The Likelihood of a Carbon Tax in China: Wishful Thinking or a Real Possibility?

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I. INTRODUCTION

In 1992, China signed the primary international agreement on climate change, the United Nations Framework Convention on Climate Change (UNFCCC) with 154 other countries at the Earth Summit in Rio de Janeiro.[1] About six years later, in May 1998, China signed the Kyoto Protocol to the UNFCCC.[2] At the time, China was still a moderate emitter of carbon dioxide (CO_2), the main greenhouse gas (GHG) covered by the Kyoto Protocol.[3] In August 2002, China ratified the Kyoto Protocol to the UNFCCC[4] and the Protocol entered into force on February 16, 2005.[5] By contrast, the United States ratified the UNFCCC in 1992,[6] but has not ratified the Kyoto Protocol. The George W. Bush Administration's 2001 decision to abandon the Kyoto Protocol process and the 2009 negotiations at Copenhagen have been the key events of the first decade of the twenty-first century.[7] Although Australia signed the Protocol in 1997, it did not ratify it until Kevin Rudd became Prime Minister in December of 2007, with ratification taking effect in early 2008.[8]

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1. United Nations Framework Convention on Climate Change, *opened for signature* May 9, 1992, S. Treaty Doc. No. 102-38 (1992), 1771 U.N.T.S. 107 [hereinafter UNFCCC] (signed by China June 11, 1992); *see* Dongsheng Zang, *Green from Above: Climate Change, New Developmental Strategy, and Regulatory Choice in China*, 45 TEX. INT'L L.J. 201, 201-02 (2009); *see also* Daniel Bodansky, *Prologue to the Climate Change Convention*, *in* NEGOTIATING CLIMATE CHANGE: THE INSIDE STORY OF THE RIO CONVENTION 45, 45 (Irving M. Mintzer & J. Amber Leonard eds., 1994) (describing the events leading up to the 1992 UNFCCC).

2. Kyoto Protocol to the United Nations Framework Convention on Climate Change, 2303 U.N.T.S. 162 (entered into force Feb. 16, 2005) [hereinafter Kyoto Protocol]. China signed the Kyoto Protocol on May 29, 1998. *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, U.N. TREATY COLLECTION, http://treaties.un.org/Pages/ShowMTDSGDetails.aspx?src=UNTSONLINE&tabid=2&mtdsg_no=XXVII-7-a&chapter=27&lang=en#Participants (last visited Mar. 11, 2012). In September 2002, Premier Zhu Rongji announced China's ratification of the Kyoto Protocol at the U.N. World Summit on Sustainable Development in Johannesburg. Shao Zongwei, *Nation Approves Kyoto Protocol*, CHINA DAILY (Sept. 4, 2002, 8:16 AM), http://www.chinadaily.com.cn/en/doc/2002-09/04/content_134822.htm.

3. Dongsheng Zang, *supra* note 1, at 202 (citing *Global CO_2 Emissions: Increase Continued in 2007*, PBL NETH. ENVTL. ASSESSMENT AGENCY (June 13, 2008), http://www.pbl.nl/en/publications/2008/GlobalCO2emissionsthrough2007.html; Elisabeth Rosenthal, *Booming China Leads the World in Emissions of Carbon Dioxide, a Study Finds*, N.Y. TIMES, June 14, 2008, at A5).

4. Kyoto Protocol, *supra* note 2, at 163; Shao Zongwei, *supra* note 2.

5. Kyoto Protocol, *supra* note 2, at 162.

6. UNFCCC, *supra* note 1, at 165.

7. LARRY PARKER ET AL., CONG. RESEARCH SERV., RL 30024, U.S. GLOBAL CLIMATE CHANGE POLICY: EVOLVING VIEWS ON COST, COMPETITIVENESS, AND COMPREHENSIVENESS, at ii (Feb. 24, 2011), http://assets.opencrs.com/rpts/RL30024_20110224.pdf.

8. *Australia Ratifies Kyoto Protocol*, SYDNEY MORNING HERALD, Dec. 3, 2007, http://www.smh.com.au/news/environment/rudd-signs-kyoto-deal/2007/12/03/1196530553203.html.

China's twenty years of market reform since it ratified the UNFCCC has "resulted in an impressive decline in carbon intensity, which is measured by CO_2 emissions per dollar of gross domestic product (GDP) created."[9] However, as a result of its rapid industrialization, China is appearing as a major contributor to global warming.[10] The International Energy Agency has noted that primary energy demand between 2000 and 2005 increased by 55% while GDP grew by 57%.[11] This rise in energy demand was driven by "surging electricity demand (met largely by increased coal use) and by the manufacture of metals, building materials and chemicals for infrastructure[,] consumer goods[,] and export markets."[12] As a result, CO_2 emissions increased on average by 10.6% from 2000 to 2005, which was three times the 3.2% growth rate of the 1990s.[13] The Netherlands Environmental Assessment Agency's June 2008 report indicates that China surpassed the United States as the world's largest emitter of CO_2 in 2006.[14] A major problem with the Kyoto Protocol for many environmentalists in the United States and Europe was that neither of the two largest emitters, the United States and China, was subject to a binding CO_2 cap.[15]

Notwithstanding the growing pressures on China from the international communities relative to climate issues, Premier Wen Jiabao, in an interview with the Financial Times published on February 2, 2009,

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9. Dongsheng Zang, *supra* note 1, at 202 (citing Ying Fan et al., *Changes in Carbon Intensity in China: Empirical Findings from 1980-2003*, 62 ECOLOGICAL ECON. 683, 683 (2007)). Zang noted, "An earlier study by a research project at the Massachusetts Institute of Technology concluded that the decrease in energy intensity in the 1980s was the result of changes in China's production technology." *Id.* at 202 n.7 (citing XIANNUAN LIN, CHINA'S ENERGY STRATEGY: ECONOMIC STRUCTURE, TECHNOLOGICAL CHOICES, AND ENERGY CONSUMPTION (1996)).

10. *See Global CO_2 Emissions: Increase Continued in 2007*, *supra* note 3 (noting that China topped the list of CO_2-emitting countries).

11. INT'L ENERGY AGENCY, WORLD ENERGY OUTLOOK 2007: CHINA AND INDIA INSIGHTS 263 (2007), http://www.iea.org/textbase/nppdf/free/2007/weo_2007.pdf.

12. *Id.*

13. Dongsheng Zang, *supra* note 1, at 202 (citing Ross Garnaut et al., *China's Rapid Emissions Growth and Global Climate Change Policy*, *in* CHINA'S DILEMMA: ECONOMIC GROWTH, THE ENVIRONMENT AND CLIMATE CHANGE 170, 172 (Ligang Song & Wing Thye Woo eds., 2008)).

14. *Global CO_2 Emissions: Increase Continued in 2007*, *supra* note 3.

15. Dongsheng Zang, *supra* note 1, at 202-03 (citing RICHARD B. STEWART & JONATHAN B. WIENER, RECONSTRUCTING CLIMATE POLICY: BEYOND KYOTO 8 (2003)). "According to Stewart and Wiener, since the Kyoto Protocol leaves China, other developing countries, and the United States out of the regulatory framework, '[T]he Kyoto Protocol now omits more than half of global greenhouse gas emissions, and that omission will worsen over time because it excludes the countries whose emissions are growing fastest.'" *Id.* at 203 n.13 (quoting STEWART & WIENER, *supra*, at 8).

indicated that China did not intend to agree to any caps at the United Nations conference on climate change scheduled for December 2009 in Copenhagen, stating, "[I]t's difficult for China to take quantified emission reduction quotas at the Copenhagen conference, because this country is still at an early stage of development."[16] He made it clear that China was not ready to accept a carbon cap at the Copenhagen conference and that a carbon cap was unlikely in the near future because of the status-quo economic situation in China. At the Group of Eight (G8) meeting held in July 2009 in L'Aquila, Italy, the United States and European Union failed again to persuade China and India to commit to a binding carbon cap.[17] The possibility of a double dip recession in the United States, coupled with a Republican majority in the Senate and increasing signs of a close presidential election in November of 2012, practically guarantees that the United States will not commit to a binding emissions cap or other measures such as a carbon tax in the near future. The serious economic crisis now unfolding among key nations within the Eurozone and its impact on the global economy strengthens the resolve of many countries to avoid measures that will increase costs to industry, consumers, and sovereign debt.

Although China is now the world's largest emitter of CO_2[18] it has adopted a wait-and-see approach in the context of international climate change negotiations and is unwilling to make a serious commitment to reducing its emissions until the developed world does likewise.[19] Environmentalists in the West are increasingly intrigued by the questions: Can China be engaged to tackle climate change issues on its own initiative, and what is the best approach to address these issues;[20] and what is the best way to achieve meaningful reductions in GHG emissions?[21] Generally speaking, there are three options for regulating GHG emissions in quantities considered necessary to be an effective

16. Interview by Lionel Barber, Editor of the Fin. Times, with Wen Jiabao, Premier of China (Feb. 2, 2009), http://www.ft.com/cms/s/0/795d2bca-f0fe-11dd-8790-0000779fd2ac.html?nclick_check=1.

17. Dongsheng Zang, *supra* note 1, at 204 (citing Patrick Wintour & Larry Elliott, *G8 Summit: Barack Obama Says World Can Close the Carbon Emissions Gap*, GUARDIAN (July 9, 2009), http://www.guardian.co.uk/environment/2009/jul/09/barack-obama-g8-climate-change).

18. *Global CO_2 Emissions: Increase Continued in 2007*, *supra* note 3.

19. Jeffery Logan et al., *For China, the Shift to Climate-Friendly Energy Depends on International Collaboration*, BOS. REV., Jan./Feb. 2007, http://bostonreview.net/BR32.1/loglewcummings.php.

20. *See* Jonathan B. Wiener, *Climate Change Policy and Policy Change in China*, 55 UCLA L. REV. 1805, 1806 (2008); *see also* Logan et al., *supra* note 19.

21. *See* Dongsheng Zang, *supra* note 1, at 204.

mitigation strategy: traditional command-and-control (CAC) regulation, tradable permit markets, and taxes.

In terms of combating climate change, it is becoming increasingly difficult to reach an agreement that will be accepted by all of the major emitting countries on precisely how to reduce emissions in a way that will not adversely affect economic growth, contribute to increased costs, higher unemployment, and, as we have witnessed in recent months in several regions in the world, being seen as a contributing factor to political instability. However solid the science highlighting the urgent need to combat global warming and climate variation, there remains no consensus on how to design and implement policies that will be effective in the context of reducing emissions while, at the same time, on a country-by-country basis, being politically achievable. Contrary to the position being put forward by the Australian government in support of its carbon tax, it will take more than moral leadership to persuade the major emitting countries to embrace measures that may have devastating short and medium term negative economic impacts.[22] It is in this context that this Article will explore the imposition of a carbon tax and/or tradable permit markets in China.

As Hoeller and Wallin indicate, a carbon tax is an environmental tax that is levied on the carbon content of fuels.[23] In other words, it is a form of carbon pricing. A carbon tax can be implemented by taxing the burning of fossil fuels—coal, petroleum products such as gasoline and aviation fuel, and natural gas—in proportion to their carbon content. The National Science Academies[24] and the assessment reports of the Intergovernmental Panel on Climate Change (IPCC)[25] have pointed to the potential impacts of human-induced climate change. Carbon taxes are one of the policy measures that can be used in reducing GHG emissions

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22. *See* Andrew L. Urban, *The Greatest Moral Challenge of Our Time . . . Is Not Climate Change*, PURSUE DEMOCRACY (June 27, 2011), http://pursuedemocracy.com/2011/06/greatest-moral-challenge/ (stating that global warming is not a moral issue, but rather "a matter of practical politics and economic management").

23. Peter Hoeller & Markku Wallin, *Energy Prices, Taxes and Carbon Dioxide Emissions*, 17 OECD ECON. STUD. 91, 92 (1991), *available at* http://www.oecd.org/dataoecd/33/26/34258255.pdf.

24. *See G8+5 Academies' Joint Statement: Climate Change and the Transformation of Energy Technologies for a Low Carbon Future*, NAT'L ACADEMIES (May 2009), http://www.nationalacademies.org/includes/G8+5energy-climate09.pdf; *see also Climate Change at the National Academies*, NAT'L ACADEMIES, http://dels-old.nas.edu/climatechange/ (last visited Mar. 12, 2012).

25. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT 7-14 (Nov. 2007), http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf.

from fossil fuels.[26] Some countries have implemented carbon taxes or energy taxes based on the carbon content of fuels.[27]

In the context of climate change, the heated discussion on whether to levy carbon taxes is now one of the major topics of debate in China. Not only the news media, but also the official administrative agencies like the Ministry of Environmental Protection, the Ministry of Finance, and experts and scholars in academic circles are giving more consideration to this particular mechanism to reduce emissions. At this point in time, most of the commentary in China focuses on the experience of other countries who have introduced some form of carbon taxes, using these examples as a basis for levying carbon taxes in China. Nevertheless, the commentary and discussions within China are at a very rudimentary stage of development and have not yet tackled the detail with respect to what problems and obstacles are likely to occur in the context of the Chinese economy and whether or not it is feasible to levy carbon taxes in practice. Several of these key issues are the subject of this Article.

II. BACKGROUND

The ability of China to achieve the sustainable development of its economy is under significant stress as China is now experiencing a severe period of "both potential energy shortages and challenges related to climate change impacts."[28] It is predicted that China's energy deficiency in terms of coal and natural gas will reach 25% of total domestic production, while its oil import dependency could be as high as 60% by 2020.[29] According to an authoritative forecast, China's annual energy-related CO_2 emissions growth rate is expected to reach 2.8% during the period 2006 to 2030, compared with only 0.1% for Organisation for Economic Co-operation and Development (OECD) European countries over the same period.[30] Although the industrialized countries experienced much the same rapid growth in emissions, it is not

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26. Igor Bashmakov et al., *Policies, Measures, and Instruments*, *in* IPCC, CLIMATE CHANGE 2001: MITIGATION 399, 413-14 (Bert Metz et al. eds., 2001), *available at* http://www.grida.no/climate/ipcc_tar/wg3/pdf/6.pdf.

27. *See id.* at 414-15.

28. Xin Wang et al., *An Analysis on the Short-Term Sectoral Competitiveness Impact of Carbon Tax in China*, IDÉES POUR LE DÉBAT, June 2010, N° 03, at 4, http://www.iddri.org/Publications/Collections/Idees-pour-le-debat/IPD1003 - wang, li, zhang.pdf.

29. *Id.* (citing R.B. MAO & Q.T. CHEN, A STUDY OF APPROACHES AND METHODS TO MEET CHINA'S 20% ENERGY EFFICIENCY TARGET FOR 2010 (2008)).

30. ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, INTERNATIONAL ENERGY OUTLOOK: 2009, at 112 figs.83 & 84 (May 2009), http://www.setav.org/ups/dosya/25025.pdf.

realistic for China to replicate their development pathways.[31] The modernization process in China must give consideration to both economic growth and the control of GHG emissions.[32] Combating climate change, however, is of course in China's own interest, a fact that has forced it to develop at least a political willingness to address the issue.[33] A series of ambitious targets that should be implemented urgently have been set by the Chinese government, including the reduction of carbon intensity per unit of GDP by 40% to 45% and to increase the proportion of new and renewable energies to 15% of the total energy consumption by the end of 2020, compared to 2005 levels.[34] It should be noted, however, that the commitment to reduce the intensity of its emissions, a position also adopted by India at the Copenhagen Summit in December 2009,[35] is not a reduction in actual emissions over a base period but rather a commitment not to increase emissions to a level that otherwise would have occurred had nothing been done to curb emissions. This should not, therefore, be confused with a cap and trade scheme where the aggregate emissions are, in fact, reduced over time.

In addition, a series of CAC policies have been widely implemented in China like closing small and inefficient thermal power plants and energy-intensive factories and limiting the expansion and installation of new energy-intensive industries.[36] It is likely that these policies and measures will be continued and expanded in the future. As a major policy instrument, these adjustment and control measures have successfully contributed to the achievement of the energy efficiency improvement targets and market restructuring objectives of the Eleventh Five Year Plan (2006-2010).[37] CAC policies, however, often come with high implementation costs and may well have negative impacts in terms

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31. Xin Wang et al., *supra* note 28, at 4.

32. *Id.* (citing Jiankun He et al., *CO_2 Emission from China's Energy Sector and Strategy for Its Control*, 35 ENERGY 4494 (2010)).

33. *Id.* (citing ZhongXiang Zhang, *Can China Afford To Commit Itself an Emissions Cap? An Economic and Political Analysis*, 22 ENERGY ECON. 587, 587 (2000)).

34. *Id.*

35. *India Pledges To Reduce Carbon Intensity*, ENV'T NEWS SERV. (Dec. 4, 2009), http://www.ens-newswire.com/ens/dec2009/2009-12-04-02.asp.

36. Xin Wang et al., *supra* note 28, at 4 (citing GUOHUA WU, A STRATEGIC STUDY ON ENERGY CONSERVATION AND EMISSION REDUCTION IN CHINA (2009) (in Chinese, author's translation)).

37. *Id.* (citing Ying Chen et al., *China's Energy Saving and Emission Reduction vs. Climate Change Actions from 2008 to 2009*, *in* GREEN BOOK OF CLIMATE CHANGE: ANNUAL REPORT ON CLIMATE CHANGE ACTIONS 38, 38-51 (WeiGuang Wang & GuoGuang Zheng eds., 2009) (in Chinese, author's translation); ZhongXiang Zhang, *Is It Fair To Treat China as a Christmas Tree To Hang Everybody's Complaints? Putting Its Own Energy Saving into Perspective*, 32 ENERGY ECON. (SPECIAL ISSUE) S47 (2010)).

of social equity.[38] The drawbacks of CAC policies are mainly reflected in the following two aspects: deadweight loss may emerge because of industry differences in marginal abatement costs or damages from emissions[39] and, in the absence of a clear price signal, clean renewable energies will be unlikely to replace cheaper fossil fuels and lead to a change in consumption behaviour.[40]

There is little doubt that CAC policies alone will be insufficient to enable China to cope with the conflicting climate and economic pressures in the face of rapid growth and a dramatic increase in quality of life standards, which, in turn, will inevitably exacerbate energy demand from domestic transport and other consumer oriented industries.[41] It is worth noting that a call for action emerged at the Communist Party's Central Committee Conference on economic issues in December 2007, namely a "speeding up in the implementation of fiscal, tax, pricing and financial policies [in order] to save energy and reduce CO_2 emission."[42] This demand, however, did not lead to a systematic fiscal measure focused on energy saving and CO_2 emissions reduction in China. The existing taxes in China cover only a relatively small part of energy mix and pollution,[43] among which no tax focuses on carbon emissions. For example, although fees (charges) are collected on 113 pollutant types (such as waste water, solids, noise pollution, and radioactive materials), there is currently no fee imposed on carbon emissions.[44] Also, despite the fact that resource taxes have been levied on coal, oil, and natural gas in China since 1984,[45] which can help to reduce CO_2 emissions indirectly, they cannot clearly distinguish the external carbon costs of different

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38. *Id.* (citing OECD, ENVIRONMENTAL PERFORMANCE REVIEWS: CHINA (2007); CHINA COUNCIL FOR INT'L COOPERATION ON ENV'T & DEV., ECONOMIC INSTRUMENTS FOR ENERGY EFFICIENCY AND THE ENVIRONMENT (2009), http://www.foes.de/pdf/Research_Report_EN_FINAL.pdf).

39. *Id.* (citing Nicholas Z. Muller & Robert Mendelsohn, *Efficient Pollution Regulation: Getting the Prices Right*, 99 AM. ECON. REV. 1714 (2009)).

40. *Id.*

41. *Id.*

42. *Id.*

43. *Id.* For example, restrictive fiscal measures on exports have only been imposed on a small range of energy-intensive products, accounting for only a relatively minor portion of Chinese GDP and total exports. *Id.* (citing Xin Wang & Tancrède Voituriez, Can Unilateral Trade Measures Significantly Reduce Leakage and Competitiveness Pressures on EU-ETS-Constrained Industries? The Case of China Export Taxes and VAT Rebates (Jan. 21, 2009) (unpublished manuscript), *available at* http://ssrn.com/abstract=1635830 (follow "One-Click Download" hyperlink)).

44. *Id.* at 4-5.

45. *Id.* (citing ZUO LIU, CHINA TAXATION (2007)); Shixing Yang, *Resources Tax Reformation Aims at Adjusting Tax Rate of 6 Mineral Resources*, CHINA TIMES (Feb. 14, 2012), http://chinatimes.cc/yaowen/hongguan/2012-02-24/28975.shtml.

fossil fuels.[46] A carbon tax levied on fossil fuels based on their carbon content avoids the aforementioned drawbacks. On one hand, it can give explicit price signals on carbon costs;[47] on the other hand, a carbon tax can cover most of the CO_2 emission sources.[48] A carbon tax might not only stimulate and strengthen China's efforts to develop a low carbon economy, but under increasing pressure from the international community, it might also provide a strong signal that China is now undertaking greater efforts to combat climate change and fulfil its international obligations.[49] Under increasing criticism both domestically and internationally, it is increasingly likely that the Chinese government will place a carbon tax much higher on its agenda as it appears that other measures and actions to deal with its GHG emissions at this point in time have received only limited international recognition.

The levying of an environmental tax has been on the Chinese government's agenda dating back as far as 2008.[50] As one of the key taxation policies that China has taken under consideration, the environmental tax proposal has been undergoing careful study and appraisal by the Ministry of Finance, State Administration of Taxation, and the State Environmental Protection Administration for some time.[51] There are three plans for the collection of environmental tax, which were proposed by Sun Gang and Xu Wen, two researchers with the Ministry of Finance, in their report published in November 2007.[52] The first plan, based on the principle of "pay according to profits," suggests that the government collect a tax from companies according to the amount they earn from their products that consume resources or pollute the environment.[53] It is obvious that this kind of general environmental taxation would be imposed across the corporate sector because almost all of their products consume resources.[54] According to the second plan, companies would pay a tax in accordance with how many pollutants they

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46. Xin Wang et al., *supra* note 28, at 5.

47. *Id.* (citing WILLIAM J. BAUMOL & WALLACE E. OATES, THE THEORY OF ENVIRONMENTAL POLICY (2d ed. 1998); NICHOLAS STERN, THE GLOBAL DEAL: CLIMATE CHANGE AND THE CREATION OF A NEW ERA OF PROGRESS AND PROSPERITY (2009)).

48. *Id.*

49. *Id.* (citing ZhongXiang Zhang, *The U.S. Proposed Carbon Tariffs and China's Responses*, 38 ENERGY POL'Y 2168 (2010)).

50. CHEN GANG, POLITICS OF CHINA'S ENVIRONMENTAL PROTECTION: PROBLEMS AND PROGRESS 150 (2009).

51. *Id.* (citing *Gov't Mulls Tax Plan for Environmental Protection*, CHINA DAILY (Jan. 7, 2008), http://www.chinadaily.com.cn/bizchina/2008-01/07/content_6374549.htm).

52. *Id.* at 150-51.

53. *Id.*

54. *Id.* at 151.

have discharged and the tax will target the discharge of sulfur dioxide, carbon dioxide, sewage, solid waste, and other forms of pollutants.[55] This plan is based on the "polluter pays" principle. The fees (or charges) that have been imposed on most of the discharges of sulfur dioxide and oxynitrides will be replaced by these taxes. The third plan is based on the "user pays" principle, which would ask consumers of potentially polluting products, such as fossil fuels, ozone-consuming commodities, fertilizers, and pesticides, to pay the environmental tax.[56] Although an environmental tax has been put on the government's agenda, it seems that there is still a long way to go. The Ministry of Finance indicated, meanwhile, that it prefers to raise the existing resource and consumption tax in order to give more consideration to environmental protection while adding new forms of taxes into the current taxation system.[57]

In this context, on September 23, 2009, the "official think tanks" proposed that the Chinese government should introduce a carbon tax within the next five years as it strived to move China away from reliance on dirty coal and to curb fast-growing carbon emissions.[58] The proposals came just hours after President Hu Jintao told a United Nations summit that China would "notably" cut its carbon intensity by 2020.[59] For years, the Chinese researchers had discussed the option of levying a tax on carbon emissions as part of efforts to cut pollution and wasteful energy use, but little progress had been made. However, the timing of the proposals, weeks before the Copenhagen conference to agree on a new climate change treaty, made it seem more likely the government would seriously consider levying carbon taxes.[60]

A Ministry of Finance research institute said levying a carbon tax was "a feasible way to curb significantly the use of coal and other fossil fuels, the main sources of emissions of carbon dioxide and other [GHGs]."[61] The institute noted concerns, however, that such a levy would depress economic growth and its introduction would be based on international and domestic economic conditions.[62] The institute

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55. *Id.*

56. *Id.* (citing *Gov't Mulls Tax Plan for Environmental Protection*, *supra* note 51).

57. *Id.*

58. Shi Jiangtao, *Think Tank Calls for Carbon Tax by 2013; Research Institute Linked to Ministry of Finance Puts Forward New Anti-Pollution Plan*, S. CHINA MORNING POST, Sept. 24, 2009, at 4.

59. *Id.*; *see also* Li Jing, *Hu Upbeat on Climate Deal*, CHINA DAILY (Oct. 22, 2009, 7:32 AM), http://www.chinadaily.com.cn/china/2009-10/22/content_8828416.htm.

60. Shi Jiangtao, *supra* note 58.

61. *Id.*

62. *Id.* It should be noted that these concerns were expressed well in advance of the economic crisis facing the Eurozone countries in October 2011 during the G20 summit in

suggested the tax could be introduced by 2013 after the government brought in a resource tax.[63] The institute's proposal suggested the tax should not be so high that it would become burdensome, and it should start at ten yuan per ton of carbon dioxide emitted.[64] The Chinese central government would get 70% of the carbon tax proceeds, and would spend most of that money on tackling pollution and climate change problems; local governments would get the remaining 30%.[65] Coal, China's biggest source of air pollution, accounts for 70% of the nation's energy consumption.[66] Academics and environmental groups urged the central government to impose energy and environmental taxes, including a tax on coal.[67]

Presently, there is a heated debate in China on whether it is necessary to levy a carbon tax. The advocates for the tax insist that carbon tax legislation is necessary to combat climate change and is a significant means of boosting energy savings and emission reductions.[68] However, the opponents assert that carbon tax legislation will burden commercial enterprises and will have detrimental effects on the competitiveness of many of them.[69] Moreover, they underline the fear

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Cannes, France, triggered by the imminent threat of Greece defaulting on its debt obligations and Italy facing political and economic uncertainty with the rumoured forced resignation of Prime Minister Silvio Berlusconi. *See* Catherine Viette, *Berlusconi Survives 51st Confidence Vote*, FRANCE 24 (Oct. 14, 2011), http://www.france24.com/en/20111014-italy-berlusconi-faces-confidence-vote-parliament-financial-crisis; *Berlusconi To Stand Trial on Prostitution Charges*, MACLEANS.CA (Feb. 15, 2011, 1:45 PM), http://www2.macleans.ca/2011/02/15/berlusconi-to-stand-trial-on-prostitution-charges/. These events, the continuing weakness of the U.S. economy and the forecasts that a full recovery from this global economic downturn could take as long as ten years, will have a profound impact on when a carbon tax in China might be introduced. *See* Michael Sivy, *How the U.S. Can Avoid a Lost Decade*, TIME: MONEYLAND (Dec. 6, 2011), http://moneyland.time.com/2011/12/06/how-the-U-S-can-avoid-a-lost-decade/.

63. Shi Jiangtao, *supra* note 58.

64. *Id.*

65. *Id.*

66. *Id.*

67. *Id.*

68. *See* Zitai Zhang, *Thinking About Legislation for Carbon Tax in China*, 2 L. SCI. MAG. 98, 98-99 (2010) (in Chinese, author's translation). For example, in June 2009, the Institute for Financial Science of the Chinese Ministry of Finance concluded that it is necessary for China to implement a carbon tax on the basis of learning the lessons and experience of implementing carbon taxes from other countries. Haili Cao, *Guesses of Implementing Carbon Tax in China*, CENTURY WKLY., Jan. 18, 2010, at 14 (in Chinese, author's translation). In the feasibility study report on Implementing Carbon Taxes in China issued by the Institute, it proposed that carbon taxes, as an effective policy tool to achieve energy saving and emission reduction as well as an efficient economic measure to protect the environment, should become one of the main policy instruments for combating climate change. *Id.*

69. For example, the director and researcher of the Urban and Environment Institute of the Chinese Academy of Social Sciences, Jiahua Pan, indicated that there were "incorrect points" in political, economical, and environmental aspects when implementing carbon taxes in China.

that carbon taxes may have a significant impact on the distribution of income.[70]

Others opposed argue that carbon taxes may have a significant impact on the Chinese economy due to its high costs in reducing GHG emissions.[71] Thus, developing countries, which are weaker in economic strength, cannot afford such heavy financial burdens without financial and technical support from developed countries. The research suggests that the Chinese government needs to impose taxes of 90.71 yuan per ton of carbon (yuan/tC) and 192.9 yuan/tC respectively if using the carbon taxes to fulfil the 5% and 10% emission reduction targets.[72] As a result, the production costs of all departments will increase. For example, the costs of the power industry will increase 5.78% and 12.07% respectively, the costs of the steel industry will rise 0.91% and 1.94%, and the costs of postal service and transportation will grow 0.128% and 0.263% respectively.[73] The total social cost can be reduced if the adjustment of the energy structure is in combination with the imposition of a carbon tax. For example, with the imposition of an 82.1 yuan/tC carbon tax, a switch of 1% of coal use to the use of natural gas instead will reduce the entire emission reduction target by 5% but will result in a decrease of resident welfare and GDP by 0.78% and 1.51% respectively.[74] The above data clearly indicates that the imposition of carbon taxes combined with adjustments in China's energy structure can have significant impacts across the whole economy.

Considering the problems and obstacles that may be encountered during the legislative process and the implementation of carbon taxes, it is necessary to analyse the necessity and feasibility of implementing these taxes in China.

Haili Cao, *supra* note 68, at 14; *see* Yiming Wei et al., *Suggestions and Solutions to Carbon Emissions in China*, 2 ADVANCES CLIMATE CHANGE RES. 15, 18 (2006) (in Chinese, author's translation). He considered that, in terms of politics, the Chinese still had not committed to specific emissions reduction targets; from an economic perspective, the enterprise tax burden in China had already been excessive. Haili Cao, *supra* note 68, at 14. In addition, levying carbon taxes cannot enable China to reduce carbon emissions definitely. He supplemented that if it was used to counter the carbon tariff proposed by developed countries, it would become "even incorrect." *Id.*

70. *See* Chuanxuan Li, *Legislation for Carbon Tax in the Context of Climate Change: Necessity and Feasibility*, 110 J. GANSU INST. POL. SCI. & L. 11, 14-15 (2010) (in Chinese, author's translation) (discussing the acceptability of the impact of a domestic carbon tax on the distribution of income).

71. *Cf. id.* (arguing that a carbon tax is a feasible way to control GHG emissions).

72. Yiming Wei et al., *supra* note 69, at 18 (citing Qiaomei Liang et al., Analysis Model on Regional Energy Demand and Emissions of CO_2 (2005) (unpublished manuscript)).

73. *Id.*

74. *Id.*

III. THE NECESSITY OF IMPLEMENTING CARBON TAXES IN CHINA

The case for implementing a carbon tax in China is far from settled and will inevitably be heavily influenced by events occurring in the global economy. Unlike Australia, which has just enacted into law a carbon tax to take effect on July 1, 2012 (amid vows from the Coalition opposition party to repeal this tax if it wins office in the next election),[75] China has much more to lose if the imposition of such a tax results in a loss of competitiveness amongst its trading partners. It accordingly will carefully take into account the positions adopted by other jurisdictions upon whom it depends to sustain its growing economy.

A. Carbon Tax Legislation as a Means of Improving the Current Mechanisms for Energy Saving and Emission Reduction in China

The current mechanisms with respect to energy saving and emission reduction in China are centrally driven, and mainly depend on the government. The central government outlines the proposed target, the target is then disassembled layer upon layer, supervised, and implemented by the government at all levels.[76] This structure lacks encouragement and initiative, which forces the responsible body to save energy and reduce emissions in a passive, as opposed to a creative, manner. It is feared that this kind of superincumbent mechanism will continue to have adverse impacts on the efficiency and effect of energy saving and emission reduction efforts.

Some commentators argue that in the context of a market-oriented economy, the government should more readily turn to economic means to stimulate energy saving and emission reduction.[77] Revenues raised by a carbon tax can be applied to encourage the enterprises to undertake their own initiatives to save energy and reduce emissions. It is postulated that when commercial enterprises are allowed to implement their own initiatives to save energy and reduce emissions, a kind of bottom-up dynamic concerning energy saving and emission reduction will emerge.[78] This anticipated psychological change at the grassroots level, in

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75. Ben Packham & James Massola, *Australia To Have Carbon Price from July 1, 2012, Julia Gillard Announces*, AUSTRALIAN (Jan. 23, 2012, 10:33 AM), http://www.theaustralian.com.au/news/gillard-to-reveal-climate-policy-today/story-e6frg6n6-1226011223441. The carbon tax legislation cleared the Australian Senate on November 8, 2011. Alison Rehn, *It's Official, Australia Has a Carbon Tax*, DAILY TELEGRAPH (Nov. 8, 2011, 6:16 PM), http://www.dailytelegraph.com.au/news/its-official-australia-has-a-carbon-tax/story-e6freuy9-1226188707768.

76. *See* Zitai Zhang, *supra* note 68, at 98.

77. *Id.*

78. *Id.*

conjunction with the government's determination to seriously embark on a program to realize significant energy savings and emission reductions in light of a deteriorating global economic outlook, remains problematic.

B. Carbon Tax Legislation: The Challenge of Potential Carbon Tariffs

As mentioned above, due to the anthropogenic climate change caused by GHG emissions and the commitments and obligations under the Kyoto Protocol, a number of jurisdictions have enacted or are considering enacting either cap-and-trade (CAT) or emissions trading schemes (ETS), such as the EU, or carbon taxes (for example, the Nordic countries).[79] Such regimes, however, have negative impacts on the competitiveness of domestic firms by imposing additional costs on domestic producers in contrast to foreign producers. As a response to concerns about this, some jurisdictions are considering leaking carbon emissions to other jurisdictions which have less stringent policies.[80] Another potential policy response to these concerns is a "carbon tariff," which has also been the subject of heated debate in recent years. The so-called "carbon tariffs" are defined here as any measures that impose "a levy on an imported good on the basis of either the CO_2 emitted in the production of that good specifically or on the CO_2 emissions or CO_2 emission reduction efforts of the producing country generally."[81] In short, it is a unilaterally-imposed trade-restrictive measure levied on goods and services imported from countries that do not have a domestic price signal.[82]

The American Clean Energy and Security Act of 2009[83] (ACESA), by a vote of 219 to 212, was passed by the United States House of Representatives on June 26, 2009, however, it did not pass in the U.S. Senate to become law.[84] According to the ACESA, a special CO_2 emission tariff, namely the so-called Border Tax Adjustments (BTAs), would be imposed on carbon emission-intensive products, such as: aluminum, steel, cement, and some chemical products that are imported

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79. *See* Paul-Erik Veel, *Carbon Tariffs and the WTO: An Evaluation of Feasible Policies*, 12 J. INT'L ECON. L. 749 (2009); *infra* Part IV.B.

80. Veel, *supra* note 79, at 749.

81. *Id.* at 750.

82. TIM WILSON & CAITLIN BROWN, INST. OF PUB. AFFAIRS, COSTLY, INEFFECTUAL AND PROTECTIONIST CARBON TARIFFS: WHY CARBON TARIFFS SHOULDN'T BE ADOPTED TO OFFSET THE COST OF CARBON 5, http://sustainabledev.org/wp-content/uploads/2009/12/Carbontariffs.pdf (last visited Mar. 27, 2012).

83. H.R. 2454, 111th Cong. (2009).

84. *H.R. 2454: American Clean Energy and Security Act of 2009*, GOVTRACK.US, http://www.govtrack.us/congress/bill.xpd?bill=h111-2455 (last visited Mar. 13, 2012).

from countries without quantitative emission reduction targets beginning in 2020.[85] In addition, in July 2008, the EU announced that as of January 1, 2012, internal and external flights to and from its airports would be added to the ETS, a scheme that forces polluters to buy allowances for CO_2 they emit above a certain cap.[86] All flights, regardless of the operator's nationality, taking off and landing in the EU would be affected, which involves more than 2000 foreign airlines.[87] From that point on, the airline companies would be responsible for the emitted GHG from their aircraft as long as it flies through EU's skies. This will affect dozens of airline companies in China as well as other airlines around the globe. It is estimated that Chinese airlines will have to pay 800 million yuan (US$87 million) to the EU for CO_2 emissions in 2012, potentially rising to three billion yuan (US$330 million) in 2020.[88]

With a proliferation of legislative measures to implement carbon tariffs, such measures are being scrutinized more often. For example, many developing countries believe that the EU aviation tax violates the principle of "common but differentiated responsibilities," one of the fundamental principles in the efforts to cut global carbon emissions, because the tax does not differentiate responsibilities between developing and developed countries.[89] Additionally, these measures are attracting increased scrutiny in terms of their compliance with international trade law.[90] As a major opponent of carbon tariffs, China criticizes the proposed tariffs on imports put forward by some developed countries as being inconsistent with the World Trade Organization (WTO) rules, claiming that "it is de facto protectionism in the name of environmental protection."[91] The spokesperson for the Chinese Ministry of Commerce said in 2009 that the carbon tariff proposal in the ACESA violates not only the basic norms of the WTO but also the principle of "common but

85. *See* H.R. 2454, §§ 185, 765.

86. Opinion, *EU's Carbon Control Aims at Emission Reduction Only?*, CHINA DAILY (May 18, 2011, 1:04 PM), http://www.chinadaily.com.cn/bizchina/2011-05/18/content_12533017.htm.

87. *Id.*

88. *Id.* China has indicated that it will refuse to pay the EU aviation levy. *Chinese Airlines Refuse To Pay EU Emissions Charge*, SYDNEY MORNING HERALD (Jan. 6, 2012), http://www.smh.com.au/travel/travel-news/chinese-airlines-refuse-to-pay-eu-emissions-charge-20120106-1pnpm.html.

89. Opinion, *supra* note 86.

90. *See* Veel, *supra* note 79, at 770-93.

91. *China: Carbon Tariff Could Trigger Trade War*, PEOPLE'S DAILY ONLINE (July 3, 2009), http://english.peopledaily.com.cn/90001/90778/90857/90861/6693060.html; *see also* David Stanway, *China Says "Carbon Tariffs" Proposals Breach WTO Rules*, REUTERS (July 3, 2009, 2:04 AM), http://www.reuters.com/article/2009/07/03/us-china-climate-idUSTRE5620FV20090703.

differentiated responsibilities" between developed and developing countries mandated by the Kyoto Protocol.[92] Thus, "[t]he carbon tariff will not help to reinforce the confidence of the international community on cooperation on tackling the financial crisis, nor will it help to consolidate the joint efforts by various countries on climate change negotiations."[93]

Currently, there are heated disputes on whether carbon tariffs violate the WTO rules. According to the General Agreement on Tariffs and Trade (GATT) article XX paragraphs (b) and (g), some countries assert that they may adopt policy measures that are inconsistent with GATT disciplines, such as carbon tariffs, but necessary to protect human, animal or plant life or health (paragraph (b)), or relating to the conservation of exhaustible natural resources (paragraph (g)).[94] Pascal Lamy, the Director-General of the WTO, when being interviewed by newspaper *Le Figaro* indicated that the WTO had given neither the green light nor the red light to carbon tariffs.[95] It appears, however, that it will not be easy to use the WTO rules to attack carbon tariffs.

Implementing carbon tax legislation may have a positive effect in dealing with the challenge of carbon tariffs. First, in addition to the domestic revenues raised, a carbon tax can encourage the domestic manufacturing industry to pay more attention to carbon emission reduction strategies. Furthermore, levying a carbon tax can render the WTO carbon tariffs issue moot, as double taxation violates the WTO rules.[96]

There is a further argument that the imposition of a carbon tax will allow the Chinese government to participate in international rulemaking more actively such as with the rules associated with the WTO that are now almost exclusively created by the developed countries.[97] As a developing country, China has to accept these rules passively. Progressive elements in China suggest that the Chinese government

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92. *Which Door Does "Carbon Tariff" Close?*, PEOPLE'S DAILY ONLINE (July 22, 2009, 4:24 PM), http://english.peopledaily.com.cn/90001/90780/91344/6707305.html.

93. *China: Carbon Tariff Could Trigger Trade War*, *supra* note 91.

94. *See* Veel, *supra* note 79, at 775-78.

95. *Lamy Indicates the WTO Has Not Opened the Green Light to Carbon Tariffs*, MINISTRY COMMERCE PEOPLE'S REPUBLIC CHINA (Sept. 14, 2009, 10:26 PM), http://www.mofcom.gov.cn/aarticle/i/jyjl/m/200909/20090906516209.html (in Chinese, author's translation).

96. *See* Veel, *supra* note 79, at 796-97.

97. *See* Zitai Zhang, *supra* note 68, at 99.

should change its thinking and learn to grasp the initiative when facing the upcoming era of green economy.[98]

C. Carbon Tax Legislation May Resolve the Negative Externality Problems Concerning Carbon Emissions

Carbon emissions are different in nature from general waste gas emissions and waste water discharges, whose adverse consequences will appear in a relatively short period and within a relatively defined area.[99] The pollutants generated by general waste gas emissions and waste water discharges are better understood and are more amenable to regulatory control in China through the imposition of administrative liabilities or charges, such as sewage charges, and/or civil liabilities, including civil compensation and ecological compensation.[100] In many cases, administrative liabilities and civil liabilities can be employed together. Experience has shown that these measures often resolve the negative externality problems of the discharge behaviour effectively.[101]

However, carbon emissions have long-term cumulative impacts and are not confined to a particular jurisdiction or area, which makes it difficult, if not impossible, to regulate in the absence of a complete ban (for example with respect to the production and use of chlorofluorocarbons (CFCs) in the context of the Montreal Protocol).[102] Thus, a more effective way to deal with the negative externality problems related to carbon emissions may be to impose a price on carbon in the form of a carbon tax.

IV. FEASIBILITY OF IMPLEMENTING CARBON TAXES IN CHINA

Notwithstanding the ongoing debate in China over the need for carbon tax legislation, there remains concern over whether or not the imposition of such a tax regime is feasible. In China, it is necessary to analyse both the "general foundation" and "special foundation" of carbon tax legislation before one can make any credible prediction as to the feasibility of its implementation. In this context, the general foundation means the fundamental conditions required for all legislation, such as the dissemination of concepts, the discussion of issues and concerns, and the

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98. *See* Linglin Zhi, *The Evolution of the Game Rules Behind Carbon Tariffs*, JIEFANG DAILY, Dec. 19, 2009, at 5, *available at* http://epaper.jfdaily.com/jfdaily/html/2009-12/19/content_277163.htm (interview with Professor Zitai Zhang, Fudan University).

99. *See* Zitai Zhang, *supra* note 68, at 99.

100. *Id.*

101. *Id.*

102. *Id.*

sufficiency of theoretical foundations to support it.[103] The special foundation refers to whether the particular obstacles or issues encountered in implementing carbon taxes can be eliminated or mitigated so that there is a reasonable feasibility of implementing the legislation.[104]

In the context of China, taking into account problems encountered by the developed countries in implementing carbon taxes, the main obstacles are likely to be its social and economic impacts and issues related to the stability of carbon tax income.

A. The Fundamental Conditions of Carbon Tax Legislation: Carbon Tax Legislation Appears To Have a Sufficient Theoretical Foundation

A carbon tax, as a type of environmental tax, offers a potentially cost-effective means of reducing GHG emissions.[105] From an economic perspective, carbon taxes are a type of Pigovian tax.[106] According to this theory, carbon taxes are levied on a market activity that generates negative externalities (environmental pollution) and are intended to correct the market outcome back to efficiency, namely internalizing the externality by imposing a carbon tax equal to the marginal social cost.[107]

The polluter-pays principle, which was proposed by the Environmental Committee of OECD in 1972, is also one of the theoretical foundations of carbon taxes.[108] According to this principle, the CO_2 emitter should pay for its emission behaviour. With the development and implementation of carbon tax legislation, the environmental right and obligation theory and the tax revenue justice theory have also become part of the theoretical foundation.[109]

1. The concept of the carbon tax has already been widely disseminated and the relevant issues and concerns about it have also been widely discussed. The concept was introduced into China at the end of the 1990s beginning with the consideration of the carbon tax system

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103. *See* Chuanxuan Li, *supra* note 70, at 14.

104. *Id.*

105. *See* Sujata Gupta et al., *Policies, Instruments and Co-Operative Arrangements*, *in* IPCC, CLIMATE CHANGE 2007: MITIGATION 745, 755-56 (Bert Metz et al. eds., 2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter13.pdf.

106. *See* Dieter Helm, *Economic Instruments and Environmental Policy*, 36 ECON. & SOC. REV. 205, 208-09 (2005).

107. *Id.*

108. *See* Chuanxuan Li, *supra* note 70, at 14; Ning Zhang, *The Necessity and Feasibility of Implementing Carbon Tax in China*, 398 CO-OPERATIVE ECON. & SCI. 100, 100 (2010) (in Chinese, author's translation) (discussing the related theory of carbon taxes).

109. Chuanxuan Li, *supra* note 70, at 14.

developed in the Nordic countries at that time.[110] In the face of increasing pressure to act on climate change and the introduction of green taxes, proposals for the introduction of a carbon tax have been raised more frequently in China over the last decade. This was reinforced in the context of the "Bali Roadmap" in 2007 leading up to the Copenhagen Climate Change summit conference in 2009, and the concept of carbon taxes has been widely discussed and disseminated across China.[111] At the same time, discussions of how to implement such taxes and their likely impact on energy saving and emission reduction have taken place gradually with interested segments of the public and within various legislative departments. Carbon tax legislation has been one of the most important issues in the discussion of a green tax system and the levying of environmental taxes since 2005.[112] Support from members of the public and government departments for carbon tax legislation is under consideration. *The National Climate Change Programme*, issued by the State Council in 2007, presented findings with respect to the application of using tax revenue to help combat climate change.[113] In addition, the Ministry of Environmental Protection and the Ministry of Finance are both actively carrying on research concerning carbon tax legislation.[114] All of this demonstrates that carbon tax legislation enjoys some degree of support to the point of at least exploring its potential impact on the social and economic fabric of Chinese society.

2. Theoretical research on carbon tax legislation has intensified. In the past, most of the research on carbon taxes in China was focused on the definition of concepts and the evaluations of research carried out by foreign countries, and was not focused on the specifics of the Chinese system.[115] In recent years, however, the relevant research has been much more comprehensive. Carbon tax legislation has become a mainstream issue for many research institutions resulting in valuable research outputs in increasingly large numbers.[116]

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110. *Id.*
111. *Id.*
112. *Id.*
113. *Id.*
114. *Id.*
115. *Id.*
116. *Id.*

B. Consideration of Carbon Tax Legislative Models from Other Jurisdictions

The Nordic countries began to levy carbon taxes earlier than other countries. For example, Finland, as the first country in the 1990s to introduce a CO_2 tax, initially collected this kind of tax with a few exemptions for specific fuels or sectors.[117] On January 1, 1991, Sweden enacted a CO_2 tax following Finland, imposing a tax of 0.25 Swedish krona per kilogram (US$100 or €72 per ton) on the use of oil, coal, natural gas, liquefied petroleum gas, petrol, and aviation fuel used in domestic travel.[118] Norway introduced a CO_2 tax on fossil fuels in 1991 as well.[119] In 1992, Denmark also issued a CO_2 tax, placing a tax of about US$14 per ton of CO_2 for households and US$7 per ton of CO_2 for business.[120] In 1999, Germany launched a program of ecological taxation reform including the reform of carbon taxes.[121] Italy also introduced carbon taxes in 1999.[122] Additionally, the U.K.'s Climate Change Levy Agreement was enacted in 2001, which was also part of its carbon tax regime.[123]

Apart from the European countries, Quebec became the first Canadian province to issue a carbon tax on energy producers starting in October 2007, and the revenue collected was used for energy-efficiency programs including public transit.[124] Later, in February 2008, the province of British Columbia in Canada announced its intention to implement a carbon tax of US$10 per ton of carbon dioxide equivalent

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117. *See* Ann Vourc'h & Miguel Jimenez, *Enhancing Environmentally Sustainable Growth in Finland* 15 (Econ. Dep't, OECD, Working Paper No. 229, 2000), *available at* http://www.oecd.org/dataoecd/21/10/1880843.pdf.

118. Amanda Min Chung Han, *Paying the Price of Emission*, ASIA-PAC. BUS. & TECH. REPORT (May 1, 2010), http://www.biztechreport.com/story/507-paying-price-emission; *see Carbon Taxes Raised To Tackle Climate Change*, LOCAL (Sept. 17, 2007, 6:54 PM), http://www.thelocal.se/8522/20070917.

119. INT'L ENERGY AGENCY, ENERGY POLICIES OF IEA COUNTRIES: NORWAY 39 (2005).

120. David Morris, *Green Taxes*, INST. FOR LOCAL SELF-RELIANCE, http://www.ilsr.org/ecotax/greentax.html (last visited Mar. 13, 2012).

121. Chuanxuan Li, *supra* note 70, at 11.

122. *Id.*

123. *See* Gildas de Muizon & Matthieu Glachant, *The UK Climate Change Levy Agreements: Combining Negotiated Agreements with Tax and Emission Trading*, *in* VOLUNTARY APPROACHES IN CLIMATE POLICY 231, 232 (Andrea Baranzini & Philippe Thalmann eds., 2004).

124. Mir F. Ali, *Carbon Credits vs. Carbon Tax*, NONPROFIT TECH. (Mar. 29, 2010), http://ngo-tech.blogspot.com/2010/03/carbon-credits-vs-carbon-tax.html.

emissions (CO_2e) (2.41 cents per liter on gasoline) beginning on July 1, 2008.[125]

It should be noted, however, that the current Canadian government is led by Stephen Harper, who was re-elected in 2011 on a platform directly opposed to carbon taxes and emissions trading schemes.[126] Moreover, Canada's Foreign Minister, John Baird, attended the Commonwealth Heads of Government Meeting in Perth, Australia, in late October 2011, where he stated that he did not believe that Canada would introduce a carbon tax or ETS, nor did he believe that the United States will introduce one, given the hostility of the U.S. Congress to both.[127] In Japan, there have also been extensive discussions,[128] although political and social instability resulting from the 2011 Fukushima nuclear disaster on top of a poorly performing economy will undoubtedly curtail enthusiasm for imposing a further tax at this time.

These experiences will provide valuable guidance for China while it contemplates what it might do over the coming years to curtail its own emissions and move towards a more sustainable future.

C. Social and Economic Implications of Carbon Tax Legislation

The social and economic implications of carbon tax legislation are important issues giving rise to heated debate (and in some cases hysteric debate) in almost every jurisdiction where such taxes or some form of ETS have been seriously considered. In some developed countries with a democratically elected system of government, the intention to introduce a carbon tax or emission trading scheme has led to electoral defeat of the government proposing it, or has claimed the scalps of its political leaders (sometimes at the hands of their own political parties).[129] As indicated

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125. *Id.*; Notice from Ministry of Small Bus. & Revenue, B.C., British Columbia Carbon Tax 4 (Feb. 2008), http://www.rev.gov.bc.ca/documents_library/notices/British_Columbia_Carbon_Tax.pdf.

126. *See* Myron Ebell, *Canadian Election Results: No Cap-and-Trade, No Carbon Tax*, GLOBAL WARMING.ORG (May 3, 2011), http://www.globalwarming.org/tag/canadian-elections/.

127. *See* Greg Sheridan, *Canada Blunts Carbon Tax Case*, AUSTRALIAN (Oct. 31, 2011), http://www.theaustralian.com.au/national-affairs/canada-blunts-carbon-tax-case/story-fnapmixa-1226180920686.

128. *See* Chuanxuan Li, *supra* note 70, at 11 n.1. Japan has considered carbon taxes in the context of its legislative agenda since 2004 and has commenced several rounds of discussions on the carbon taxes scheme proposed by the Ministry of Environment. *Id.* Although this scheme was renounced by the current government in 2009, the government is optimistic about the scheme's chances in the future. *Id.*

129. In Australia, for example, the elected Prime Minister, Kevin Rudd, was deposed by his own Labor Party in favour of his Deputy Prime Minister, Julia Gillard, two years into his first term, in part because he decided to postpone the introduction of an ETS in order to avert a further drop in the opinion polls. Nicholas Stuart, *Julia Gillard Stumbles Towards Electoral Disaster*,

above, other countries, including Japan, Canada, Ireland, and the United States, have virtually given up on the introduction of carbon taxes and ETSs at the national level due to both economic considerations and the open hostility of large segments of their voting constituencies.[130]

D. Economic Concerns

A domestic carbon tax has potentially important implications for a country's economy. First, levying carbon taxes will likely cause negative impacts on national economic growth, at least in the short to medium term.[131] As industries strive to adapt to a less carbon-intensive economy, prices will go up, and jobs may be lost as a country moves toward more sustainable forms of energy production. This is considered to be the necessary cost of the economic restructuring. After the transitional period, many reputable economists predict that the economy will recover and return to growth.[132] The difficulties faced by all countries contemplating such changes resulting from the imposition of such measures are that no one can predict with certainty (1) how long the transition will take, (2) whether or not a country's major trading partners will follow suit, (3) how much it will cost in both productivity and

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N.Z. LISTENER, Sept. 17, 2011, http://www.listener.co.nz/commentary/julia-gillard-stumbles-towards-electoral-disaster/. The leader of the opposition Liberal/National Party Coalition, Malcolm Turnbull, who supported Rudd's ETS against the wishes of his Party, was deposed in favour of the current leader of the opposition, Tony Abbott, who strongly opposes both a carbon tax and an ETS. Lenore Taylor, *Abbott Leaves Trail of Fumes as Senate Finalises Carbon Tax*, SYDNEY MORNING HERALD (Nov. 8, 2011), http://www.smh.com.au/national/abbott-leaves-trail-of-fumes-as-senate-finalises-carbon-tax-20111107-1n3yt.html. The current Prime Minister, Julia Gillard, campaigned in the August 2010 election, vowing that "there would be no carbon tax under any government she led." Stuart, *supra*. However, failing to win a majority, she entered into a formal coalition minority government with the Greens (who elected their first ever seat in the lower House of Representatives), and had the support of four Independents, and immediately reversed her position and committed her party to introduce a carbon tax without which she would not have secured the support of the Greens, who hold the balance of power in the Senate. *See id.* The carbon tax legislation was passed by Parliament on November 8, 2011, with the Coalition Opposition vowing to repeal it should they win office in the next election. Taylor, *supra*. The Coalition, as of January 2012, held a massive lead over Labor in the opinion polls. *See* Ross Fitzgerald, *Desperate for Short-Term Personal Survival, Gillard Makes Serious Error of Judgment*, AUSTRALIAN (Feb. 11, 2012), http://www.theaustralian.com.au/national-affairs/opinion/desperate-for-short-term-personal-survival-gillard-makes-serious-error-of-judgment/story-e6frgd0x-1226268016228; Dennis Shanahan, *Julia Gillard and Labor Flatlining with Voters: Newspoll*, AUSTRALIAN (Jan. 31, 2012), http://www.theaustralian.com.au/national-affairs/polling/julia-gillard-and-labor-flatlining-with-voters-newspoll/story-fnc6vkbc-1226257786926.

130. *See, e.g.*, Greg Sheridan, *It's Madness To Sacrifice Ourselves for Nothing*, AUSTRALIAN (Apr. 9, 2012), http://www.theaustralian.com.au/national-affairs/opinion/its-madness-to-sacrifice-ourselves-for-nothing/story-e6frgd0x-1226036215554.

131. *See* Chuanxuan Li, *supra* note 70, at 14.

132. *See, e.g.*, *id.*

growth terms, and (4) whether the public (particularly the voting public) is prepared to endure the cost over the longer term.[133]

Second, carbon taxes indeed have significant impacts on some energy-intensive industries. Generally speaking, higher energy prices will not lower the international competitiveness, which is inevitable from a long-term perspective, however, in certain energy-intensive industries, such as the power industry, the negative competitive effects of a unilateral carbon tax on domestic industries may be serious in the short term,[134] which has become the main obstacle for the introduction of carbon taxes.[135] Therefore, policy makers are constantly concerned with the negative impacts of carbon taxes, especially on energy-intensive industries, which are pillar industries in the national economy. Most countries have delayed or even given up their carbon tax schemes when strongly opposed by these energy-intensive industries.

This raises, in some cases, a serious dilemma for policy makers. One of the common methods of protecting the energy-intensive industries is to impose a lower tax on them or even to exempt these industries from carbon taxes.[136] For example, in countries such as Denmark, Norway, and Sweden, where carbon taxes have already been

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133. For example, in the context of the U.S. presidential election to take place in November 2012, it appears that it may be a relatively close contest between Barack Obama seeking his second term and his Republican challenger. Obama, who was unable to pass his environmental legislation through Congress when his party controlled both houses, is unlikely to risk alienating a large segment of the American people who are currently struggling with eight percent unemployment and the real possibility of slipping into a double dip recession as the result of slower than expected growth and the ongoing Eurozone crisis. *See* Sheridan, *supra* note 127; Chris Isidore, *A New Recession Seems Inevitable*, CNN MONEY (Feb. 24, 2012, 4:44 PM), http://money.cnn.com/2012/02/24/news/economy/double_dip_recession/index.htm. The Republicans, if they win office in 2012 or control either the House of Representatives or the Senate, are unlikely to allow passage of a carbon tax or ETS scheme.

The Australian government's newly enacted carbon tax legislation is predicated upon there being a global ETS in operation by the year 2016. *See* Select Committee on the Scrutiny of New Taxes, Senate of Australia, *Interim Report—The Carbon Tax: Economic Pain for No Environmental Gain* (2011) [22], *available at* http://www.aph.gov.au/Parliamentary_Business/Committees/Senate_Committees?url=scrutinynewtaxes_ctte/carbontax/interim_report/report.pdf. China, India, Canada, and the United States clearly indicated at the Copenhagen summit and subsequently that they were not prepared to sign up to a binding cap and trade ETS, leaving the prospect of a functioning global ETS regime in place by 2016 increasingly remote. *Id.*; *see also* Henry Ergas, *Lies, Deception and Carbon Tax*, AUSTRALIAN (Sept. 26, 2011), http://www.theaustralian.com.au/news/opinion/lies-deception-and-carbon-tax/story-fn7078da-1226146005701.

134. LUCAS ASSUNÇÃO & ZHONGXIANG ZHANG, *Domestic Climate Change Policies and the WTO* 15 (U.N. Conference on Trade & Dev., Discussion Paper No. 164, 2002), *available at* http://unctad.org/en/docs/osgdp164_en.pdf.

135. *Id.* (citing Jean-Philippe Barde, *Economic Instruments for Environmental Protection: Experience in OECD Countries*, *in* APPLYING MARKET-BASED INSTRUMENTS TO ENVIRONMENTAL POLICIES IN CHINA AND OECD COUNTRIES 31 (Org. for Econ. Co-operation & Dev. ed., 1997)).

136. *Id.* at 17.

implemented, energy-intensive industries are normally exempted from such taxes in part or even totally.[137] It can be seen from Table 1 that this has resulted in a large gap between effective and nominal tax rates. Furthermore, a carbon tax can be made more progressive with appropriate revenue returns. For example, if such taxes are not totally exempted, governments will refund tax revenues collected from environmental taxes to these industries in the form of subsidies for energy-saving investments and cuts in employers' social security contributions.[138] Another method is reducing other taxes (tax-shifting) to soften the impacts of added costs on these energy-intensive industries, which reflects the revenue-neutral principle.

Table 1: Effective and nominal tax rates (1998) in selected sectors in Sweden, Denmark, and Norway (ECU per ton of CO_2 emissions, 1 ECU=US$1.12)[139]

Energy products	Sweden (nominal)	Denmark (nominal)		Norway (nominal)
	Manufacturing Industry	Light processes	Heavy processes	Pulp/paper industry
Gas oil (heating)	20.9 (41.9)	11.2 (12.5)	3.1 (12.5)	9.9 (19.9)
Heavy fuel oil	18.8 (37.7)	11.6 (12.8)	3.2 (12.8)	8.8 (17.6)
LPG	20.2 (40.4)	11.5 (12.8)	3.2 (12.8)	0 (0)
Coal	21.5 (43)	11.9 (13.2)	3.3 (13.2)	23.4 (23.4)
Natural gas	19.3 (38.5)	11.3 (12.5)	3.1 (12.5)	0 (48.8)

137. *Id.*

138. *Id.*; *cf.* Andrea Baranzini et al., *A Future for Carbon Taxes*, 32 ECOLOGICAL ECON. 395, 409 (2000) (noting that empirical studies of carbon taxes have shown them to be generally regressive).

139. Baranzini et al., *supra* note 138, at 403 tbl.3.

This, to some degree, goes against the "polluter pays" principle and creates the impression amongst members of the public that they are being penalized while the polluting industries are permitted to carry on business as usual. Exempting polluting industries from such taxes does little to change their behaviour. On the other hand, by imposing the tax on such industries, it will be reflected in higher prices or lower production for those industries that are trade-exposed and competing against countries that have not imposed such taxes or have insulated their trade-exposed industries from them.[140]

If, on the other hand, compensation is offered to offset higher prices, as is being promised by the Australian government in order to ensure that the tax does not negatively impact a large segment of the population, it is hard to see how this will affect behaviour.[141] The underlying purpose of environmental taxes is to use price signals or increases to force changes in behaviour.

Third, as mentioned above, carbon taxes can weaken the international competitiveness of commercial enterprises. The main stumbling block to implementing carbon taxes is likely the potential impact on competitiveness. From the perspective of the firm level, competitiveness can be defined as "the ability of a firm to maintain or even increase international or domestic market share[] and profitability."[142] There are many factors affecting a firm's competitiveness, including "micro" factors (for example, cost structure, product quality, trademark or branding, service, and logistical networks) and "macro" factors (for example, exchange rates, trade rules, and political regime stability).[143] A firm's competitiveness can be influenced by carbon taxes through the change of its production costs.[144] As a kind of Pigovian tax, a carbon tax can provide incentives for innovation in

140. *See* Svetlana German, *Climate Change Legislation in Australia: Trade Exposed Industries Mounting a Strong Resistance*, CLIMATE LAW BLOG (May 3, 2011), http://blogs.law.columbia.edu/climatechange/2011/05/03/climate-change-legislation-in-australia-trade-exposed-industries-mounting-a-strong-resistance/.

141. *See* Richard Denniss, *In Australia's New Carbon Tax, A Host of Missed Opportunities*, ENVIRONMENT360 (Dec. 12, 2011), http://e360.yale.edu/feature/in_australias_new_carbon_tax_a_host_of_missed_opportunities/2475/.

142. ASSUNÇÃO & ZHONGXIANG ZHANG, *supra* note 134, at 15.

143. *Id.* (citing Richard Baron & ECON-Energy, *Economic/Fiscal Instruments: Competiveness* [*sic*] *Issues Related to Carbon/Energy Taxation* (Annex I Expert Group on the UNFCCC, Working Paper No. 14, 1997), *available at* http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD(97)190&docLanguage=En).

144. *Id.*

emissions reduction technology and practices.[145] However, from a short-term perspective imposing a carbon tax on an energy-intensive firm will increase its production costs with respect to less energy-intensive firms, which leads to a decline in competitiveness.[146] Not surprisingly, potential "losers" strongly oppose the levy of carbon taxes, and they even threaten to re-establish their business activities in countries that do not implement carbon taxes.[147]

One commonly used means to mitigate negative competitiveness effects on domestic industries is to establish border tax adjustments (BTAs).[148] According to the definition provided by the OECD and adopted by the GATT Working Party, BTAs are regarded as:

> [A]ny fiscal measures which put into effect, in whole or in part, the destination principle (i.e. which enable exported products to be relieved of some or all of the tax charged in the exporting country in respect of similar domestic products sold to consumers on the home market and which enable imported products sold to consumers to be charged with some or all of the tax charged in the importing country in respect of similar domestic products).[149]

The application of the destination principle means that products should be taxed in the country where they are consumed instead of where they are produced, unless these products are also consumed in the country where they are produced.[150] On the basis of this principle, a country can apply this kind of tax on its domestic energy-consuming industries for internal concerns to preserve its international competitiveness and tax imports up to the same level to preserve its domestic competitiveness.[151]

It is worth noting that a longstanding and unresolved debate is whether the process-based BTAs are in conflict with the GATT/WTO principles.[152] GATT article II(2)(a) provides that GATT's prohibitions on tariffs do not prevent a country "from imposing at any time on the

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145. For a discussion of Pigovian Taxes, see N. Gregory Mankiw, *Smart Taxes: An Open Invitation To Join the Pigou Club*, HARV. U. DEP'T ECON., http://www.economics.harvard.edu/files/faculty/40_Smart%20Taxes.pdf (last visited Mar. 14, 2012).

146. *See* ASSUNÇÃO & ZHONGXIANG ZHANG, *supra* note 134, at 15.

147. *Id.*

148. *See id.* at 17.

149. PETER VAN DEN BOSSCHE, THE LAW AND POLICY OF THE WORLD TRADE ORGANIZATION: TEXT, CASES AND MATERIALS 333 (2005) (quoting Report of the Working Party, *Border Tax Adjustments*, ¶ 4, L/3464 (Dec. 2, 1970), GATT B.I.S.D. (18th Supp.) at 97-109 (1972)); DUNCAN BRACK ET AL., INTERNATIONAL TRADE AND CLIMATE CHANGE POLICIES 75 (2000).

150. ASSUNÇÃO & ZHONGXIANG ZHANG, *supra* note 134, at 17.

151. *Id.*

152. *See* BRACK ET AL., *supra* note 149, at 75-90.

importation of any product . . . a charge equivalent to an internal tax . . . in respect of the like domestic product or in respect of an article from which the imported product has been manufactured or produced in whole or in part."[153] Therefore, a question is raised as to whether this provision permits a country that regulates GHG emissions to levy a border tax on imports from countries that do not regulate GHG emissions.[154] If the answer is no, then a country levying a carbon tax cannot seek to equalize competitiveness burdens through levying the same tax on products imported from countries that do not have such tax, thereby protecting its domestic industries from foreign competition that does not suffer such tax. Although the answer is still unclear, some carbon tax lobbies argue that imposing a border tax would encourage the levy of a carbon tax to be taken into account by other importing countries.[155] Even if the answer to the aforementioned question is yes, there are still some points that should be noted when considering imposing BTAs for carbon taxes. For example, it is necessary to distinguish energy products (e.g., coal, oil, and gas) from final products (e.g., cars and chemical products) when the products to be imported or exported are not the energy products themselves, but goods "whose production or distribution involves the use of taxed energy inputs."[156] However, there are complicated technical issues, making it difficult to quantify the accurate carbon content involved in almost all trade products.[157]

Another means to mitigate negative competitiveness effects would be the international harmonization of carbon taxes.[158] As most of the discussions noted above about the mitigation of negative competitiveness effects of carbon taxes on energy-intensive industries are restricted to a domestic level, the international perspective would become a new horizon.[159] Undoubtedly, a domestic carbon tax can achieve a domestic emission reduction target in a cost-efficient way.[160] However, domestic carbon taxes cannot achieve a global cost-efficient emission reduction target as long as CO_2 emissions are not "distributed among countries in such a way that the marginal cost of abatement is equalized among

153. General Agreement on Tariffs and Trade art. II(2) & (a), Oct. 30, 1947, 61 Stat. A-11, A-15, 55 U.N.T.S. 194.

154. SHI-LING HSU, THE CASE FOR A CARBON TAX: GETTING PAST OUR HANG-UPS TO EFFECTIVE CLIMATE POLICY 97 (2011).

155. *See id.*

156. ASSUNÇÃO & ZHONGXIANG ZHANG, *supra* note 134, at 18.

157. *Id.*

158. *Id.* at 19.

159. For further discussion of this problem from an international perspective, see *id.*

160. *See id.*

countries."[161] Global cost efficiency may be achieved through either an international carbon tax or a tradable carbon emission permits regime and herein lies the rub.[162] Although an international carbon tax seems to have more advantages than a domestic carbon tax in addressing global emission reduction targets, there are a lot of difficulties in implementing such a tax in practice. As Hoel has pointed out, on the one hand, a tax administrated and collected by an international agency would be too bureaucratic and the administration would interfere with state sovereignty; on the other hand, governments would allow for free riders, for example through reducing other domestic taxes on fossil fuels, to offset a carbon tax.[163] For these concerns, some scholars suggest that the international carbon tax can be globally imposed on each country by some international agency, but domestically administrated and collected by its central government.[164] If such an international carbon tax could be put in place, it will help to avoid complexities of applying BTAs among the countries imposing common international carbon taxes. However, in the current global context, while the harmonization of carbon taxes at the OECD and global levels seems to be theoretically the ideal solution, it is hardly a practical solution to mitigating competitiveness effects.[165]

In addition, the potential negative effects on competitiveness can also be mitigated if the introduction of carbon taxes is announced in advance, phased-in gradually, and increased over time.[166] This method can help to attenuate economic effects of the tax by avoiding unduly

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161. *Id.*; *cf.* Michael Hoel, *Efficient International Agreements for Reducing Emissions of* CO_2, 12 ENERGY J. 93 (1991) (discussing the disadvantages of uniform reduction agreements); Michael Hoel, *International Environment Conventions: The Case of Uniform Reductions of Emissions*, 2 ENVTL. & RESOURCE ECON. 141 (1992) (discussing the same).

162. The international community did not rise to the challenge of reaching consensus at the Copenhagen summit nor did it do so at the Cancun summit that followed. *See Main Goal of UN Climate Change Conference: Agreement on Successor to Kyoto Protocol*, CNTV (Nov. 30, 2010, 8:09 AM), http://english.cntv.cn/program/newsupdate/20101130/101972.shtml. It is even less probable that international consensus will be reached at the forthcoming summit in Durban, South Africa, to be held in November 2011, and thus the prospect for agreement on an international carbon tax or global ETS regime is virtually nonexistent. Moreover, surveys taken in many countries have shown that in the face of a continuing financial crisis now enveloping most developed and developing economies, combating climate change now ranks much lower on the priority scale than it did in December 2009. Press Release, GlobeScan, Climate Concerns Decline Since Copenhagen Summit: Global Poll (Dec. 2, 2010), http://www.globescan.com/news_archives/cancun_radar/Cancun_climate_release.pdf.

163. *See* Hoel, *Efficient International Agreements for Reducing Emissions of* CO_2, *supra* note 161, at 97.

164. *See* ASSUNÇÃO & ZHONGXIANG ZHANG, *supra* note 134, at 19.

165. *Id.*

166. *Id.* at 18.

early retirement of existing infrastructure and meanwhile "send a steady but strong price signal for a shift away from carbon-intensive choices."[167]

E. Social and Income Distribution Concerns

The impact of a domestic carbon tax on the distribution of income is a fundamental factor determining its acceptability.[168] It is known that carbon taxes reduce carbon emissions mainly through affecting the price of carbon energy. As a result, it raises the energy price, which will result in rising living costs which will have significant effects on low-income households. Because energy consumption is a rigid demand which cannot be replaced, most middle- and low-income households have to spend a larger percentage of their income on energy (such as gasoline, other fuels, and electricity) than higher-income households do. Therefore, "a carbon tax is expected to have a regressive impact on the distribution of income."[169] There are several studies and findings to support the above mentioned conclusion. For example, according to Smith's study, which calculates the distributional effects of a mixed carbon and energy tax on different income range groups in the United Kingdom, it can be seen from the results that the wealthiest 20% of U.K. households spend just an additional tax of £2.95 per week, whereas the poorest 20% of the population have to pay an additional tax of £1.45 per week.[170] If expressed as increases of tax paid as a percentage of total spending, these figures are equivalent to 0.8% and 2.4%, respectively.[171] Compared to the higher-income households, the percentage for low-income households is three times greater. Thus the public tends to take issue with carbon taxes which may lead to the rise of energy prices. Obviously, it will be unfeasible to implement carbon taxes without addressing this perceived obstacle properly.

Opinions concerning the distributive impacts of carbon taxes are different. On the one hand, carbon tax advocates consider that the effects of a domestic carbon tax on the distribution of income are relatively

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167. *Id.*

168. ZhongXiang Zhang & Andrea Baranzini, *What Do We Know About Carbon Taxes? An Inquiry into Their Impacts on Competitiveness and Distribution of Income*, 32 ENERGY POL'Y 507, 511 (2004).

169. *Id.*

170. Stephen Smith, *Distributional Effects of a European Carbon Tax*, *in* THE EUROPEAN CARBON TAX: AN ECONOMIC ASSESSMENT 49, 54 (Carlo Carraro & Domenico Siniscalco eds., 1993).

171. *Id.*

moderate.[172] For instance, in a literature review on this topic, Speck indicates that the distributive impacts on low-income households depend on the type of energy products being taxed (e.g., domestic energy and transport fuels), as well as the distribution of benefits from improved environmental quality among the population.[173] In Barker and Köhler's study, it appears that the overall weak regressive impact of carbon taxes is due to taxes levied on domestic energy (e.g., energy used for heating, cooking, lighting), rather than the taxation of transport fuels, because the latter has a weakly progressive outcome for most EU countries.[174] On the other hand, carbon tax opponents argue that the distributive impacts are not as weak as the lobbies' arguments, as most studies on this topic are based on developed countries, which cannot be generalized in developing countries.[175] Shah and Larsen argue that the incidence of carbon taxes in developing countries would be affected by institutional factors, including market power, price controls, import quotas, rationed foreign exchange, the presence of black markets and tax evasion, and urban-rural migration, which may make a difference to tax-shifting.[176] Considering the great resistance to the introduction of carbon taxes in developed countries[177] and the possible regressive distributional impacts on low-income households, it is necessary to seek efficient means to mitigate the potential regressive distributional impacts of a carbon tax.

One commonly used method to decrease the regressive distributional impacts of carbon taxes is setting a tax-free allowance for essential use of energy.[178] For example, the government could grant each household a tax-free energy allowance by imposing a tax on energy only above a certain floor. As some amount of energy is necessary to satisfy basic needs, which are rigid demands for each household, exempting a tax within this amount will not exert a burden on low-income households. If more energy above that floor is consumed, incentives for energy saving

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172. *See* ZhongXiang Zhang & Baranzini, *supra* note 168, at 511 (citing Stefan Speck, *Energy and Carbon Taxes and Their Distributional Implications*, 27 ENERGY POL'Y 659 (1999)).

173. *Id.* (citing Speck, *supra* note 172).

174. *Id.* (citing Terry Barker & Jonathan Köhler, *Equity and Ecotax Reform in the EU: Achieving a 10% Reduction in CO_2 Emissions Using Excise Duties* (Univ. of Cambridge, Envtl. Fiscal Reform Working Paper No. 10, 1998)).

175. *Id.* at 511 n.13 (citing Anwar Shah & Bjorn Larsen, *Carbon Taxes, the Greenhouse Effect, and Developing Countries* (The World Bank, Policy Research Working Paper No. 957, 1992), *available at* http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1992/08/01/000009265_3961003070355/Rendered/PDF/multi_page.pdf).

176. Shah & Larsen, *supra* note 175, at 8.

177. *Cf.* James Poterba, *Tax Policy To Combat Global Warming: On Designing a Carbon Tax*, *in* GLOBAL WARMING: ECONOMIC POLICY RESPONSES 71, 73 (Rudiger Dornbusch & James M. Poterba eds., 1991) (noting countries where carbon taxes have been adopted).

178. ZhongXiang Zhang & Baranzini, *supra* note 168, at 511.

will be provided through imposing a tax on energy progressively.[179] Such a scheme was introduced in the regulatory energy tax on small energy users in the Netherlands in January 1996 with a special consideration given to distributional concerns,[180] setting a tax-free allowance of 800 cubic meters per year for gas and of 800 kilowatts per hour for electricity to mitigate its regressive distributional impacts on low-income households.[181]

Apart from setting a tax-free allowance for essential use of energy, the regressive impacts of carbon taxes could also be reduced by using the generated fiscal revenues.[182] One possibility to compensate poorer households suffering from a carbon tax is through *ex post* lump-sum redistribution of carbon tax revenues to the people.[183] As discussed above, the amount of energy cost spent by low-income households account for a higher proportion relative to their income than high-income groups, thus they would proportionally receive a higher redistribution amount relative to their income than high-income groups, which would reduce regressive distributional impacts.[184] However, this method will lead to other negative impacts such as decreasing the scope for the revenues to be used to maximize the efficiency gains from reductions in other existing distortional taxes as well as causing negative effects on macroeconomic variables.[185] Another possibility to make carbon taxes progressive is by means of appropriate revenue return, such as using the generated fiscal revenues to decrease labour taxes, reduce income taxes, or change the social security system (e.g., an increase in housing benefits and social benefits based on means-tested benefits),[186] which reflects the revenue neutral principle. According to this principle, the total social tax burden will be kept in balance by transferring a portion of the tax burden from regressive taxes (such as individual income tax, social security tax and other tax burdens) to a tax on carbon emissions instead, which essentially reflects tax shifting.[187]

In addition, the income raised from carbon taxes can be used to subsidise the low-income households whose social welfare decreases in

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179. *Id.*
180. *Id.*
181. *Id.* (citing Wilfred Alblas, *Energy and Fiscal Reform in The Netherlands*, *in* APPLYING MARKET-BASED INSTRUMENTS TO ENVIRONMENTAL POLICIES IN CHINA AND OECD COUNTRIES, *supra* note 135, at 153).
182. *Id.*
183. *Id.*
184. *Id.*
185. *Id.*
186. *Id.*
187. Chuanxuan Li, *supra* note 70, at 14-15.

order to satisfy social justice concerns and enhance the legitimacy of carbon tax legislation, which can have a better result in terms of reducing regressive distributional impacts than lump-sum redistribution. Such measures, however, should be accompanied by a complementary redistribution policy targeting those social groups that do not benefit directly from such tax cuts, such as pensioners and the unemployed.[188]

All in all, the most important criterion in terms of assessing these above mentioned methods is that the efficiency gains can only be achieved by sacrificing the distributional neutrality of the package, which is an explicit trade-off between efficiency and equity.[189]

F. Stability of Carbon Tax Revenue

Maintaining the stability of tax revenue is a fundamental requirement of traditional tax legislation. Without the stability of tax revenue, the fiscal revenue sources cannot be ensured. This reflects the traditional function of tax revenue on raising fiscal revenue. In terms of carbon taxes, however, there are some problems concerning the stability of tax revenue. Due to the implementation of carbon taxes, the CO_2 emissions will decrease gradually, and the carbon tax revenue will decrease as well. It is the so-called "regressive problem."[190] Most countries are worried about the regressive problem of carbon taxes, which has a negative effect on the application of carbon taxes.

In the end, however, the regressive and the tax revenue stability issues must not be perceived as being directed more at income distribution to the detriment of reducing or curtailing emissions or there will not be the public support required to avert a political disaster for the particular government of the day.

V. CONCLUDING COMMENTS

In the post-Copenhagen era, a carbon tax may play an important role in combating climate change, implementing carbon emissions reduction, and boosting a low-carbon economy. It might also prove to be an effective measure in combating carbon tariffs. It is far too early, however, to suggest that China would be prepared to follow the example of Australia or some of the Nordic states in developing and implementing

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188. *See id.*

189. ZhongXiang Zhang & Baranzini, *supra* note 168, at 512 (citing Smith, *supra* note 170).

190. *See* Chuanxuan Li, *supra* note 70, at 15.

a carbon tax or indeed a cap and trade ETS in the absence of the United States, India, and other countries following suit.

The EU, which launched its emissions trading scheme in 2005, has witnessed a sharp decline in the price of EU allowances (as low as €6.90 per ton of CO_2 in early December 2011) attributable, in part, to the Eurozone sovereign debt crisis.[191] China, although experiencing relatively strong growth compared with OECD economies, has nevertheless seen recent evidence of a slowing economy amid rising inflation. Ominously, the looming threat of a double-dip recession across the Eurozone and a slowing of demand in both Europe and the United States will serve to encourage China to maintain its competitive edge in both production costs and its resistance to raising the value of its currency until such time as global economic recovery is assured.

President Obama, on his first state visit to Australia, only a few days after the passage of the Australian carbon tax legislation, would not commit to either a carbon tax or an ETS.[192] He made it very clear that global financial uncertainty necessitated a U.S. approach to reducing emissions through a program of direct action focused on emissions performance standards on vehicles and industry and not through a carbon tax or ETS. He also indicated clearly that the United States would not be part of any multilateral climate change agreement unless the emerging economies of China and India take similar decisive action to lower their emissions.[193]

In such circumstances, the likelihood of China, India, and other major emitting countries implementing a carbon tax and/or ETS will remain, in the opinion of these authors, extremely low.

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191. *See* Jay Maroo, *Can the EU Emissions Trading Scheme Survive Europe's Debt Crisis?*, RISK.NET (Dec. 5, 2011), http://www.risk.net/energy-risk/feature/2129803/eu-emissions-trading-scheme-survive-europes-debt-crisis#.

192. *See* Lauren Wilson, *China and India 'Must Cut Emissions,'* AUSTRALIAN (Nov. 17, 2011), http://www.theaustralian.com.au/national-affairs/carbon-plan/china-and-india-must-cut-emissions/story-fn99tjf2-1226197232667. By the United States' virtually ruling out the establishment of a global ETS by 2016, a fundamental assumption underpinning the Australian Treasury's modeling of the government's carbon tax legislation, the economic projections flowing from the tax have been seriously undermined strengthening both the Coalition's opposition to it and its vow to repeal it, if elected. *See id.*

193. *Id.*