

5-21-2017

# Chinese Industrialization & Subsequent Environmental Degradation

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## Recommended Citation

Wojcik, Courtney, "Chinese Industrialization & Subsequent Environmental Degradation" (2017). *Dickinson College Honors Theses*. Paper 256.

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**Courtney Wojcik**

## **Chinese Industrialization & Subsequent Environmental Degradation**

### Executive Summary

China has risen from the subject of Western neo-colonialism to a rising hegemon that is beginning to buck the U.S.'s monopoly of the Asia-Pacific arena. Traditionally, Chinese society spurned the economic elite, Confucian-era businessmen made up the lowest social class. This view promoted by Mao Zedong, who stripped property holders of their assets to transition to a state-led economic system and led the country straight into a severe economic depression. It was only after the reform and opening policies of Deng Xiaoping, that China was able to recognize its economic potential. Since these policies were enacted, China's impressive economic growth has allowed it to revolutionize its population, transforming its agrarian society into one of the world's largest consumer bases.

However, China's rapid economic growth has come at a high cost. It's incredible demand for modernization has caused widespread deforestation, severe pollution and dehydration of waterways, and some of the highest levels of air pollution in the world. China has severe environmental problems that not only decrease its quality of life, but also may make its economic growth, which is the basis of its government's legitimacy, difficult to maintain. In order to fully grasp the aims and ability of a rising China, we need to understand the problems that it faces from within. Because of its rapid industrialization, the Chinese are facing a severe environmental crisis that they are unlikely to solve unless strong, immediate action is taken in the form of policies aimed at sustainability.

## From Agricultural Poverty to Industrial Might

Before the collapse of the Qing Dynasty in 1911, Chinese politics and society were ruled by Confucianist thought. Confucianism, more of an ethical philosophy than a true religion, dictated the proper relationships in society, emphasizing the responsibility of ruler to ruled, father to son, husband to wife, elder brother to younger brother, and friend to friend. From this viewpoint, it was the ruler's responsibility to care for his people, setting a standard of virtue for the public to emulate. (Dreyer 2012, 27) Part of the ruler's social contract was his responsibility to manage the environment. Confucianism promoted the belief that the natural world existed to fulfill the needs of man, and should be managed by the political system. (Simons 2013, 48) When the ruling dynasty was no longer able to manage the environment, indicated by "the appearance of comets, plagues of insects, drought, floods," he was perceived to have lost the Mandate of Heaven, and a new dynasty would eventually emerge. (Dreyer 2012, 27) During the dynastic era, the environment was always a subtext in Chinese society. Its health indicated general prosperity, and the turmoil it could inflict upon the Earth indicated the displeasure of the heavens.

However, during this time the environment was never utilized as a tool to achieve economic prosperity. While a small market economy existed, in the sense that small scale trading, commodity production, and the buying and selling of land were present, there was no strong force of economic development. (Schwartz 1996, 119) This stemmed from the fact that "Confucianism had a proagricultural, anticommercial bias." (Dreyer 2012, 43) Confucianist thought promoted the ideal of living off your own work, by living a life that does not inherently take advantage of others. By this dictation, "peasants were considered the producers of wealth" while "merchants were regarded as...dishonest folk who sought to make a profit out of other's

peoples work.” (Dreyer 2012, 43) No value was recognized in the ability of merchants to act as intermediaries between interested parties. Furthermore, the political system typically ignored merchant activities, rarely passing laws that would affect their practices. However, the government, by divine right, could intervene in merchant activity at their will to achieve state initiatives, like “empire-wide trade, flood control, and famine.” (Schwartz 1996, 120) This outlook, while allowing small-scale commercial activity to exist, inhibited the ability of large-scale industrialization to occur in China. It wasn’t until after the fall of the Qing dynasty and the rise of so-called Asian-tigers like Japan and South Korea, that the Chinese government began to experiment with developing their national economy.

Although businessmen were still among the lowest social classes, Communism did not spurn economic advancement as Confucianism had. Lenin’s roadmap of rapid industrialization was particularly attractive to the Chinese, who wanted to catch up to the economic successes of their neighbors. When the Communist Party took power, Mao Zedong promised to revolutionize China to quickly transform the country into a global superpower. He urged citizens to divert their resources, most of which were invested in small-scale agriculture, into steel production. Mao insisted that if every citizen left crop production behind and fully engaged in the construction of small state-owned steel furnaces, that “China could overtake British steel production within the next fifteen years.” (Shapiro 2001, 67) To achieve this goal, Mao declared that “man must conquer nature” [人定胜天] - an official slogan that was disseminated across the country to encourage the utilization of natural resources in this quest for industrialization. (Shapiro 2001, 67)

The country, caught in the revolutionary zeal of the Great Leap Forward, devastated the natural environment. Viable crops were destroyed to make room for heightened grain production

and entire forests were cut down to fuel steel production. (Shapiro 2001, 101) The countryside was left in ruin; “at many places crops rotted in the fields, because peasants were too busy building reservoirs and making iron and steel in their backyards; [using] unscientific methods such as deep plowing damaged the soil.” (Yang 2013, 61) Mao’s interpretation of the environment as something to be manipulated and controlled by man wasn’t an uncommon one. Environmental mismanagement is a common pattern in Chinese history. Because ecological processes and environmental carrying capacities were not considered, the Great Leap Forward failed to turn China into an industrial power and instead led to a widespread famine. Although Mao was unable to successfully industrialize China, his policies set the stage for the continued marginalization of the environment in Chinese economic policies.

After Mao’s death, Deng Xiaoping rose to power. Deng was a strong proponent of economic reform, he recognized that Mao’s policies had “retarded economic growth and development” and that his reforms could improve the situation drastically. (Larus 2012, 146) Recognizing the desperate need to change the economic structure, Deng announced his Four Modernizations policy: the drive to improve agriculture, industry, science and technology, and national defense. (Larus 2012, 146) While this was a much needed change in terms of economic advancement, the revitalization and protection of China’s environment was not considered a key issue. Furthermore, the price of raw industrial inputs, such as coal and oil, were kept artificially low, even though they were relatively scarce. (Dreyer 2012, 163) This meant that the supply of natural materials was not reflected in the price of the good, leading to increased demand and reliance on these raw materials for production. As China’s industrial infrastructure developed, it was built on these artificially cheap materials. Because of this, it has been difficult to move away from them, even as China’s environmental outlook is increasingly bleak.

## China's Industrial Economy

Since the capitalist market reforms of 1978, China has experienced tremendous economic growth. In this relatively short period of time, China has been able to move away from an agricultural based economy and has focused on cheap manufacturing export-led growth model. To put this in perspective, “in the 1960s, about 60% of the Chinese Labor Force were employed in agriculture, by 1990, the fraction of the labor force employed in agriculture had fallen to about 30%, and by 2000 still further.” (Chandrappa et al 2011, 29) However, China is still the world's largest agricultural economy, which counts for about 10% of its GDP. (Bajpai 2014) Because of government support and low labor costs agriculture in China is very profitable; it has become a global producer of many commodity crops such as rice and wheat. With that being said, agriculture is a shrinking profession in China. Many members of younger generations see the advantages of moving to cities for industrial sector or service sector jobs, where they are offered better pay and higher standards of living.

While China still has a strong agricultural base, a large portion of its economic output has shifted to the industrial sector. It has constructed massive cities, built thousands of factories, retrained its labor force, and developed an efficient transportation infrastructure. In a mere fifty years, Deng Xiaoping's economic reforms allowed true growth to occur in the Chinese economy, through the expansion of rural enterprises. Companies owned collectively by villages could produce goods they saw as desirable, rather than products and amounts dictated by the government. This led to a 32% increase in GDP over the span of ten years, and dramatically increased rural wages. (Wen 2016) They began to produce light consumer goods, at so high a rate that China became the world's largest producer and exporter of textiles, furniture, and toys, and the largest producer and importer of cotton. (Wen 2016) China began to invest heavily in

infrastructure to support this massive economic shift, building 2.6 million miles of public roads and developing a massive high-speed railway system. (Wen 2016) By 2010, China became the world's second largest economy by GDP, demonstrating the success of its new economic management.

### Energy Consumption

However, this rapid economic growth has come at cost. While China has successfully developed a strong industrial base, the speed at which it has grown has massively changed its consumption patterns. Its energy production and consumption have grown dramatically; by 2010 China became the world's largest total energy consumer, and accounts for nearly half of the world's energy consumption growth over the previous decade. (Shambaugh 2016, 93) While some of this energy usage is rightfully attributed to economic growth. As factories are built, rates of production increase, and quality of life rises, the demand for more energy increases as well. Energy consumption is an essential component of an advanced economy, evident in the industrial sector's use of nearly 75% of China's energy consumption. (U.S. Energy Information Administration 2015) That being said, China's rapid growth and relatively low GDP per capita has made it difficult for the industrial sector to invest in the newest, most efficient energy technologies. China's energy infrastructure is tragically underdeveloped. It uses about twice as much energy as developed countries to accomplish the same tasks, demonstrating the extent to which new investments are needed to decrease energy usage. (Dong 1998, 158)

China's increased energy consumption has been fueled by both domestic and international resources. While China has a large variety of natural energy resources within their territories, the lack of infrastructure and high demand has led them to acquire energy from

abroad. China is the world's second-largest consumer of oil and the largest net importer as of 2014. (Dong 1998, 158) It imports more oil than is produced domestically, with crude oil imports reaching 61% at the end of 2015. (Dong 1998, 158) China's interior holds extensive amounts of energy resources, a large amount of which have remained untapped. The northern provinces have vast coal and oil reserves, and are the primary source of domestic energy resources. However, these oil fields and coal mines have been overused, and their supplies are currently dwindling. (U.S. Energy Information Administration 2015) They are also relatively far from the coastal manufacturing hubs, leading to price increases reflecting the cost of transportation. To negate this problem, China has begun to import significant amounts of oil and coal. Meanwhile, it has begun to explore alternative energy resources, and they are currently exploring the quality of oil fields in provinces of Sichuan, Shanxi Gansu, Ningxia, and offshore in the Yingge Sea, Chaidamu, South China Sea, and East China Sea. (Jingwen 1998, 364) Some of the claims in the South China and East China Seas have been subject to territorial disputes with other countries in the region, stalling the development of these oil fields. (U.S. Energy Information Administration 2015)

While China is the world's largest oil importer as well as a heavy investor in internal oil exploration, the primary form of energy used in the country is coal. In fact, "China is the world's top coal producer, consumer, and importer, and accounts for almost half of global coal consumption." (U.S. Energy Information Administration 2015) Although China has made attempts to diversify its energy sources, coal accounted for about 66% of Chinese energy consumption in 2012. (U.S. Energy Information Administration 2015) This heavy reliance stems from several factors. First, coal is historically the most commonly available form of energy in China. Coal is a cheap, readily available resource that can be used in both industrial energy

production and by small households. While it may not seem like it, household use of bituminous “soft” coal, particularly during the winter is a significant portion of coal usage in China, especially in more remote provinces where infrastructures are not as developed. (Shambaugh 2016, 93) Second, China is experiencing a glut in its coal market. Global coal prices have declined since 2012, and the Chinese government has imported large quantities to help offset the costs of domestic-coal transportation, leading to the surplus. (U.S. Energy Information Administration 2015) The cost of coal fell so low that many Chinese coal mines were unable to maintain production levels, but domestic use of coal is still much higher than other fuel types.

Although coal is a relatively cheap resource, it is one of the dirtiest forms of energy, about three times more polluting than either oil or natural gas. (McElroy 1998, 244) Coal, made up of oxygen, carbon, and hydrogen, creates carbon dioxide when combusted through the bondage of the carbon and oxygen molecules. Without the use of modern technologies, such as CO<sub>2</sub> scrubbers, the carbon dioxide produced is released into the atmosphere. At smaller amounts, this doesn't pose a significant problem because natural processes remove carbon dioxide from the atmosphere. However, the “complete combustion of 1 short ton (2,000 pounds) of this coal will generate about 5,720 pounds (2.86 short tons) of carbon dioxide.” (Hong and Slatick 1994) In 2013, China consumed about half of the world's total use of coal, about 4 billion short tons, constituting about 85% of the country's total CO<sub>2</sub> emissions. (Weidou and Sze 1998, 78) In amounts as large as this, not unusual for a developed industrial-based economy, carbon dioxide emissions can pose serious problems. They not only affect the quality and the air and contribute to climate change, but also lead to health hazards in areas with significant pollution.

Overall, China's rapid industrialization has benefited the country tremendously. It has transformed the society from a poor, agrarian state to one of the world's economic powerhouses.

It has increased both the national GDP and GDP per capita, improved standards of living, and provided a stable source of income for many. China has come a long way from the start of Deng Xiaoping's reforms, when the average citizen "aspired to possess the 'four rounds'...a bicycle, a wristwatch, a sewing machine, and a washing machine...and 'three electrics'...a telephone, refrigerator, and private telephone" to modern Chinese society, which has the largest number of millionaires and second largest number of billionaires in the world. (Shambaugh 2016, 55) Its export-led economic model, with subtle shifts to a market-based economy, have allowed it to amass wealth and foreign influence. However, this growth has come at the expense of environmental health. The reliance on fossil fuels, poor urban planning, and lack of strong regulations have created serious environmental degradations that have social implications and human health impacts of their own.

### Environmental Degradation

The two major forms of environmental degradation in China are of air and water. The quality of these two basic resources are important indicators of environmental health. When their quality is degraded, for whatever reason, the resulting impacts to ecosystems and human health are astounding. Maintaining a healthy environment is crucial to increasing quality of life and years of healthy life. Globally, nearly 25 percent of all deaths and the total disease burden can be attributed to environmental factors. (Healthy People 2020 2016) In particular, poor air quality is linked to premature death, cancer, and long-term damage to respiratory and cardiovascular systems, and the contamination of surface and ground water by infectious agents or chemicals can cause severe illness. (Healthy People 2020 2016) While China has improved its

quality of life standards through economic growth, if it continues to manipulate its environment without regard to best practices the health of its society will be stunted.

Ambient air pollution is the particulate matter (PM) released into the air as the result of the burning of fossil fuels, noxious gases, ground level ozone, and tobacco smoke. (NIH 2016) These four sources of air pollution create particulates of different sizes, which have different effects on the quality of the air. “The major components of PM are sulfate, nitrates, ammonia, sodium chloride, black carbon, mineral dust and water. It consists of a complex mixture of solid and liquid particles of organic and inorganic substances suspended in the air.” (WHO 2016) The most concerning of these particles is PM 2.5, those that are 2.5 micrometers in diameter or smaller. These fine particulates are produced during all types of combustion, whether from car exhaust, power plants, or a forest fires. Because coal is the primary fuel used to power China’s industrial sector, it is responsible for about 40 percent of the deadly fine particulate matter in China’s atmosphere. (Wong 2016, “Coal”) In regions with a large industrial presence, such as Hebei province, which surrounds Beijing, the levels of PM 2.5 are extremely concerning.

On December 7, 2015, Beijing issued its first ever red alert in response to PM 2.5 levels that reached an AQI (air quality index) of 291. (BBC 2015) That’s nearly 40 times the limit recommended by the World Health Organization, but is not the highest recording China has ever seen. (Wong 2015) In the winter and summer months, extremely high AQI levels are almost expected and even forecasted. In December of 2016, PM 2.5 levels in Beijing are expected to reach an AQI of 500, which is 200 points passed the benchmark for hazardous. (Reuters 2016) At these levels, PM 2.5 particles, normally invisible to the naked eye, are a thick grey smog filling the city streets and obscuring the skyline. This poisonous smog is a problem that plagues all of China, not only Beijing. Urban areas, especially those near industrial centers, constantly

experience unhealthy levels of PM 2.5 due to the byproducts of coal-powered production. The smog becomes a part of daily life, something Chinese citizens have become accustomed to dealing with by simply donning a mask or staying indoors. However, the health effects of PM 2.5, now more widely known, have led to the recognition of the problem within Chinese society and government.

Air pollution has a wide range of effects on the human body. PM 10 particles are small enough to be inhaled and accumulate in the respiratory system, while the even smaller PM 2.5 particles can pass through the lungs and enter the bloodstream. (EPA 2016) These pollutants are linked to both acute and chronic health effects, including cardiovascular disease, respiratory issues, and increased risk of cancers and stroke. (Xiping 1998, 283). The particles derived from fossil fuel combustion have been “consistently associated with cardiac mortality,” as they impede the ability of the lungs to properly function. (Ayres et al 2006, 26) The symptoms of respiratory illness appear as acute problems in young children, such as bronchitis or asthma, but can lead to chronic illness in older adults. The manifestation of these illnesses has been linked to air pollution through time series studies, correlating mortality and hospital admissions to varying AQI levels. (Ayres et al 2006, 35) Because the incidence of PM 2.5 particles is largely attributed to coal burning, these health effects can be directly linked to China’s industrialization. In a study led by Tsinghua University and the Health Effects Institute, it was found that coal combustion, through its subsequent air pollution, contributed to 366,000 premature deaths in China in 2013. (Health Effects Institute and Tsinghua University 2016) Therefore, it is imperative that the Chinese government significantly revise its emission standards and incentivize the adoption of cleaner technologies to combat this public health crisis.

Environmental degradation in China, in almost every sense, is a cause or symptom of climate change. Air pollution is perhaps the most obvious example. Because China is the world's largest consumer of coal, it is also the world's largest emitter of carbon dioxide. "In 2009, China's share of global CO<sub>2</sub> emissions measured 6,319 million tons, 21.4% of the world's total." (Shambaugh 2016, 89) Carbon dioxide, a greenhouse gas, is a main precipitator of climate change because it traps the sun's energy in the atmosphere, causing global temperatures to rise. At the current rate of emissions, bolstered by heavy polluters like China, major changes to ecological systems are inevitable. Even with climate pacts promising to decrease greenhouse gas emissions, temperatures will rise high enough to trigger climate feedback loops, "where the natural world begins to release massive amounts of stored greenhouse gases." (Simons 2013, 188) The effects of climate change are already visible in some parts of the world. Perhaps the most evident is in changing weather patterns and the intensification of droughts in the world's driest regions. One of these places is Northern China, where the overconsumption of water is aggravated by increasingly sparse rains. (Wong 2016, "Resettling") While climate change is not the first issue that comes to mind when analyzing China's abuse of its environment, it is a major issue pressing the globe today. If China does not prioritize reducing its emissions, it will continue to face criticisms from both its citizens over quality of life and from foreign governments over the abuse of the global commons.

Air quality is not the only environmental issue degrading the quality of life in China, water is also a pressing concern. Water pollution, largely from point-sources like factories, has led to widespread illnesses and destruction of food supplies, while the mismanagement of the resource has led to widespread scarcity. Historically, China has utilized its tremendous river power to shape its economic and societal growth. On the banks of the Yellow River, running

through northern China, and those of the Yangtze River in the south Chinese society flourished into what is now one of the world's largest populations; these rivers have fueled China's agricultural production and industrial development for centuries. In recent decades, more and more of these waters have been dammed or diverted to support industrial growth. Industrial use of these rivers has led to a serious, significant problems, in terms of quality and quantity, for those reliant on the Yellow and Yangtze Rivers for personal consumption and sustenance farming.

The Chinese government is not known for its quality control regulations, especially not when it concerns the environment. Water is a common resource, to be used as each individual pleases. It is often the case that "the rational man finds that this share of the cost of the wastes he discharges...is less than the cost of purifying his wastes before releasing them." (Hardin 1968) Because of poor controls governing the commons, most rivers in China have been plagued by chemical spills, such as lead and mercury. (Shambaugh 2016, 90) It seems that almost every month there is another staggering report of an industrial mishap that has resulted in the degradation of some water supply. Take the 2005 instance of a chemical plant explosion on the Songhua River for instance, which resulted in benzene levels 108 times higher than national standards. (Shambaugh 2016, 90) Industrialization has impacted water resources in ways other than point-source pollution. Practices such as strip mining, widely used in coal-rich regions such as Wuhai, have contributed to the pollution of the Yellow River through contaminated run off. (Yardley 2006) These pollution issues are present across the nation, leaving 43% of state-monitored rivers as unsuitable for human contact in 2010, and 75% of China's lakes highly polluted. (Shambaugh 2016, 89) The Chinese Communist Party's historic encouragement of rapid economic growth to pull China out of poverty has allowed for the quality of the water

supply to be over-looked. They did not set strict guidelines to prevent chemical contamination of waterways, nor did they assess the broad environmental impacts of industrial practices. In the quest for profit environmental quality was left behind, creating serious problems for today's leaders to clean up.

Aside from industrial pollutants, China's rapid economic growth has created a mismanagement of the water supply, leading to severe water shortages in some regions. Water is a resource demanded by almost every aspect of society. It is used for basic human consumption, to water fields, as an input to industry, and as a source of income itself. Because the amount of water consumed by each individual is not controlled, rational actors will use as much as they personally need without regard for the overall impact. (Hardin 1968) The free uncontrolled nature of this common resource more often than not leads to its overuse. This is the case of the Yellow River, which runs through the coal-rich regions of northern China, which is slowly running dry. Coal-fired power plants, many of which are found along the Yellow River, are extremely water intensive, "consuming 7.4 billion cubic meters of water each year, enough to meet the needs of 406 million people, or about 30 percent of the nation's population." (Wong 2016, "Report") With increasing desertification in northern China, it is difficult not to associate the coal industry's massive use of water as an abuse of the commons. Estimates have approximated that "China had 21,000 square miles more desert than what existed in 1975," which has indicated that the natural rate of desertification is steadily increasing. (Hanner et al) The increasing lack of water has forced the migration of thousands of residents, because of the declining productivity of agriculture.

## China's Response

The wide scope of China's environmental problems is worrying. Its overwhelming desire to develop has left the environment by the wayside, severely lacking any major policy protections. China is defensive of its position as a developing country, and has asserted its right to the same scale of industrial growth experienced by Western countries during their own industrial revolutions. "Because of the need of the Chinese to develop economically...they are unlikely to make the avoidance of CO<sub>2</sub> emissions a top priority." (Dong 1998, 121) China refuses to be handicapped by the expectations of the developed world, expressed by numerous government officials in statements to the press like the following example:

"As for China's impact on surrounding countries, I'm first to admit the problem. But let's talk about this in the context of international fairness, whose development model are we emulating? Who has been shifting all of its pollution-heavy factories to China? ... And who bears an even greater international responsibility than China -- but has yet to shoulder it -- on matters like greenhouse-gas emissions"

- Pan Yue, Ministry of Environmental Protection (Pottinger et al 2004)

While this mindset is understandable, it is essential that China develop a clear and effective national energy policy in order to mitigate the problems it has caused to its environment before their widespread impacts become irreversible.

That being said, China is open to developing a more sustainable economy, as the economic costs of pollution in China are about \$100bil a year, or 5.8% of GDP. (Shambaugh 2016, 89) China has invested heavily in the innovation of renewable energy sources to diversify away from its use of coal. From popular initiatives, to provincial regulations, to central government directives there is now an increased awareness of environmental degradation. China

has become a leader in many renewable energy fields. It is the world's third largest ethanol producer, the largest producer of photovoltaic cells which are used in the production of solar panels, and the world's top wind turbine producer. (Shambaugh 2016, 93) Furthermore, China is the world's fifth largest consumer of wind power. (Shambaugh 2016, 93) Several provinces, such as Beijing, have instated AQI monitoring and alert systems and have taken steps to curb emissions on days where air pollution reaches hazardous levels. (Shambaugh 2016, 92) Others have utilized pollutant discharge fees for firms that exceed regulated levels. (Shambaugh 2016, 92) The central government has utilized a command-and-control approach to set higher efficiency standards for coal plants, shutting down many older plants and mines producing less than 30,000 tons per year to reduce air and water pollution levels. (Shambaugh 2016, 93)

They have also made strides in urban planning, incorporating large green spaces and expanding forests to cover 40 million hectares, and have worked with international organizations like the U.N. to pledge their participation in environmental pacts. (Shambaugh 2016, 92) The overuse of the Yellow River has become so extreme that the government is experimenting with new ways to rehydrate the region. The South-North Water Diversion Project is a plan to build a series of canals diverting water from the Yangtze River hundreds of miles to the North. (Shambaugh 2016, 92) These extreme efforts indicate that the steps taken by the Chinese government to reduce water consumption on the Yellow River are simply not enough. Unless a more equitable use of the commons is instated, most easily achieved through a reduction of coal-fired plants in the region, water scarcity in Northern China will continue to persist.

China is slowly making progress to remedy its environmental damage, but the question is – is it enough?

## Conclusion

China's rapid industrialization has led to the degradation of its environment particularly the quality of its air and water. Its historic precedents, stemming from Confucian ideology and Maoist logic, have created a culture of manipulating the environment to serve political aims. In a rush to catch up to the developed world, China has relied extensively on its coal resources and exploited the natural commons to cut costs. Until recently, its government has turned a blind eye to environmental degradation. Now, its urban centers are choking on poisonous air, while its rural regions are suffering from toxic water that is becoming ever-more scarce. While the government has set some environmental standards in place and invested in the production of renewable energy technologies, it is not nearly enough to stop further and irreversible environmental damage from occurring.

To prevent irreversible harm to its environment, the central government should explore new environmental policies. The first issue they should tackle is the over-reliance on coal as an energy resource, because of its impact on both air and water quality. The price of coal is currently subsidized in China, making it the commodity of choice for many industrial consumers. If the price of coal was deregulated, with a "market price reflecting a relationship to quality, transport, and environmental costs," it would become much more expensive, causing demand to fall. (Weidou and Sze 1998, 82) The central government should instead subsidize the adoption of innovative technologies, such as emissions scrubbers for use in smoke stacks, to encourage energy-intensive industries to function more sustainably. Policies such as these will allow China to continue its rate of growth while simultaneously removing pressure from its environment. China has an opportunity to become a symbol for sustainable development for the rest of the developing world, and if they can transition to a clean economy, it will only make them more

powerful. If these steps are not taken, it is unlikely that China will be able to continue its rate of growth, as the economic and social costs of environmental damage will become too high.

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