

## **China: tackling climate change**

*“Climate change is the defining challenge of our age” – Ban Ki-moon.*

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### **Introduction**

Climate change holds a key place among other environmental, strategic, and national threats confronting nations today. During the last two decades, climate change has had a devastating effect on ecological and water systems, impacting the political geography of many States around the world.

The phenomenon has its genesis in large-scale deforestation and massive emissions of carbon dioxide by the highly industrialized countries. Together, the two activities have played a part in altering the Earth’s temperature, melting its ice caps, and depleting the ozone layer. Still, it was only in 1978 that, while several scientists were conducting experiments in Antarctica, they uncovered a hole in the ozone layer and the effects of climate change became evident.<sup>1</sup> In 1992, with the Rio Earth Summit, the international community began taking steps to curb the impact of climate change.<sup>2</sup>

Today, rapidly changing weather patterns, altering landscapes, and rising sea levels are becoming issues which can no longer be ignored. China, in particular, has experienced extensive losses due to climate change. Water shortages, rising sea levels, floods, droughts, earthquakes, and severe storms have caused significant environmental degradation. For example, parts of north-eastern China could face intense drought, while shrinking glaciers in parts of western China and in the Tibet Autonomous Region could result in treacherous flooding in parts of south-eastern China.<sup>3</sup> Similarly, the nation’s production of wheat, maize and rice are also expected to decline due to rising temperatures, and changes in patterns of rainfall.

For an economically resurgent China, climatic change also spells disaster in terms of environmental pollution (which includes water, air, and motor pollution, as well as changing weather patterns) as increasing greenhouse gas emissions create difficulties for China in its efforts to address climate change. In 2007, China adopted China’s National Climate Change Programme (CNCCP).<sup>4</sup> According to this plan, China will reduce its energy dependency on coal, and increase its use of hydroelectric power, besides nuclear and wind energy.

According to Ma Kai, Chairman of National Development and Reform Commission of China, “...being a developing nation, we have had no obligation to cut carbon emission. But it does not mean that China is not ready to cut

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emissions in the air; as a responsible nation we will make efforts to reduce it and find new ways to tackle this problem.”<sup>5</sup>

Likewise, President Hu Jin Tao expressed his views on the subject during the 2007 G-8 summit in Germany by stating that “now, this is a time for the developed nations to take serious efforts regarding this issue; if we fail to take solemn actions, it will bring catastrophic results for the whole community of the globe.”<sup>6</sup>

Fortunately, even as China grows, it seems consciously aware of the problem, and is taking serious steps both domestically and internationally to mitigate the impact of climate change in order to preserve the environment for the present and future generations.

### **Climate change in China: an overview**

Demographically, China has the world largest population, and its land area is the world’s 3<sup>rd</sup> largest. China is also the second leading energy consuming country after the United States, and is described as the largest carbon-emitting country in the world. During the last thirty years, China’s increasing volume of industry, growing urban population and the ‘motor revolution’ have changed atmospheric conditions. Rapid urban development has increased the demand for clean water, sanitation and energy; in addition to fuelling the consumption of luxuries which create potential problems for the environment (e.g., automobiles).

In 2009, China’s urban population reached 620 million, the largest in the world.<sup>7</sup> According to UN reports, the size of China’s urban areas is expected to increase to fifty-eight per cent by 2020, and eighty per cent of the total population by 2050.<sup>8</sup> In future, we can clearly see China’s tendency towards urbanization. That is coupled with the fact that the country is also in the process of rapidly industrializing and modernizing; factors which place added stress on the environment. For example, China houses numerous domestic and foreign manufacturing factories, including renowned automobile manufacturers such as PSA Peugeot and Citroen.

Left unchecked, the demand for energy and the rate of carbon greenhouse gases (GHG) emissions are likely to swell to unseen proportions. Yet, the debate on carbon emissions is not a simple one, and the issue is not equally important to other nations in the world. However, it is connected to other ecological challenges faced by the planet.<sup>9</sup> It is a reality that the earth’s temperature is rising at an astonishing speed; as a result, frequent and widespread environmental destruction could become the norm. Recognizing that, China began its national climate programme in 2007, and is determined to achieve its environmental targets.<sup>10</sup> According to this programme, the country aims to cut carbon emissions by twenty per cent per capita by the end of 2010.<sup>11</sup> In 2006, China’s greenhouse gas emissions reached six billion metric tons, and contributed twenty per cent to

world's total.<sup>12</sup> Despite these statistics, the country's per capita emission is relatively low; and in 2010, its per capita carbon emission level is far behind that of the U.S. However, given China's large population and status as the "factory of the world", there remain many challenges to be met.

### **Basis for accelerated environmental change**

#### *Poor climatic situation*

To begin with, China is located between two disaster belts, the Eurasia middle latitude and Pan-Pacific, where earthquakes and other geological disasters have been observed frequently. The country's topography is also quite complex: in the east it is bordered by the Yellow Sea and the East China Sea; in the north lies the inner Mongolian plateau; in the south it is covered by mountains and hills; and in the central regions, the nation's two major rivers, the Yellow River and Yangtze River, make deltas. Meanwhile, most of China's grasslands are alpine and desert. The temperate grasslands in northern China are in danger of degradation and desertification due to the impact of drought and deterioration of the ecological environment. China is also vulnerable to rising sea levels, because it has a long coastal line extending to more than 14,500 km.<sup>13</sup>

Moreover, many parts of China's territory are located in the continental monsoon climate region where weather changes drastically from season to season. Comparatively, most parts of China have a wider range of seasonal temperature deviation than other continental areas at the same latitude. During the summer season, huge flooding destroys agriculture and housing in the south. Similarly, in the north, extreme winter temperatures (between -20c to -30c) immobilize or disrupt transport, communication, and other essential activities.<sup>14</sup> Given this topographical and climatic diversity, it is no surprise that in the past China has also faced many deadly earthquakes and storms in different parts of its territory (such as the 2008 earthquake in Sichuan province).

#### *Overpopulation*

China's population remains the world's largest, with 1.3 billion inhabitants, accounting for twenty per cent of the world total. This enormous population puts huge employment pressure on the country's economy, and every year approximately ten million new rural labourers move to the cities to look for jobs. This relocation contributes to China's rapid urban population growth. As a result, in 1979, China made its first attempt to control the size of its population. It started a birth control policy, called (Du Sheng Zi Nu), to limit couples to having one child. In this way, Chinese authorities instituted fines and even forced sterilization after the second or subsequent pregnancies.

Yet, despite its strict birth control policy, China's population growth rate continues to remain at 0.655 per cent annually.<sup>15</sup> At this speed in 2010, the

country's population will soon reach 1.4 billion.<sup>16</sup> On one hand, this huge population is considered to be a lucrative market for goods consumption, but at the same time, this population will place huge agricultural/land demands on the country. Food security could, therefore, become a renewed challenge for China and its huge population.

*Abundant use of coal*

Coal is another main source of pollution in China. It is vigorously used for energy and for cement production. China's manufacturing industry is booming, many factories are under construction, and all around China there is large-scale construction. So, there is a need for more cement to build bridges, roads, etc. The cement industry is China's biggest polluter. Its coal utilization has increased to more than eight hundred million tons during the period between 2005 and 2010.<sup>17</sup> Nitrogen oxide is generated from the burning of coal, and that becoming the major source of urban smog. Many cities in China; such as Beijing, Shanghai, Datong, and Nanjing; are facing severe smog problems which create poor visibility conditions. The air quality in Beijing is so poor that at times it is difficult to see buildings that are only a few yards away.

However, China has planned to construct five hundred and sixty-two new coal-fired stations by the end of 2012.<sup>18</sup> This means that new and more abundant emissions will be produced, which are likely to undermine the efforts that are being made under the Kyoto Protocol. It is clear that China will face much more difficulties than other countries in decreasing its carbon intensity per unit of energy. That can be mainly attributed to three reasons: 1) its energy mix adjustment is constrained by the mix of energy resources to a certain extent; 2) its energy efficiency improvement is subject to the availability of advanced technologies and financial resources; and 3) its coal-dominated energy resources and consumption structure will not change substantially for a long time in future.

*'Motor revolution'*

There are approximately one hundred million vehicles running on China's roads, of which eighty-five million are passenger cars; and according to the Ministry of Public Security in 2009, 13.5 million cars were sold in China.<sup>19</sup> A prominent environmentalist, Liang Congjie, noted that approximately three hundred million families are living in China, and if each family has two cars, there would be six hundred million cars on China's road; this figure would definitely surpass the world total.<sup>20</sup>

Additionally, like many of China's other industries, the country's motor industry is also growing fast. There are an additional ten million new vehicles being produced every year.<sup>21</sup> Many famous motor brands such GM, Chrysler, Fiat, Ford, Honda, Nissan, Suzuki, and Toyota have factories in China, because it has become the largest automobile market in the world. China's recent 'motor

revolution', in particular its shift towards personal cars, is a major cause of urban pollution. In fact, automobiles are now the primary source of overall air pollution in China's major cities. This rapidly growing vehicle fleet has substantially damaged the country's environment, particularly in major urban centres such as Beijing, Shanghai, Urumqi and Dalian where traffic jams are becoming a daily routine.

### **Problems created by climate change**

#### *Rising temperatures / harsh conditions*

Human behaviour is an important element in rising of the temperature on earth. Burning of fossil fuels and an increase in the number of motor vehicle on the roads, as well as deforestation for human and business needs and different modes of energies, are all factors that are contributing to CO<sub>2</sub> emissions (which play a role in increasing earth's temperature). An analysis of the past two decades of China's temperature indicates that the country's climate has increased by 1.1 c in the normal temperature, and as a result, China's temperature is expected to rise between 1.1c to 2c by 2020 due to the high carbon emissions in the air.<sup>22</sup> With rising temperatures come even more accelerated, intensified land and weather shifts (e.g., sandstorms, desertification, drought, famine, etc.) in various regions, which altogether may hinder the ease of daily activity.

#### *Rising sea levels / business disruptions*

During the last four decades China's sea level has risen seven to eight inches in coastal cities such as Tianjin, Shanghai and Guangzhou. As already noted, the total coastline of the country is 14,500-km-long, and sea levels have risen four inches on average, while the temperature is becoming much warmer.<sup>23</sup> According to statistics from the Organization for Economic Cooperation and Development, Shanghai and Guangzhou are considered in the top ten at risk coastal cities of the world.<sup>24</sup> There is an assumption that the sea levels could increase six to eight inches by 2030 in many coastal areas.<sup>25</sup> This is a serious problem due to the common and aggressive sea storms that directly disturb business activities in the coastal regions.

#### *Glacier retreat / water scarcity*

The Tibet plateau, the Hindu Kush and the Himalayas are the main sources of fresh water in China, and outside the North Pole and South Pole, these regions have the largest absorption of glaciers in the world.<sup>26</sup> These glaciers provide fresh water for the two and half billion population of the region. The rising temperature impacts these water sources, and many experts believe that by the end of 2035, these resources could disappear.<sup>27</sup> Fifty per cent of Chinese glaciers originate in Qinghai which forms the main source of the famous Yangtze and Yellow Rivers. Reservoirs of glaciers have already shrunk by seven per cent.<sup>28</sup>

There is a strong possibility that without glaciers, water will become scarce in the northern parts of China.

The U.N. is also worried that the earth's increasing temperature will melt the Tibet Plateau in less than a hundred years.<sup>29</sup> In the last four decades, the rising temperature has resulted in the loss of sixty-six hundred square kilometre area across the Tibet Plateau. The total area of this ice roof is two and half million square kilometres and it comprises twenty per cent of China.<sup>30</sup>

#### *Agriculture / food scarcity*

Rising temperatures, inadequate water supplies, intense weather conditions (heat waves, rainstorms, floods and typhoons), and the acute diseases which affect cultivation areas together threaten China's agricultural productivity. Water shortages and desertification can be seen in the northern parts of the country. Simultaneously, water level is rising in the Yangtze River which causes disastrous flooding. These droughts and flood conditions are directly affecting the domestic agricultural scenario. There is a clear postulation that China's agricultural production capacity (in areas such as rice, wheat and corn) could be condensed by more than twenty per cent by 2050.<sup>31</sup>

Although the impact is uncertain, it is reasonable to estimate that these conditions can lead to massive food shortages. The Chinese government still remembers the famine which killed more than ten million people in 1960. Even following the one-child policy, China's population has been increasing at the rate of twelve million annually,<sup>32</sup> and most of country's population is dependent on agricultural industry (which includes livestock and crop cultivations).

#### *Earthquakes and floods / deaths*

As seen above, China is situated near earthquake zones, and it is quite frequently disturbed by natural hazards. During the last century, China suffered four major earthquakes. The deadliest occurred in 1976, and killed more than two hundred and forty thousand people in Tangshan.<sup>33</sup> The most recent large-scale earthquake hit Wenchuan County in the Sichuan Province of China, and had a death toll of more than sixty nine thousand.<sup>34</sup> Sichuan Province is also known as one of the main rice and wheat producing areas in China. Even more disturbing is the fact that China's prominent Three Gorges Dam is situated a few hundred miles east from the Wenchuan County, but, luckily, it was not damaged.<sup>35</sup>

Flooding is another source of destruction; abnormally recurring floods kill hundreds of people every year in the country. In 2009, a fatal flood affected the southern and central parts of the country, and more than three hundred and twenty thousand homes were evacuated in the area.<sup>36</sup> According to the Chinese State media, the total loss was projected to have been US\$ 31 million.<sup>37</sup> In 1931, an irrepressible flood occurred in Yellow River and Yangtze River. That killed more than one million people, and was the most devastating flood in the history

of China. Today, China is included in top ten countries that are disproportionately affected by climate change.

### **China's participation in U.N.-sponsored summits/conferences on the environment**

#### *The Johannesburg Summit, 2002*

In 2002, a climate change summit was held in Johannesburg, South Africa, in which 187 States participated. The major outcome of this summit was a recognition for all country's to be able to provide access to clean water and improved sanitation systems, as well as the need for all countries to be more responsible in their regulation of the use of chemicals, and support for the development of renewable and other modes of green energy.<sup>38</sup> The conference's basic principles also included the following requirements to:

- meet all the commitments under the United Nations Framework Convention on Climate Change (UNFCCC);
- for every member State to work cooperatively towards achieving the objectives of UNFCCC;
- provide technical and financial assistance in accordance with commitments under the UNFCCC;
- enhance scientific and technological capabilities, especially in developing countries; and to
- enhance the implementation of national, regional and international strategies to monitor the earth's atmosphere.

During this conference, China announced its intention to ratify the Kyoto Protocol to reduce the greenhouse emissions, and Premier Zhu Rongji noted that, "We are called upon by the new situation to proceed from the larger interest of harmony between man and nature and complementarily between environment and development and to take the road of sustainable development with stronger determination and more solid steps."<sup>39</sup> From 1998 to 2002, China had invested more than \$ 70 billion towards environmental protection.<sup>40</sup>

#### *The Kyoto Protocol*

The Kyoto Protocol was adopted in December 1997 in Kyoto, Japan. It entered into force in February 2005 after fifteen years of negotiations, and will expire in 2012.<sup>41</sup> There are 175 nations that are signatories to the Kyoto Protocol. The crux of the Kyoto Protocol is a request for the world's 38 industrialized nations, which are responsible for about 30 per cent of global Green House Gases (GHG), to cut off their carbon emissions by an average of 5.2 per cent.<sup>42</sup> China is currently working under the Kyoto Protocol, the United Nations Framework Convention on Climate Change, and is an active participant in global efforts to deal with climate change. Today, China is emitting more than 1/5 of the world

carbon emissions, and has agreed to cut its emission by 20 per cent by the end of 2020.<sup>43</sup>

The Chinese government believes that the United Nations Framework Convention on Climate Change and the Kyoto Protocol provide an effective means for increasing international cooperation to address climate change. China has ratified the Kyoto Protocol as a non-Annex1 (developing) country, and, according to the first phase, known as the First Commitment Period (2008-2012), it has no obligation to reduce carbon emission. Nevertheless, China appears ready to build up international cooperation with all Kyoto Protocol member States, and demands that developed countries fulfil their commitments under the Convention to provide financial support and transfer of technology to developing countries so as to enhance their capacity to address climate change issues.

*U.N. Summit, 2005*

From September 14 to 16, 2005, the U.N. summit on climate change was held in New York, the United States, with the participation of all member States.<sup>44</sup> Participants acknowledged that climate change had become a serious threat for the global community, and reaffirmed their responsibility towards addressing the issue. Member States also admitted that there was a dire need for collaboration; and encouraged clean energy, energy efficiency, and conservation. Moreover, countries called for the execution of the Johannesburg Plan, and reiterated the need for work on the transfer of technology, private investment, and capacity-building measures among developing States.

During this conference, Chinese President Hu Jin Tao stressed that “China’s development is closely bound up with the development of whole world. We are ready to work with all other countries to make the 21<sup>st</sup> century truly the century of development for all.”<sup>45</sup> He added, “We adhere to the U.N. policy on climate change which emphasizes cutting more carbon emission.”<sup>46</sup>

*U.N. Climate Change Conference, Bali, 2007*

The United Nations conference on climate change was held in Bali, Indonesia from December 3 to 15, 2007. Delegates from 180 countries participated, along with observers from intergovernmental and nongovernmental organizations. The proposal that came out from the European Union emphasized that developing and developed countries must cut carbon emissions level 20-40 per cent by the end of 2020.<sup>47</sup>

The Bali conference emphasized four main elements. These elements included the reduction of carbon emissions and the sharing of financing facilities, as well as the adaptation and transfer of technology and financing facilities to developing countries on easy, transparent terms to enhance forest activities in every member State. During the Bali conference, China announced its domestic

plan to improve disaster prevention capacity via improving its agricultural and water resources, healthcare, and overall ecosystem technologies. Through these measures, China aims to reduce its reliance on coal, increase the share of renewable energy to 10 per cent by 2010, reduce nitrous oxide emissions from industries, and increase forest coverage.

#### *Copenhagen Conference on Climate Change, 2009*

From December 6 to 18, 2009, signatories of the United Nations Framework Convention on Climate Change (UNFCCC) met in Copenhagen, Denmark. This was the 15<sup>th</sup> Conference of Parties (COP 15) under the UNFCCC.<sup>48</sup> The main agenda of the conference was to ensure that carbon emissions are cut worldwide, and to set up new mechanisms to prevent future emissions.

During this conference, the viewpoints of the world's emerging powers (such as China, Brazil and India) and other developing countries were well represented. However, representatives from the U.S. also noted that it is problematic that at this point in time, developing countries are producing more carbon emissions in comparison to developed nations, and yet, remain without any mechanisms to control their carbon emissions level. During this conference, the Chinese delegation led by Xie Zhenhua said: "For Chinese, it is our sovereignty and our national interest."<sup>49</sup> However, the criticism did come to his side at the question of China's commitment to collective action for reserving climate change. He also noted that additional steps could be taken towards collective action on climate change.

#### **China's current policy**

Today, China is ready to cooperate with the rest of the world in addressing climate change under the framework of United Nations Framework Convention on Climate Change. This is reflected in the fact that a Chinese delegation is present at every U.N. meeting on climate change, and China remains an active participant of the Kyoto Protocol. Being a responsible country, China is taking great interest in the issue of climate change. The Chinese government recognizes the adverse, disastrous effects the rapidly progressing climate change is having on the country's natural environment during the last four to five decades (e.g., colder winters in northern parts of the country, devastating floods and earthquakes in southern parts, etc.).

From its own point of view, China demands that developed countries fulfil their commitments under the UNFCCC and the Kyoto Protocol. China also demands that developed countries share advanced nuclear technology to assist developing countries' efforts to meet their domestic energy consumptions needs. This is in keeping with the target set by the Intergovernmental Panel on Climate Change (IPCC) for all industrialized countries to reduce their carbon emission to a minimum level of 25 to 40 per cent by the end of 2020.<sup>50</sup> Domestically, China

continues to pursue its national climate change programme, which set a target for an environmentally-friendly, reduced carbon-emission society by the end of 2010.

### *1. Current GHG emissions*

According to the Intergovernmental Panel on Climate Change (IPCC), China's greenhouse gas emission is accelerating very fast. During the 2004-2010 period, China's emissions were projected to grow from two and half per cent to five per cent.<sup>51</sup> In 2010, China surpassed the United States as the leading carbon-emitter.<sup>52</sup> Coal, as seen, is China's major source of energy, and every year China produces more the six billion metric ton carbon emissions from the fossil fuels (including coal, petroleum, and natural gas) which hold soaring percentages of carbon.

The use of fossil fuels and industrial progression are the dominant sources of carbon emissions. Gases originated from the burning of coal, oil and gas are continuously creating dangers for the planet. Most of China's industries are coal-based, and generates approximately 68 per cent of their energy from coal. From 2000 to 2007, China's coal production capacity increased by an average of 230 million tons per year, and reached a volume of 2.62 billion tons in 2008.<sup>53</sup> What is more, coal is abundantly available in China's Inner Mongolia, Ningxia, Hunan, Shaanxi, and Guizhou provinces. Around 28,000 coal mines have been discovered in the country, of which 20,000 are State-owned, with an output of 65 per cent of China's total coal production.

### *2. Mitigation*

"Mitigation" refers to policies and actions that are designed to reduce greenhouse gas emissions from the atmosphere. Mitigating greenhouse gas emissions is one of the significant mechanisms for addressing climate change, and without it, countries will be unable to address climate change effectively. Its strategy is reflected in the idea of "common but differentiated responsibilities", as stressed in UNFCCC principles.<sup>54</sup> China appears to fully support this principle. The country's mitigation strategy includes taking action to: 1) conserve energy, 2) improve energy efficiency by developing renewable and nuclear energies with the goal of increasing the country's use of non-fossil fuel to 15 per cent, and 3) increase forests by 40 million hectares by 2020. China firmly believes that this mitigation policy will reduce emissions and would be helpful to address the climate change problem.

### *3. Technology*

Confronting the problem of climate change is an extraordinary challenge, and joint international efforts are necessary. It is very important that developed countries share climate-friendly technologies with the developing countries, as

well as provide financial support to them and expand the scope of technology to create a positive scenario. China has a relatively low level of science and technology capabilities, along with limited capacities for technology development. Yet, the country aims to transform its old coal-based source of energy to more sophisticated means of energy, such as hydroelectric, wind, solar, nuclear and biomass technologies.

For example, the Chinese government has a plan to enhance China's nuclear energy capacity to 80 GW by 2020 and 200 GW by 2030, respectively; and as the nation continues to develop this technology (in different provinces, such as Hongshidang, Weihai, Ling Ao, Fuqing, Haiyang, Fangjiashan and Sanmen), it is looking to developed countries for assistance, and better technologies.<sup>55</sup> Currently, Russia, Canada and France are assisting China in the area of nuclear development, with most of China's nuclear equipment being bought from France. Meanwhile, in 2006, China also invested \$ 136 billion in research and development, and initiated a public awareness campaign to promote growth in carbon reduction technology.<sup>56</sup>

### **Activities to lessen the impact of climate change**

#### *Promoting renewable and clean energy*

China has made a lot of effort to develop clean and renewable energy. In 2009, the country's total renewable power capacity reached 226 GW (hydroelectric power 197 GW, wind power 25.8 GW, biomass generated 3.2 GW, and grid-connected solar panels 0.4 GW<sup>57</sup>). After 2005, China has invested in wind-turbine manufacturing, and has held the first place in the world in this sector. Now, more than 80 wind-turbine manufacturing firms are working in China, and they are exporting their production worldwide. By 2020, China aims to enhance its clean and renewable energy capacity (i.e., hydroelectric to 300 GW, wind to 150 GW, biomass to 30GW, and solar to 20 GW)<sup>58</sup>. The Chinese government plans that next in 2011, it would inject \$ 75 billion into this effort. China's industry is expanding with the passage of time and hence its energy demand would also continue to increase. Beijing is well aware of this increasing energy demand and is taking serious steps to meet it through green technologies.

#### *Reforestation efforts*

China is also engaged in reforestation. According to its ministry of forestry, China's forests cover 20 per cent of the country's total land and are spread over 1.9 billion hectares.<sup>59</sup> The civil society and nongovernmental organizations are also participating in this effort. Many volunteers in Shanghai, for instance, have planted more than 200,000 trees as the city – along with many other urban areas of the country – is suffering from severe air pollution. In 2004, China also started a campaign to grow one million trees in the Inner Mongolia province, bordering on Mongolia, by 2014.<sup>60</sup>

Every year, March 12 is observed as the national tree planting day in the country, and that serves to increase awareness about the great importance trees have for human life and the earth. Over the last decade, China has successfully increased forest resources in various parts of the country through its large-scale reforestation efforts. All these efforts would enhance the capacity of forest and as well as help absorb greenhouse gases.

*Closing old and outdated coal power-stations*

Coal is the cheapest source of energy around the globe. Many countries; such as the U.S., Russia and China; rely on it for electricity production. Coal is both inexpensive and polluting. The Chinese government has decided that by the end of 2010, they would shut down outdated and old power generation plants which generate ten million kilowatts of electricity.<sup>61</sup> The coal industry has many problems, one of which is that they were constructed in 1940's, and are based on old infrastructure. The main objective of the closing of these obsolete plants is to improve the structure of power production and endorse the standard of capability in the transformation of its industry.

According to the National Development and Reform Commission, in the first two years of the 11th five-year plan, using 300 million tons of coal would help reduce 750 million tons of carbon emissions.<sup>62</sup> In the country's current (11<sup>th</sup>) five-year plan (2006-2010), China has turned in a big way to wind, nuclear, biomass, and hydro power generation. Its aim is to use new technologies to reduce the high ratio of carbon emissions, and rapidly close old power plants. These measures are a beacon of hope for ultimately reducing carbon emission growth in China.

*Expanding public awareness*

China has given great importance to expanding education and public awareness to allow for greater public participation in its campaign to tackle climate change. It stresses that public attentiveness is necessary to build up a good social atmosphere in which they might make efforts to address climate change. In 2006, the ministry of environment released a report that described how more than 1,000 non-governmental organizations are working to enhance public awareness in the area.<sup>63</sup> One significant move was taken in 2007, when students from different universities formed an NGO called China Youth Climate Action Network (CYCAN), to establish a network inside the country and to publish a monthly bulletin to raise awareness in society regarding climate change.<sup>64</sup>

Chinese authorities are also using the media to increase public awareness. The central radio station of China has consecutively broadcast more than a hundred episodes of a programme called "The Earth Our Home".<sup>65</sup> Many other

programmes and interviews with experts have also been transmitted on CCTV. Climate change has also been introduced as a subject in the basic as well as higher levels of education in the country.

#### *Proposed environmental tax*

In recent years, China has also been considering an environmental tax for polluters. The idea was first generated in 2007, and there is a strong possibility that the tax would be imposed in the next five-year plan (2011-2015). The introduction of this tax would help reduce air pollution; its proceeds would be utilised to support technological advancement and avert high polluting activities. For example, it would make it expensive for manufacturers to operate outdated machinery, etc., and would also make owning a personal vehicle more expensive. According to the ministry of public security, the total numbers of vehicles on the roads has crossed 199 million; auto emissions remain the major cause of air pollution in urban areas.<sup>66</sup>

#### **Recommendations for future work**

To continue assisting China in its efforts to address the problem of climate change, this study emphasizes the importance of the following actions:

- **Enhancing scientific approaches, as well as allocating more funds for research and development in both rural and urban areas:** By taking these actions, China would be continuing the policy work that it has already started, and would be investing in green economic development in some of its most needed, useful and/or challenging land areas. In the short term, it would encourage needed innovation in the area of green technology, and help China continue its economic growth by tapping into an expanding and sustainable market. In the long term, it would also help China avoid rapid environmental disaster.
- **Relying on renewable technology, such as wind, solar, hydroelectric, and nuclear power:** By taking this action, China would be using some of the most immediately available green technologies, similar to many other forward thinking country's (e.g., Denmark's extensive use of wind energy, Iceland's use of geo-thermal energy, etc.).
- **Preventing, controlling, and/or taxing industrial, commercial, and residential pollution:** By taking these actions, China would save its existing land, water, and air resources (such as fresh water rivers and lakes) by making different members of society more responsible for the garbage they create or manage.
- **Creating public awareness to control greenhouse gases (GHG):** By taking this action, the Chinese government would play a role in directly shaping the

values of its population, which would help build a society that understands the importance of the environment, appreciates the environment, and knows how to keep the environment healthy (e.g., through the National Tree Planting Day).

- **Encouraging resource conservation and environmental protection:** By taking these actions, China would help save, and responsibly use its existing resources, which would hopefully slow down the rate of resource depletion and allowing time for technological capabilities develop to the point at which they can match the country's future needs.
- **Relying on public buses and taxing the use of personal cars:** By taking these actions, China would be investing in both efficient infrastructure and the environment. It would help improve the country's overall productivity, and reduce the rate of auto emissions (e.g., by making driving more expensive and inconvenient).

### **Conclusion**

Climate change has created new problems for the world that can simply destroy the earth's present environment in coming decades. Over the past few decades, climate change has affected the whole world in different ways. During the 2009-2010 period alone, devastating earthquakes, floods, droughts, volcanoes, and oil spills have impacted countries like Chile, Haiti, the U.S., various European States, as well as Pakistan and China.

At present, the world community is worried about these environmental shifts, and it is written clearly in the United Nations Framework Convention on Climate Change (UNFCCC) that member States should work cooperatively to achieve their objective, and provide technical and financial assistance to address the climate change problem.

Like the rest of the globe, the Chinese State is also concerned about this problem. The impact of climate change is already observable in China. For example, extreme cold and hot weather has become common in different parts of the country. At present, environmental pollution in China is increasing rapidly. To address this problem, the Chinese government has made serious efforts to develop renewable energy technologies, to introduce novel means of energy conservation, and to promote carbon-sink techniques and other adaptive technologies.

They have also taken steps to accelerate scientific and technological innovation and importation, as well as provide strong scientific support to address climate change and promote the capacity of sustainable development. For example, China has taken measures as energy efficiency upgrading, energy conservation, installing new sources of renewable energy, planting trees

extensively, and is considering taking legal action in the form of taxes in an effort to control its carbon emissions.

In fact, after examining China's overall approach to climate change, it is evident that China sees a future that has a sustainable environment, which has been created with the help of targeted policy measures, increased international cooperation, and advances in green technology.

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