continued economic expansion is compatible with the environment and ecology. My analysis on China shows that growth is not without limits and there is a high price to pay on the environment for economic successes. Simply arguing that sustainable development or green growth is

[348] Terrence Edwards, "Mongolia's toxic smog", (9 February 2017), online: *Reuter The Wider Image* <https://widerimage.reuters.com/story/mongolias-toxic-smog>.
[349] Dasgupta et al, *supra* note 55.
[350] *Ibid*.

achievable is insufficient. The ambiguousness and vagueness of these theories could induce developing countries to follow the wrong development path and miss the opportunities and appropriate time to avoid environmental problems. Most importantly, it is not to be assumed that sustained growth is 'politically acceptable' or must be true; [351] otherwise, we are willing to accept that "the politically acceptable is ecologically disastrous while the ecologically necessary is politically impossible".[352]

My case study shows that while China's focus on economic growth has generally come out ahead when in conflict with environmental protection, it has been gradually reduced to realize sustainable development in the long term. Starting with the 11th FYP, high-priority, mandatory, and quantitative environmental targets were incorporated in China's planning system, which has significantly contributed to China's improved environment. Because the plans and targets requirements have provided a contrasting window on the resolution of the GDP *versus* environment conflict, environmental improvements could be simultaneously achieved with economic growth. These changes showed that environmental protection, once marginalized in China's uppermost decision-making process, has become a key element shaping governmental macro-regulation. Environmental laws and agencies which occupied a less prominent position in the Chinese environmental governance were also given higher priorities as the new Environmental Protection Law and the Ministry of Ecology and Environment show. While China is still in the midst of many serious environmental issues that require further commitments, the measures already are taken have shown many positive results, particularly in reducing emissions of some pollutants and saving energy.

As for the study of environmental governance in developing countries, the example of China offers a unique dimension. Despite China being unique politically, economically, geographically, and historically, its capacity to achieve long-term and national-level planning that aligns with its international commitments has allowed continuous achievements in its goals. When a developing country undergoes rapid economic development, the necessity of establishing priorities or addressing tradeoffs among goals

[351] Hickel & Kallis, *supra* note 13.
[352] Mathis Wackernagel & William Rees, *Our Ecological Footprint: Reducing Human Impact on the Earth* (New Society Publishers, 1998).

in a given period of time could be undermined if a law-centered process is the only available tool. In particular, if environmental laws are subordinated to other issue domains, they face the possibility of being marginalized or ignored if they come in direct conflict with development goals, as it was the case in China.

When faced with long-term environmental problems such as pollution and environmental deterioration, countries need macro-level, enduring, stable, and consistent strategies and policies that respond to the needs of the present and future. Macro-level planning that also pragmatically distributes objectives to local levels is useful for guidance and promotes cooperation between governments, market, state, society, and local and foreign entities. Moreover, the regulatory system in developing countries should stay flexible. While goals setting with time-bound limitations allow progression and implementation, a periodic review of the past goals and their achievement is key to future successes.[353] The ability to plan ahead, progress towards goals, and adapt to crises or unforeseen problems is especially of crucial importance. While environmental governance must be fitted to the specific environmental problems, capacities, and characteristics of the country concerned, it also needs components that can proactively prevent the seemingly inevitable negative consequences of industrialization. Prioritizing economic growth and expecting it to improve the environment is not guaranteed for developing countries' as irreversible environmental damage could precede economic successes or substantial changes in environmental governance. Even in the experience of industrialized countries, cleanups tended to have been delayed.

While one of the priorities in developing countries remains to alleviate poverty, choosing the wrong growth path will lead to more "environmental poverty".[354] Environmental degradation and poverty are often involved in the form of a vicious circle known as the "poverty trap" – "poverty leads to environmental degradation and environmental degradation deepens poverty".[355] In light of the need to shift away from a narrow growth-

[353] Kostka, *supra* note 242.
[354] Liu defines "environmental poverty" as the "lack of the healthy environment needed for society's survival and development as a direct result of human-induced environmental degradation". Liu, *supra* note 133 at 86.
[355] *Ibid*; Shixiong Cao et al, "Development and testing of a sustainable environmental restoration policy on eradicating the poverty trap in China's Changting County" (2009) 106:26 Proceedings of the National Academy of Sciences 10712.

focused development agenda, it is necessary to critically evaluate the meaning of development and the goal of sustainability. The paths to reconciling development and the environment or concepts such as sustainability may have to be redefined as Liu did: the goal of sustainability should be "living within one's own ecological means",[356] which refers to meeting basic needs with the carrying capacity of whether an individual, community, country, or the world.

Compared to what generally motivated the acceleration of environmental regulation in developed countries, there are many more opportunities that could motivate environmental action in developing countries. On top of the risks of further extinction of plant and animal species, desertification and soil erosion, unsustainable use of fossil fuels, and growing emissions of pollutants, global environmental problems such as climate change challenge and the vulnerability of ecological environments as well as social stability and even economic development concerns could serve as motivations to improve environmental governance. In China, economic and social concerns have been effective incentives in reinforcing environmental protection, despite that the political will and environmental awareness were not timely. As global environmental problems often affect the underdeveloped and developing countries most severely even though they were not the greatest contributors to climate change and global warming,[357] developing countries could benefit from the current global climate movement to make their environmental governance work before environmental deterioration becomes too severe.

[356] Lee Liu, "Sustainability: Living within One's Own Ecological Means" (2009) 1:4 Sustainability 1412.
[357] Partha Dasgupta, "How Best to Face the Coming Storm" (2004) 305:5691 Science 1716.

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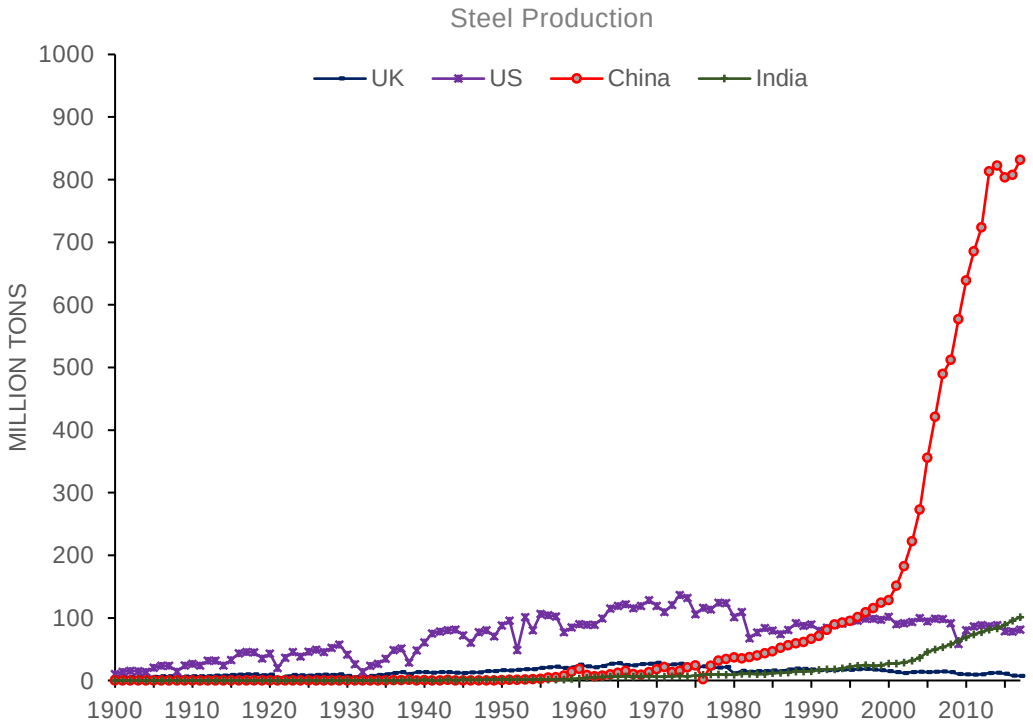
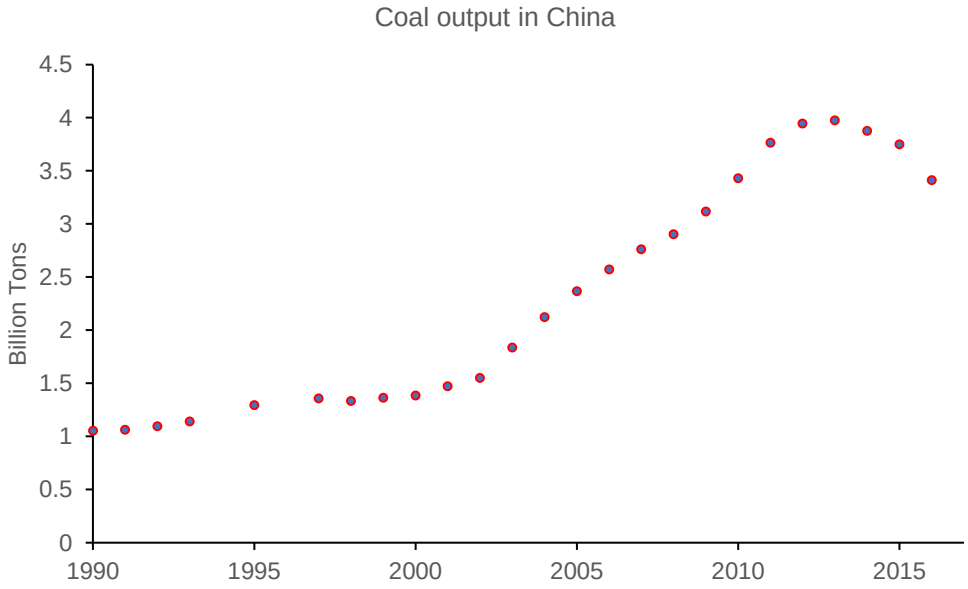
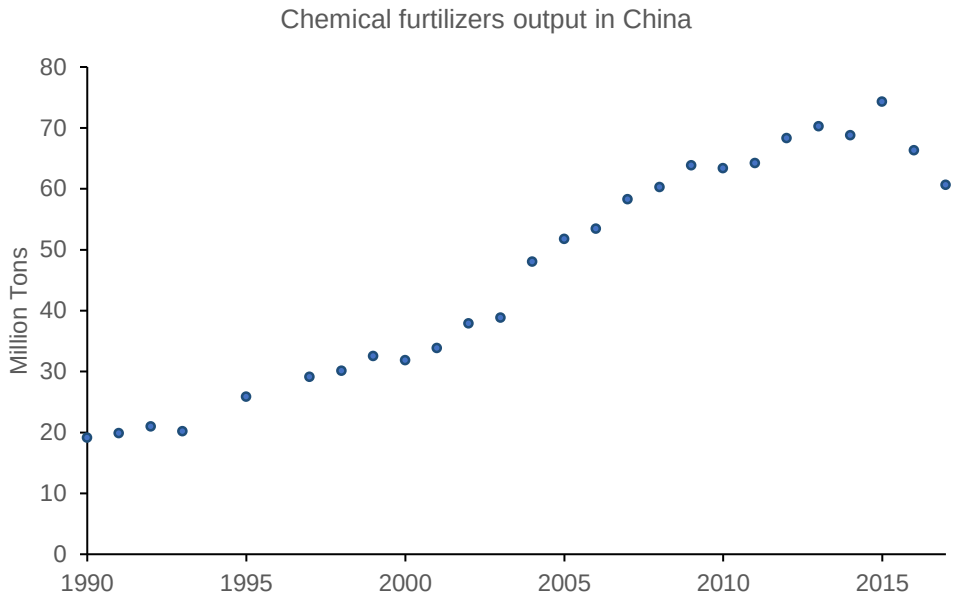
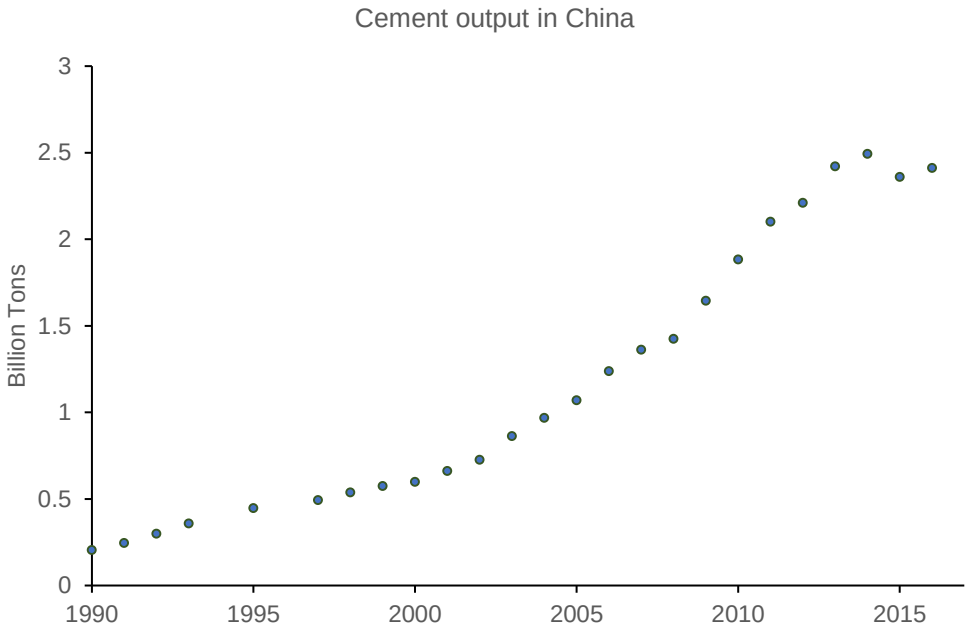
ANNEX A[358]

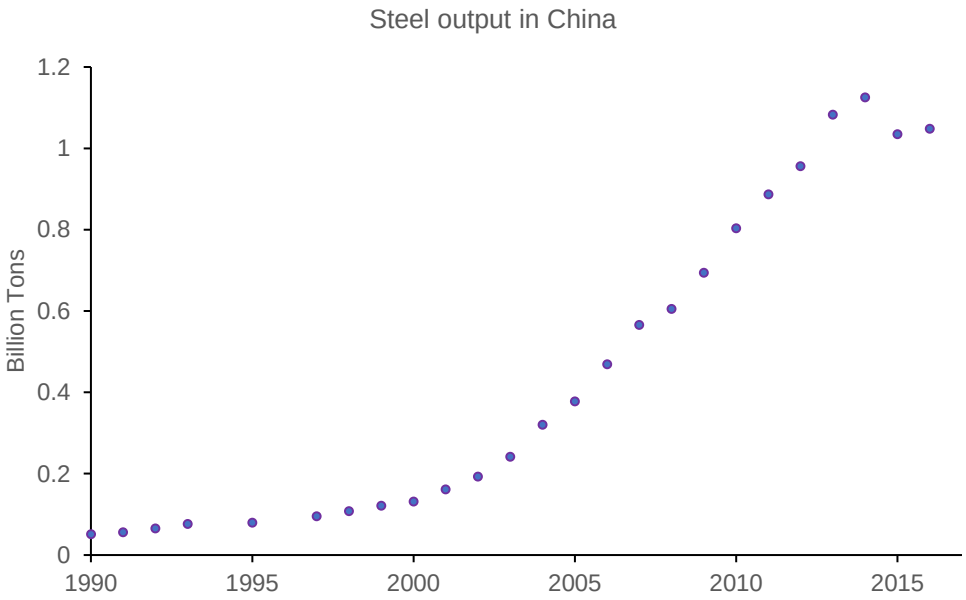


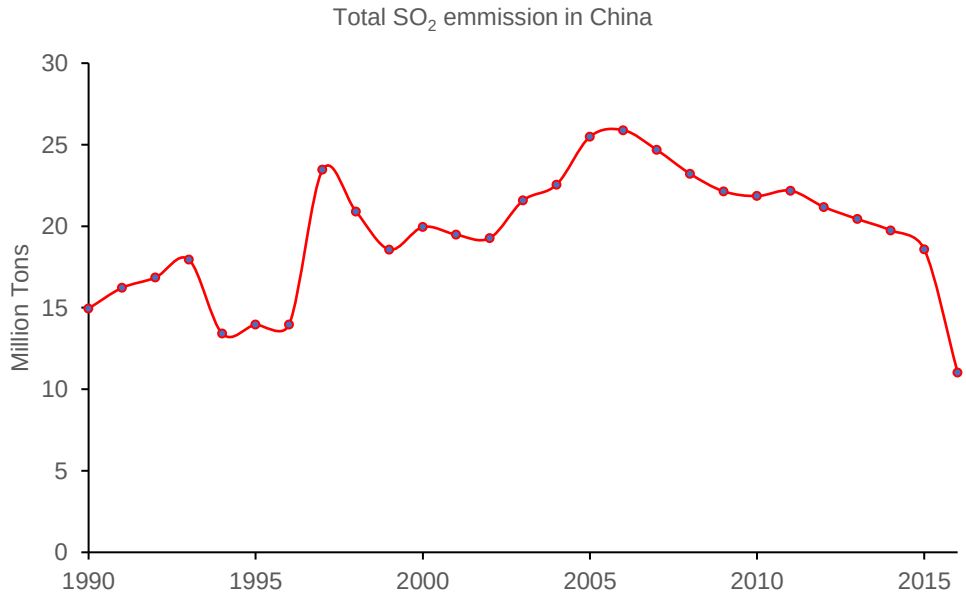


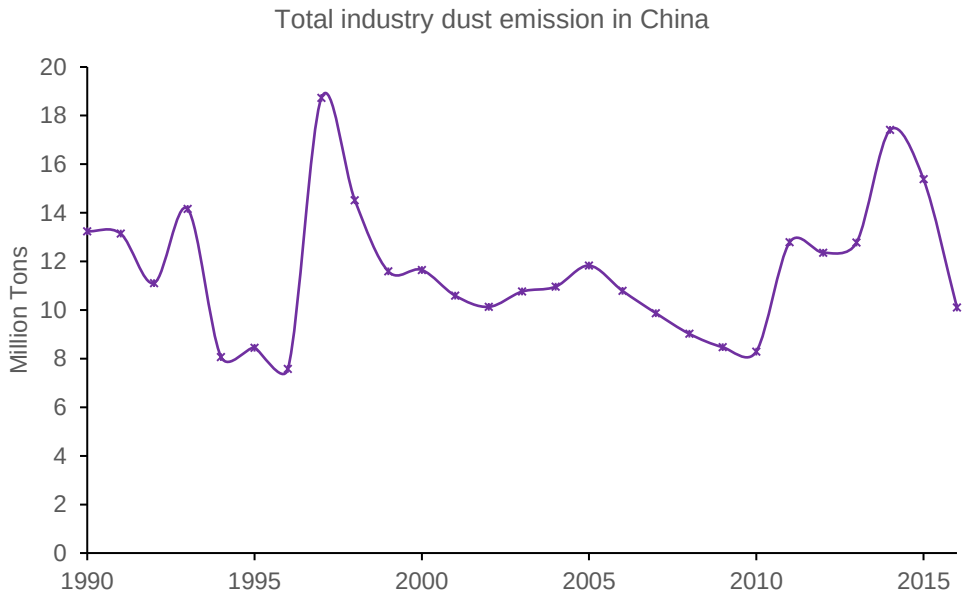
[358] All data are collected from the official website of the National Bureau of Statistics of China.

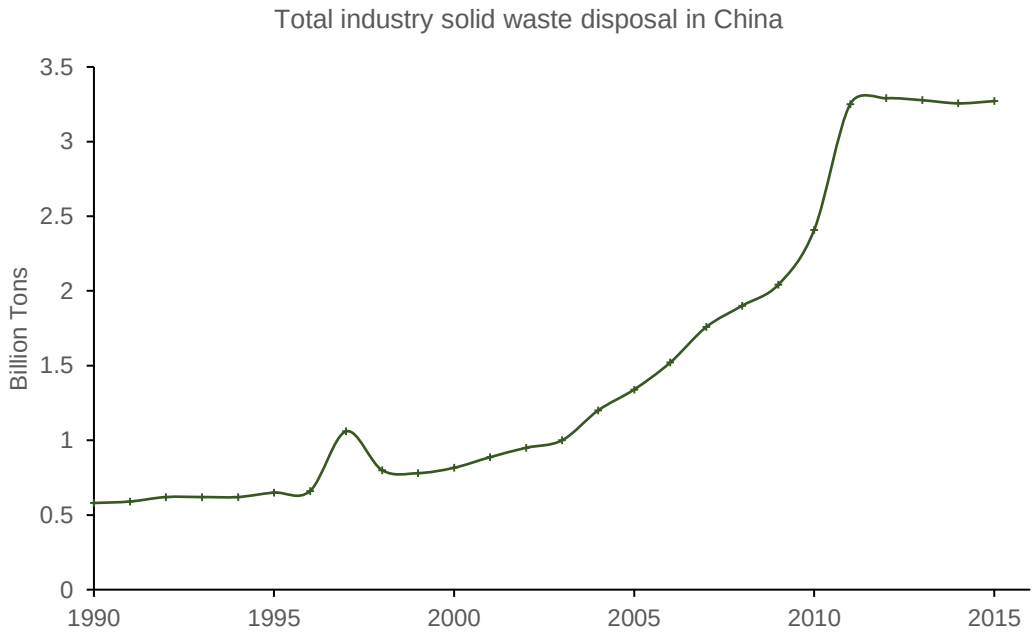

Chemical furtilizers output in China
Million Tons
80
70
60
50
40
30
20
10
0
1990
1995
2000
2005
2010
2015

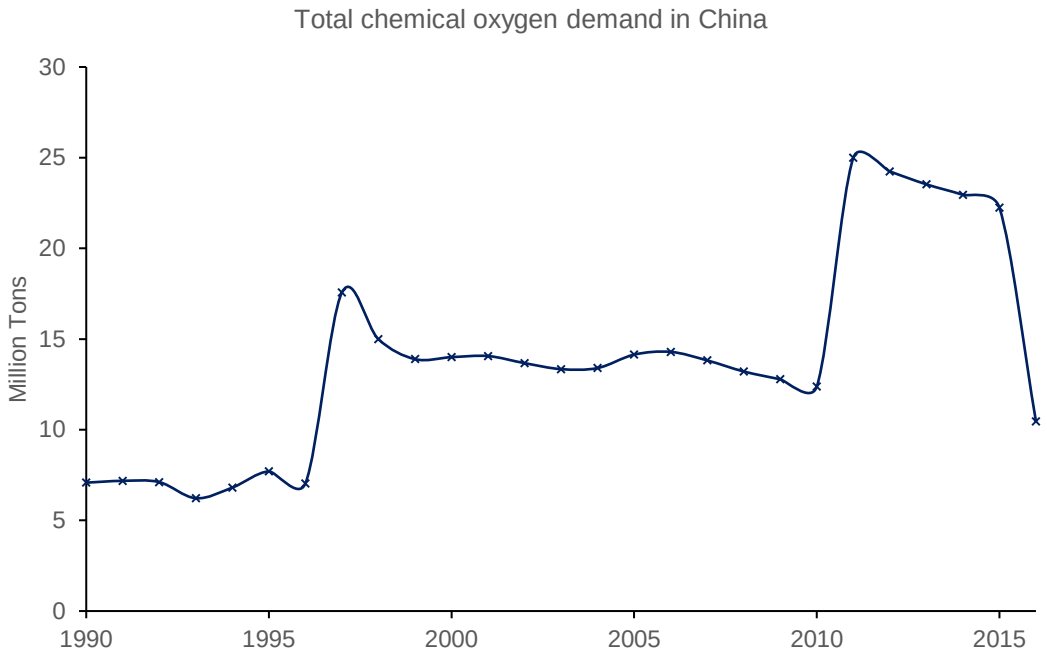

Cement output in China
Billion Tons
3
2.5
2
1.5
1
0.5
0
1990
1995
2000
2005
2010
2015


Steel output in China
Billion Tons
1.2
1
0.8
0.6
0.4
0.2
0
1990
1995
2000
2005
2010
2015


Total SO_2 emmission in China
Million Tons
30
25
20
15
10
5
0
1990
1995
2000
2005
2010
2015


Total industry dust emission in China
Million Tons
20
18
16
14
12
10
8
6
4
2
0
1990
1995
2000
2005
2010
2015


Total industry solid waste disposal in China
Billion Tons
3.5
3
2.5
2
1.5
1
0.5
0
1990
1995
2000
2005
2010
2015


Total chemical oxygen demand in China
Million Tons
30
25
20
15
10
5
0
1990
1995
2000
2005
2010
2015