Implementing Climate Protection in the Legal System of China

International, National Legal Framework and the Case of Road Transportation

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Abbreviations

ALLC	Administrative Licence Law of China
BAU	Business as Usual
CC	Constitution of China(Constitution of People's Republic of China)
CDM	The Clean Development Mechanism
CER	Certified Emission Reduction
CNCCP	China's National Climate Change Programme
COE	Certificate of Entitlement
COP	Conference of the Parties
CCS	Carbon Capture and Storage
EB	The Executive Board
ECL	Energy Conservation Law
ET	Emissions Trading
GHG	Greenhouse Gas
HLC	Highway Law of China
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
KP	The Kyoto Protocol
LLC	Legislation Law of the People's Republic of China
LRTS	Law of People's Republic of China on Road Traffic Safety
NDRC	The National Development and Reform Commission
NPC	National People's Congress
NPCSC	National People's Congress Standing Comittee
OECD	Organisation for Economic Co-operation and Development

QMANE	Regulation Regarding the Qualifications of Manufacturers for Automobiles Powered by New Energies
R&D	Research and Development
RELC	Renewable Energy Law of China
RRTS	Regulation of Road Transportation in Shanghai
SCPC	Standing Committee of the People's Congress
UNDP	United Nations Development Programme
UNESC	Convention of the United Nations on Economic, Social and Cultural Rights
UNFCCC	The United Nations Framework Convention on Climate Change
VQS	Vehicle Quota System

A. Introduction

Climate change is impending. There is a substantial scientific consensus that climate change is a real and present threat to humans and other species.[1] Moreover, a growing body of anecdotal evidence accumulated shows that climate change is already underway.[2] Thus, international and national climate policy concerns not only the mitigation of greenhouse gases (GHG), but also adaptation to climate change.

Although the United Nations Framework Convention on Climate Change (hereafter referred as "UNFCCC") has gained certification of more than 190 countries (including the USA) and the Kyoto Protocol (hereafter referred as "KP") came into force in 2005, there is so far no sound reason to be optimistic about the future of climate protection. On the one hand, the USA, the biggest greenhouse gas emitter, has not made any commitments of quantity mitigation. On the other hand, the increase of GHG from developing countries, in particular, from India and China, is becoming more and more serious. Quickly industrializing countries such as China and India have become one of the topics of the future climate protection law. Due to rapid economic development and huge populations in these countries, the international climate policy cannot be successful without their active participation. According to Article 4.1(a) UNFCCC and Article 3 KP, both developing countries and developed countries should bear the obligation to take measures to protect the climate. Therefore, the question is not "should developing countries take measures to protect the climate?", but rather "how should developing countries take measures to protect the climate and how should they adapt to climate change?" This question involves not only the international climate legal system, but also national and local legal systems. On the one hand, international climate protection treaties should provide the corresponding institutions and mechanisms with the ability to promote effective participation of developing countries in climate protection; on the other hand, the developing countries should take appropriate domestic measures on a national and local level to implement the international treaties.

On an international level, the key question is concerned with the type of commitments of developing countries in international climate treaties. The voluntary, non-binding

[1] *IPCC*, The Forth Assessment Report(Synthesis Report), Topic 1, p.1.
[2] *IPCC,* Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on ClimateChange, p.747-940.

commitments of developing countries regarding GHG mitigation in the present international climate agreements are assumed as insufficient for the reaching of the climate protection objectives that are provided in Article 2 UNFCCC.[3] Yet while developed countries rank environmental effectiveness and economic efficiency higher than equity, developing countries rank equity of climate agreement higher than environmental effectiveness and economic efficiency. As far as the issue of participation of developing countries in the international climate protection cooperation is concerned, their most important concern is equity of climate convention. There are many arguments for equity from perspectives of developing countries, among which "equal rights to GHG emissions" is one strong normative argument. This argument is consistent with the basic principle of climate protection anchored in the UNFCCC and the right to equality in the international human rights conventions. However, a lopsided interpretation and application of such rights-based arguments may make equity and environmental effectiveness a difficult knot to untie in the case of commitments of developing countries. It needs no further argument for the developed countries — especially the USA— should assume legally binding mitigation commitments at first. However, for the effective participation of developing countries in GHG mitigation, it is necessary to provide an impartial interpretation of equity and to apply equity in an appropriate way to deal with the tense relationship between equity and environmental effectiveness. Only with an impartial interpretation of equity, can the design of commitment modes of developing countries be persuasive.

More importantly, the commitments of developing countries in the international climate conventions should be implemented within the national legal systems. Furthermore, only these commitments that can be implemented in the national legal system of a country should be assumed by this country in the international climate convention. It is important to investigate any potential implementations of climate protection in each country's national legal system, since the specific situation between developing countries differs vastly.

As the largest developing country, China plays an important role in climate protection. China is the world's second largest GHG emitter. Without corresponding regulations on GHG emissions, the increase of GHG in China will make climate protection impossible to achieve. However, the effective implementation of climate protection in its legal system is a great challenge for China. The state is confronted with other legal and political duties, such

[3] *Höhne et al.,* Evolution of Commitments under the UNFCCC: Involving Newly Industrialized Economies and Developing Countries, p.8.

as the provision for the peoples' basic needs, serious environmental problems directly related to the public health and energy security. Dealing with the relationship between climate protection and other state duties is a new subject, which requires detailed study from case to case. In addition, although equity has become the most important concern of China in the negotiation of international climate agreements, the inequality of GHG emissions between the rich and poor classes within China has been overlooked in the national legal system up to now.

Taking road transportation as an example, integrating climate protection in the regulations of road transportation will require the reconsideration and reform of existing regulations, as well as the introduction of new ones. China is in the process of rapid motorization, which brings about not only an increase in GHG emissions, but also serious problems such as energy security, environmental pollution, and traffic congestion. Meanwhile, the automobile industry is set as a pillar industry by the government and the peoples' basic mobility needs must be fulfilled. Road transportation regulation has been an area full of dispute in the last few years. The ban on electrical bicycles and the vehicle quota system in Shanghai have aroused heated discussion within the public. The state is confronted with interwoven policy aims and conflicting interest groups, which is a great challenge for the implementation of climate protections in road transportation, especially for a country like China with a population of 1.3 billion populations. In addition, due to the strong influences of the automobile industry and relatively rich groups on public decision-making, the equity principle of climate protection, which the Chinese government strongly advocates in the international climate agreement negotiations, has in practice not been effectively implemented in the regulation of road transportation in practice.

The aim of this thesis is to discuss the legal questions regarding the implementation of climate protection within the legal system of China with special emphasis on the regulation of road transportation. Climate law contains two important areas, one being "mitigation" which concerns the controlling and reduction of GHG emissions, and the other being "adaptation" which refers to adaptation to climate change. This thesis focuses on mitigation. It begins with the commitments of developing countries in the international climate agreements. After reviewing the current commitments(Part B), it analyses commitments of developing countries in future international climate treaties from the perspective of equity(Part C). Part D is devoted to general legal questions concerning implementation of climate protection in the national legal system and surveys briefly on legislations directly related to climate protection.

The last three chapters (Part E, F, G) are centred upon specific legal questions with respect to implementing climate protection in road transportation regulations.

B. The International Legal Framework of Climate Protection and the Participation of Developing Countries

This chapter presents the current international climate legal framework with a special focus on the commitments of developing countries in international climate agreements. Discussion of developing countries' participation in international climate protection begins with the UNFCCC (Section I). It is then followed by a review of the Kyoto Protocol (Section II). After the introduction of the international climate agreements, the remaining problems with the Kyoto Protocol are discussed (Section III).

I. The Interests and Commitments of Developing Countries in the UNFCCC

The provisions of the UNFCCC can be divided into the following categories: manifesto, objectives, principles, obligations, institutions and procedures. The interests of developing countries are appropriately upheld in the common but differentiated principle and in the structure of the obligations of the UNFCCC.

1. The Principle of Common but Differentiated Responsibility in the UNFCCC

a) The Principle

Articles 3.1, 3.2 of the UNFCCC put forth the principle of common but tdifferentiated responsibility as follows:

> "In their actions to achieve the objective of the Convention and to implement its Provisions, the Parties shall be guided, inter alia, by the following:
> 1. The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.
> 2. The specific needs and special circumstances of developing country Parties, especially those, which are particularly vulnerable to the adverse effects of climate change, and of those

> Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration."

This principle is also consistent with principle 7 of the Rio Declaration and is reiterated both in the preamble to the UNFCCC (paragraphs 3 and 18) and in Article 4.2(b) of the UNFCCC, which maintains that since the developed countries are the main contributor to climate change, they should assume the main responsibilities in climate protection. Pursuant to this principle, all parties should take responsibility in protecting the climate and promoting sustainable development, but countries should shoulder different concrete responsibilities. The developed countries are required to take the lead in combating climate change and its effects.[4]

b) Justifications for the Common but Differentiated Responsibility

The principle of common but differentiated responsibility is formed on the basis of the following principles of obligation distribution.

The principle of "Equity" means that all humans have equal rights to the benefits of the global commons.[5] As a global commons, the atmosphere is to be equally distributed to all human beings. The developed countries have historically and also nowadays discharged much more GHG emissions than developing countries. Thus, the developed countries should take leadership in fighting against climate change and be the first to reduce GHG emissions.

The principle of "Reason" means that those countries which have created a problem have the responsibility to solve it and make amends. The Annex I countries are the main contributors towards climate change and therefore should bear the main responsibility.

The principle of "Capacity" means that those countries with more resources should shoulder common burdens more heavily.[6] Since they possess major technological and financial resources, the developed countries should bear the main obligations for climate protection.

The principle of "Need" means that if there is a resource to be shared, priority should be given to those who are most in need.[7] For developing countries, GHG emissions help to fulfill

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[4] *Hunter, Salzman and Zaelke*, International Environmental Law and Policy, p.358.

5 *Kartha/Athanasiou, et al.* , Cutting the Knot :Climate Protection, Political Realism and Equity as Requirements of a Post-Kyoto Regime, p.12, available at: http://www.ecoequity.org/docs/CuttingTheKnot.pdf

[6] *Ibid.*

[7] *Ibid*.

the basic needs of their people, which differ greatly from the emissions for the sake of the luxury needs in developed countries. In addition, the most damaging effects of climate change are predicted to appear in the developing countries, since developed countries are far less vulnerable due to their superior technical and financial capacities, and are less reliant on natural resources as sources of income.[8]

c) The Structure of the Commitments of the UNFCCC: the Asymmetry of the Commitments for Climate Protection

The principle of common but differentiated obligations is not only directly written into Articles 3.1 and 3.2 UNFCCC, but is also embodied in the concrete commitment structure of the UNFCCC. The Parties are classified into three groups: Annex-I , Annex-II and Non-Annex Parties. The commitments in the UNFCCC can be divided into general and specific commitments.[9] On the one hand, all parties take general commitments; on the other hand, different groups of parties take different specific commitments.

aa) The General Commitments

The general commitments are applicable for all parties. They have been continually revised and weakened due to the arguments of developing countries based on their development rights in the process of negotiation.[10] As a result, the following general commitments are written into the UNFCCC (Article 4.1a-j). These important commitments include:

-the development of national inventories of anthropogenic GHG emissions and the removals by carbon sinks

-the elaboration and implementation of national and regional programmes containing measures to mitigate and facilitate adaptation to climate change

-the promotion of the sustainable management of sinks and reservoirs

-the cooperation in preparing for adaptation

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[8] *Verheyen*, Climate Change and International Law, p.71.

[9] *Verheyen* ,Climate Change and International Law, p.89.

[10] *Hartenstein,* warum der Erdgipfel von Rio folgenlos blieb- Wege für eine Überlebensstrategie, in: *Brauch, Günter* (Hrsg.), Klimapolitik: naturwissenschaftliche Grundlagen, internationale Regimebildung und Konflikte, ökonomische Analysen sowie nationale Problemerkennung und Politikumsetzung, 225-234.

-the promotion and the cooperation in the integration of climate policy considerations into other policy areas and international co-operation in related fields (science, technology, education etc.)

-a report on inventories and relevant policies and measures (Articles 4.1 and 12 UNFCCC).

bb) The Specific Commitments

The specific commitments are different for Annex countries and Non-annex countries: While the Annex countries have a specific obligation to reduce their GHG emissions, the Non-Annex countries are not required to do so at the same time. The specific obligations of Annex I countries also differs from those of Annex II countries: Annex I countries are obliged to reduce GHG emissions (Articles 4.2); in addition to reducing GHG emissions, the Annex II countries are obliged to provide financial assistance and technological support for developing countries (Article 4.3 and 4.4). The classification of countries, with corresponding responsibilities, is as follows:

> *"Annex I Parties* – These are mostly the developed countries, of which there are currently 41, including the European Community which is a Party in its own right, encompassing both the countries that were members of the Organization for Economic Co-operation and Development (OECD) in 1992, and countries with "economies in transition" (EITs). Annex I countries were aiming to return their emissions by 2000 to 1990 levels. They also have to make regular reports on their implementation of the Convention – in particular, on the policies and measures they are taking and the impacts that these are having on emission trends, as well as on the amount of greenhouse gases released into the atmosphere.
>
> *Annex II Parties* – These are an Annex I subset – the 24 highly developed countries. In addition to reducing their own emissions they are also required to financially and otherwise support the efforts of the developing countries.
>
> *Countries with economies in transition (EITs)* – There are 14 of them. These are mostly countries of Eastern and Central Europe and the former Soviet Union, eight of which are now members of the European Union. They are listed in Annex I, but they do not have the additional obligations of the Annex II Parties.
>
> *Non-Annex I Parties* – All Parties that are not included in either Annex. They are mostly developing countries. Like all Parties to the Convention they have general commitments to respond to climate change but they have fewer specific obligations and should also be able to rely on external support.

They are also required to provide a general description of steps taken or envisaged to implement the Convention and estimate emissions of greenhouse gases."[11]

2. No Mitigation Commitment for Developing Countries?

Article 4.2 (a) (b) UNFCCC stipulates the mitigation commitment: "Each of these Parties shall adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs". The aim of this mitigation commitment is first to return " individually or jointly to their 1990 levels these anthropogenic emissions of carbon dioxide and other greenhouse gases not controlled by the Montreal Protocol"[12]. It is apparent that Article 4.2 only applies to Annex I countries. Can one perhaps arrive at a conclusion from this that according to the UNFCCC, developing countries have no mitigation commitment?

"Mitigation commitment" or "reduction commitment " are widely used terms in the relevant literature but they are given different meanings in different cases. There are four groups of mitigation commitments: an absolute mitigation commitment, a relative mitigation commitment, a quantity mitigation commitment and an intensity mitigation commitment. An absolute mitigation commitment is one that seeks to reduce the GHG emissions to a level lower than the present level or a certain historical level. A relative mitigation commitment is one which takes measures to keep GHG emissions at a level lower than the business-as-usual level, but not necessarily lower than the present level or a certain historical level. A quantity mitigation commitment is usually understood as an absolute mitigation commitment. An intensity mitigation commitment is one attempting to reduce the GHG emissions per GDP. It can be an absolute or a relative mitigation commitment depending on its rigorousness.

According to Article 4.2(a) UNFCCC, the developed parties and other parties included in Annex I "shall adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs". Article4.2 (b) UNFCCC further stipulates the concrete commitment: returning individually or jointly to 1990 emissions levels. The mitigation commitment in Article 4.2 is absolute. The developing countries are exempt

[11] *UNFCCC,* The First Ten Years, p.16-17.
[12]Article 4.2(a) of the UNFCCC.

from this commitment in Article 4.2 UNFCCC, but they have made the commitments in Article 4.1 UNFCCC. Sections 4.1 (b) and (c) UNFCCC can be interpreted as the provision of mitigation commitments for all parties, including the developing parties, as it states that all parties commit themselves to "formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions" and to "promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases". *Metz* provides an explanation of the effective mitigation commitments taken by the developing country parties from the perspective of the objective of the Convention: if developing country parties will not take any effective mitigation measures, the objective as stated in the Convention in Article 2 of the UNFCCC will not be reached.[13] However, in contrast to the further concrete stipulation in Article 4.2 of the industrialized country parties' mitigation commitment, the developing parties' mitigation commitment is confined only to Article 4.1 UNFCCC. Furthermore, the UNFCCC requires that the mitigation policies and measures taken by the industrialized parties will "demonstrate that developed countries are taking the lead in modifying longer-term trends in anthropogenic emissions consistent with the objective of the Convention"[14] and that the developed country parties in Annex II provide the financial and technological transfer for the developing parties to "enable them to implement the provisions of the Convention."[15]

Developing countries cannot therefore shield themselves from any effective mitigation commitments.[16] On the other hand, developing countries will be able to rely on the principle of common and differentiated responsibility, to make their obligations (including mitigations obligations) contingent upon the fulfillment of the financial and technological transfer obligations and the leadership of the industrialised country parties. This means the industrialised country parties should be the first to reduce GHG emissions and provide corresponding financial and technological support when arguing that the developing country parties should take mitigation obligations.[17]

[13] *Metz et al.* , 2 Climate Policy(2002), p.211.
[14] Article 4.2(a) UNFCCC.
[15] Article 4.5 UNFCCC.
[16] *Verheyen*, Climate Change Damage and International Law, p.84.
[17] *Ibid.,* p.84.

3. The UNFCCC as the Normative Foundation for International Climate Protection Cooperation

The UNFCCC was adopted in 1992 in Rio de Janeiro and has been ratified by the vast majority of states (including USA). It is considered as the one that provides institutional framework for the international climate protection.[18] It stipulates the objectives, basic principles, obligations, institutions and procedures for international climate protection cooperation. The periodic meetings of the Parties to UNFCCC — the so-called Conferences of Parties (COP) — provide the organizational basis for further development of international climate agreements.

However, the UNFCCC is viewed only as a declaration of the intentions of dealing with the climate-change problem in the future,[19] as it lacks legally binding specific obligations for the participating parties. Both the general commitments for all parties and the specific commitments for the Annex-Parties lack legally binding effects.[20] Though the commitments to return the emissions of the Annex-Parties by 2000 to 1990 levels are written into the UNFCCC, the formulation are carefully indirect.[21] According to UNFCCC, Annex I Parties shall adopt national policies "recognizing that the return by the end of the present decade [1990's] to earlier levels of emissions […] would contribute to the modification of long term trends" (4.2(a)). Annex I parties shall *report* information on these policies and measures "with the aim of returning individually or jointly to their 1990 levels" (4.2(b)).[22] In addition, there are no specific measures in the UNFCCC to deal with non-compliance. In fact, most Annex-Parties had not returned its emissions by 2000 to the 1990 levels.

In spite of the weaknesses of the UNFCCC, it is the international environmental agreement with the widest participation at present. All important parties required for climate protection — including the USA—have certified the UNFCCC. Therefore, the basic principles, procedures and institutions in the UNFCCC should be viewed as the normative foundation and criteria in any discussion relating to further agreements. The contents of UNFCCC are not

[18] *Böhringer and Finus*, The Kyoto Protocol: Success or Failure? In: Climate-Change Policy, *Dieter Helm(ed.)*, pp.341-380.
[19] *Ibid.*, pp.341-380.
[20] *Höhne et al.,* Evolution of Commitments under UNFCCC: Involving Newly Industrialized Economies and Developing Countries, pp.3-6.
[21] *Ibid.*
[22] *Ibid.*

clear and specific, but they do provide the basic normative and institutional foundation for the negotiation of clear, specific agreements.

II. The Kyoto Protocol and the Participation of Developing Countries in Climate Protection through CDM

1. The Kyoto Protocol and the CDM

Dispite the fact that the UNFCCC has made clear that the parties should bear responsibility in taking measures to fight against climate change, there is no timetable for specific, measurable obligations. On the third meeting of the parties of UNFCCC in Kyoto the Kyoto Protocol was agreed upon. On 15 Feb. 2005 the Kyoto Protocol came into effect after the ratification of Russia. The Kyoto Protocol stipulates that the parties included in Annex I to the UNFCCC should reduce to at least 5.2 percent below the 1990 levels in the commitment period from 2008 to 2012, but reduction obligations vary among Annex-I parties as stipulated in Annex B to Protocol.[23] There are no obligations on emission limitation for the developing countries, but the general commitments in the UNFCCC are reiterated by the Kyoto Protocol.

In order to lower the overall costs of achieving the emissions targets of Annex I parties, the three so-called Kyoto Protocol Mechanisms, ET (emissions trading) JI (joint implementation) and CDM (clean development mechanism) are introduced. CDM is an arrangement under the Kyoto Protocol(Article 12 KP) allowing industrialised countries with a greenhouse gas reduction commitment (the Annex I countries) to invest in emission reducing projects in developing countries as an alternative to more costly emission reductions in their own countries.[24] According to CDM, the developed countries listed in Annex I of the UNFCCC can claim the resulting Certified Emission Reductions (CERs) by investing in greenhouse gas (GHG) emission reduction projects in developing countries. Such CERs can relieve the corresponding quantity of reduction commitments of the investing country.[25]

[23] *Rübbelke,* International Climate Pocily To Combat Global Warming: An Analysis of the Ancillary Benefits of Reducing Carbon Emissions, p.2.
[24] *UNFCCC,* The First Ten Years,pp.16-17.
[25] *World Bank*, Clean Development Mechanism in China: Taking a Proactive and Sustainable Approach ,September 2004, p.3.

The objective of CDM is not only to assist Annex I Parties "in achieving compliance with" their quantified targets under Article 3 KP, but also to assist developing countries in achieving sustainable development, while also contributing to the stabilization of greenhouse gas concentrations in the atmosphere.[26] The establishment of CDM can be traced back to the proposal advocated by Brazil for a Clean Development Fund in May 1997.[27] Due to the suggestion and insistence of USA, Annex I parties agreed upon adopting CDM as a way to promote participation in the climate cooperation rather than establishing a new financial institution like the Multilateral Fund for the Implementation of the Montreal Protocol to protect the Ozone Layer.[28] The CDM was also accepted by developing countries because they hoped to exercise more influence in a new institution.[29] Various parties saw the CDM as a vehicle for providing developing countries with an access to environmentally sustainable technology, receiving increasing foreign direct investment, and contributing directly to achieving the long-term objective of the UNFCCC.[30]

2. The Basic Rules of CDM

Although CDM, ET and JI are classified as the three flexible mechanisms of the Kyoto Protocol, the institutional basis of CDM is different from ET and JI. ET and JI belong to the "cap-and-trade" system, which means that trading is between the parties which are first to obtain quantitative emissions allowances. Unlike the ET and JI, CDM is not a trading of emissions allowances, but a trading of Certified Emission Reduction, which is based on the "baseline-and-credit" system. Because developing parties as CER sellers are not confined to emissions caps, the CER is calculated by the difference between the emissions of a CDM project and the emissions baseline in the case of business as usual (BAU). Therefore, CDM transactions do not contribute to a net reduction of global GHG emissions. And because of the credibility risk associated with the CDM, it is necessary to establish corresponding legal criteria and procedures to ensure that it can contribute to GHG control.

[26] *World Resources Institute*, How Much Sustainable Development Can We Expect from the Clean Development Mechanism, pp.1-2.
[27] FCCC/AGBM/1997/MISC.1/Add.3, pp.3-57.
[28] *Oberthür/Ott*, The Kyoto Protocol: International Climate Policy for the 21st Century, pp.165-168.
[29] *Oberthür/Ott*, The Kyoto Protocol: International Climate Policy for the 21st Century, p.168.
[30] *Michaelowa*, International Environmantal Agreements 7, pp.17–34(2007).

a) The Process of CDM

As an emissions trading system based on "Baseline-and-Credit", CDM has more credibility problems than ET and JI. Corresponding procedures should therefore be introduced to ensure that the CDM stays consistent with its objective. The procedures for a CDM project are as follows:[31]

> **Project design:** The project proponent must describe the project in a Project Design Document (PDD). Requirements include: approval by host country as contributing to sustainable development and demonstration of additionality. Moreover, if the project uses a *new* methodology for calculating baselines, it must be submitted for approval to the methodology panel before the project may be validated.
> **Validation:** An independent consultant (a designated operational entity) accredited by the EB reviews the PDD and certifies that it meets the requirements as set out by the EB.
> **Registration:** The EB reviews the project and, if all is in order, formally registers it as a CDM project.
> **Monitoring:** The project activities and results must be monitored on an ongoing basis according to the plan submitted in the PDD.
> **Verification/certification:** A DOE verifies through the monitoring process, and by an ex-post review, that the project met certain mitigation goals. Its written assurance to that effect is certification.
> **Issuance of CERs:** After review, the EB issues the appropriate number of CERs to accounts of the host country and project proponent.

b) The Criteria of a CDM Project

To ensure that a CDM project is consistent with the objective of CDM in Article 12.2 KP, it must be registered with CDM Executive Board (EB) after obtaining the consent of the developing country hosting the project. The EB decides upon whether or not to register a project through substantial examination according to the criteria put forth in Article 12.5 KP: (a) Voluntary participation approved by each Party involved;(b) Real, measurable, and long-term benefits related to the mitigation of climate change; and (c) Reductions in emissions that

[31] *Iisd(Internatinal Institue for Sustainale Development)*, Realizing the Development Dividend:Making the CDM Work for Developing Countries, Phase 1 Report(May 2005), available at http://www.iisd.org/climate/global/dividend.asp

are additional to any that would occur in the absence of the certified project activity. Only a project which meets all criteria can be registered.

aa) Approved by each Party Involved

To be eligible for CDM, the Kyoto Protocol says that projects must be "approved by each Party involved." It is necessary for a CDM-project to get both the official approval of the Host-Country and the Donor-Country.

bb) Real, Measurable, and Long-Term Benefits Related to the Mitigation of Climate Change

Article 12.5 (b) KP requires that a CDM project should bring about "real, measurable, and long-term benefits related to the mitigation of climate change". This provision is considered as directly related to Article 12.2 of the KP, which states that "[t]he purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development." Given the positive spill-over of socio-economic and environmental benefits from GHG reduction activities, a project which can bring about real, measurable, and long-term benefits in the mitigation of climate change would be highly compatible with the sustainable development goals of many developing countries. In practice, a sustainable development criterion is first examined by the host-country in its approval process. They have a veto power over projects they deem unsuitable**.** However, even if the host country thinks that a project is fulfills the criteria of "Advancing Sustainable Development", the CDM Executive Board has the right to veto if it does not agree.

cc) Additionality

Article 12.5 of the Kyoto Protocol states that GHG benefits from CDM projects must be "additional to any that would occur in the absence of the certified project activity." "additionality" ensures that the project reduces emissions more than what would have occurred in the absence of registered CDM project activity. It is not yet evident how additionality is defined, there are two basic requirements for the "additionality" of a CDM project:

Environmental Additionality requires that all CDM projects result in real, measurable and long-term GHG emissions reduction when compared to the situation without the CDM projects. That means that the emissions reduction should be additional to what would occur with "business as usual."

Financial Additionality refers to whether a project's financing is in some way supplemental to "business as usual" financial flows. This ensures that the CDM generates new financial inflows for developing countries and avoids redirecting funds that already target environmental and economic development activities. Financial additionality is defined as an economically non-viable project becoming viable as a direct result of CDM revenues.

However, the assessment of a project's additionality is a very controversial issue in practice. Two primary approaches to assessing additionality are being considered: project-specific reviews and benchmarks. To promote the predictability of "additionality", the CDM Executive Board has set official guidelines[32] to assessing additionality**.**

c) Setting the Baseline

Since the amount of Certified Emission Reductions (CER) depends upon the emissions that would have arisen without the project, the construction of this hypothetical "baseline" scenario plays the most important role in the operation of a CDM project. Once a project is deemed CDM-eligible, the applicable CERs will be calculated by subtracting the project's monitored emissions from the "baseline" emissions expected in the project's absence. This baseline may be estimated through reference to emissions from similar activities and technologies in the same country or other countries, or to actual emissions prior to project implementation. The partners involved in the project could establish a baseline with high emissions, which would yield a risk of awarding spurious credits. To avoid this credit risk by the baseline setting, independent third party verification of setted baseline is required and the baseline must also be approved by the CDM Executive Board (EB).

[32]Tool for the demonstration and assessment of additionality (Version 03), UNFCCC CDM EB, EB 29, see: http://cdm.unfccc.int/methodologies/PAmethodologies/AdditionalityTools/Additionality_tool.pdf.

III. The Insufficiency of Participation of Developing Countries in the Current International Climate Protection Agreements

1. The Significance of Effective Participation of Developing Countries in the Climate Protection

a)The Effective Participation and the Achievement of the Objective of UNFCCC

Article 2 of the UNFCCC sets forth a clear objective for international climate protection policy: "The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner". To prevent "dangerous anthropogenic interference with the climate system", this " ultimate objective" establishes a global climate protection sustainability criterion, by which we can judge how successful a global system has been.[33]

The IPCC does not give any recommendation as to what level of GHG emission it considers would politically fulfill minimum requirements for climate sustainability in light of Article 2 UNFCCC. It has not pointed out how carbon dioxide emissions would have to develop in order to keep CO2 concentration below 550 ppm or other marks. The European Union is the first and so far the only large political unit which endorsed a clear and action-orientated definition of "dangerous anthropogenic interference with the climate system". The European Parliament clearly supported the European Commissions decision in favour of the CO2 target

[33] *Wicke,* Beyond Kyoto - A New Global Climate Certificate System: Continuing Kyoto Commitsments or a Global ´Cap and Trade´ Scheme for a Sustainable Climate Policy? 1 edition, p.1.

of 550 ppm,[34] which has won broad acceptance in the literature.[35] However, up to now there has been no global, quantified sustainability target.

Although there are still disputes about which level of GHG concentration would meet the requirement of Article 2 UNFCCC, it is certain that the current international climate protection legal framework is not sufficient. Even if a 5.2% reduction in emissions by Annex-I countries are reached, the trend of GHG emissions increase cannot be reversed by the existing regime, because the emissions reduction in the Annex-I countries may be counteracted by the emissions increase in the non-Annex countries.[36]

The IEA(International Energy Agency) forecasts that if the developing countries continue to play a passive role in climate protection, their emissions will be higher than those of industrial countries around 2025.[37] If economic development in the developing countries, especially the quickly industrializing countries such as China and India go on with the business as usual model, it will result in a strong emissions increase.[38] Moreover, business as usual in the developing countries can make the efforts of the developed countries who have authorized the Kyoto Protocol go to waste because of leakage effects. Carbon-intensive economic activity will migrate from Annex I countries where it is penalized to non-Annex I countries where it may actually become more profitable.[39]

b) The Lock-in Effect and Urgency of the Active Participation of Developing Countries in the Control of GHG Emission

The greenhouse problem has worldwide implications: it concerns all economic sectors, and its impact will affect all countries.[40] The battle for mitigation of GHG emission can only be successful when the economic development model transforms from a high-carbon economy to a low-carbon economy or even better to a zero-carbon economy.[41] The energy sector plays the most important role in reducing GHG emissions, since energy activities are the principal

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[34] European Parliament (1998) resolution on climate change in the run-up Buenos Aires. Section 2, htttp://www.europal.int/home/default-de.htm.
[35]Refer to:Wicke, Beyond Kyoto- A New Global Climate Certificate System, p.29-32.
[36] *Wicke*, Beyond Kyoto- A New Global Climate Certificate System, p.29-32.
[37]*IEA*, World Energy Outlook 2002, p.73.
[38] *Wicke*, Beyond Kyoto- A New Global Climate Certificate System, p.32-37.
[39] *Edmonds/Scott et al*. , International Emissions Trading &Global Climate Change, Pew Center on Global Climate Change(December 1999), p.30..
[40]*Borione and Ripert*, Exercising Common but Differentiated Responsibility, in: *Mintzer and Leonard* (ed.), Negotiating Climate Change-The Inside Story of the Rio Convention, p.81.
[41]*Agarwal*, Making the Kyoto Protocol Work, Center for Science and Environment, 1999.

source of green house gas emissions, they are responsible for more than 50 percent of anthropogenic emissions.[42]

However, the energy sector is a sector with a characteristic of a "Lock-in Effect", because the model of energy consumption involves a complicated system, in which infrastructure plays a deciding role. That is why it is difficult and costly for developed countries to transform to low-carbon economies — the existing energy infrastructure was established for a carbon-intensive economy. Introducing a new economic model will involve a tremendous transformation.

The context of developing countries is different from that of developed countries. Most developing countries are in the process of industrialization, in which the infrastructures are being built up at a very high speed but have not yet been completed. Developing countries have a better opportunity to reduce GHG emissions than developed countries as long as the developing countries can avoid being locked into high-carbon infrastructure and its corresponding economic and social development model. If the huge energy investments that will be made by the developing countries in the next 3-4 decades are put into high-carbon infrastructure and its corresponding energy system, it will be very difficult for them to get out of it.[43]

2. Assessments of the Participation of Developing Countries in the Current International Climate Protection Treaties

a) Participation of Developing Countries in the Current International Climate Protection Treaties

A review of the present international climate protection agreements illustrates that they provide the elementary regime basis for the participation of developing countries in international cooperation for climate protection. The present international climate protection agreements have made developing countries involved in international climate protection in the following three dimensions.

[42] *Borione and Ripert*, Exercising Common but Differentiated Responsibility, in: *Mintzer and Leonard* (eds.), Negotiating Climate Change-The Inside Story of the Rio Convention, p.81.
[43] *Agarwal*, Making the Kyoto Protocol Work, Center for Science and Environment, 1999.

First, developing countries have assumed commitments for climate protection. The commitments of developing countries for the climate protection are embedded in Article 4.2(a) UNFCCC, which involves the implementation of policies and measures to mitigate climate change, regular reporting, and so on. This general commitment in Article 4.2(a) UNFCCC is restated in the Kyoto Protocol. As mentioned above, one cannot say that there are no mitigation commitment for developing countries in the UNFCCC.

Second, the Kyoto Protocol provides the CDM, a regime for developing countries to participate in the implementation of climate friendly projects.[44] A major achievement of the Kyoto Protocol is the establishment of three market mechanisms. One of those, the CDM, is a way to assist governments and private sector entities in reaching their GHG reduction targets in a cost effective manner while also contributing to the sustainable development priorities of developing countries.[45] CDM is conducive to building co-operation between the developed and developing parties and helping to strengthen the understanding of the main opportunities for abatement.[46] Although CDM projects are not expected to be particularly significant, they are focused on areas that clearly demonstrate that environment and development can be mutually supportive, by investing in new, environmentally preferable technologies such as energy efficiency and renewable energy projects.[47] Such CDM investment has the potential to create tangible and important side benefits that will increase the quality of life in developing countries, by improving air quality, the provision of energy and so on.[48] They have the potential to direct investment to new, environmentally preferable technologies, helping to bring them closer to the mainstream in developing countries.[49]

Third, the Marrakesh Accords include a series of decisions concerning the participation of developing countries.[50] These decisions include not only a framework for capacity building in developing countries which will aid in the implementation of the UNFCCC, but also a

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[44] *Höhne et al.,* Evolution of Commitments under UNFCCC: Involving Newly Industrialized Economies and Developing Countries, p.5.
[45] *IISD(International Institute for Sustainable Development)*, executive summary of the report: Realizing the Development Dividend: Making the CDM Work for Developing Countries – (Phase I Report); May 2005, Available at http://www.iisd.org/climate/global/dividend.asp
[46] *Stern*, Stern Review on the Economics of Climate Change, p.504.
[47] *IISD(International Institute for Sustainable Development)*, executive summary of the report: Realizing the Development Dividend: Making the CDM Work for Developing Countries – (Phase I Report). May 2005, Available at http://www.iisd.org/climate/global/dividend.asp
[48] *Ibid.*
[49] *Ibid.*
[50] *Höhne et al.,* Evolution of Commitments under UNFCCC: Involving Newly Industrialized Economies and Developing Countries, pp.5-6.

framework for the transfer of technology which aims to increase and improve the transfer of and access to environmentally sound technologies and know-how.[51] It also establishes a new special climate changes fund, a least-developed country fund and an adaptation fund in order to mobilize additional resources for the involvement of developing countries.[52]

b) Insufficiency of Participation of Developing Countries in the Current International Climate Protection Agreements

aa) The Insufficiency of Commitments of Developing Countries

Although the developing countries are bound to the general commitments in Article 4.1 (a) UNFCCC and in the Kyoto Protocol, such general commitments do not have legally binding effects(except commitment to submit the national inventories of greenhouse gas emissions with the "semi-legal" binding effect).[53] These commitments are formulated in a very general sense. Due to their very general and unspecific nature, it is difficult to make sound assessments on compliance. Even for these general commitments, compliance of the developing countries is conditional on the financial and technological support of developed countries. Moreover, there are no corresponding measures to deal with non-compliance, since the measures to deal with non-compliance only apply to the developed parties.

The US government put special emphasis on the commitments of developing countries in the international climate protection agreement. In March 2001, the U.S. withdrew from the Kyoto Protocol, reasoning that the costs to the U.S. economy would be too high and the exemption of developing countries from binding emission targets would not be acceptable.[54] In the negotiations of future international climate protection agreements, a key issue will be to transform the general commitments of developing countries into more specific and examinable ones and to take corresponding measures to deal with non-compliance of their commitments.

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[51] *Ibid.*
[52] *Ibid.*
[53] This commitment is specific, but the developing countries can argue the financial and technological support from developed countries for the fulfilment of this commitment.
[54] In 1997, the U.S. Senate unanimously passed the Byrd-Hagel resolution, which makes "meaningful"participation of developing countries a *conditio sine qua non* for ratification (The Byrd-Hagel Resolution, U.S. Senate, 12 June 1997, 105th Congress, 1st Session, Senate Resolution 98).

bb) The Limitations of CDM

The CDM is a unique institution which functions as a bridge between both developed and developing countries and public and private sectors, and which concerns both climate and development issues. It also holds the promise of delivering environmental benefits at lower costs by harnessing market forces.[55] However, the project-based nature of CDM is preordained to have little ability to control the GHG increase or to assist developing countries in swithing from a high-carbon development model and "achieving sustainable development".[56]

Firstly, as above stated, the CDM is based on the "Baseline-and-Credit" model, which determines its limitations in controlling the GHG increase. Compared with JI under Article 6 KP and emissions trading under Article 17 KP, CERs will be added to the assigned amount of the acquiring Party (Article 3.12) but not subtracted from the assigned amount of another party,[57] because the developing countries have not been bound to any quantity cap. That means that the overall amount of GHG emission allowances of Annex B industrialised countries will increase.[58] Under this system, in which there is no distinction between developed countries taking responsibility for emission reductions and those making physical reductions within their borders, the contribution of CDM to GHG mitigation is limited.

Secondly, the CDM provides little incentive for developing countries to make policies and take measures in controlling GHG emission to switch to a sustainable development model. In order to promote a transformation into a low-carbon development model in the developing countries, it is important that developing countries make large investments in environment-friendly and long-lived energy and transport infrastructure, which require not only technology and financial transfer from developed countries, but also the adoption of corresponding national law and policy by developing countries. However, the present CDM provides little incentive for developing countries to take active measures in controlling GHG emissions: on the one hand, there are no legal commitments, and on the other hand, there is no mechanism to encourage developing countries themselves to take action in protecting the climate.

[55] *Baumert*, 38 Geo. Wash. Int'l L. Rev. 365.
[56] *Baumert,* 38 Geo. Wash. Int'l L. Rev. 365, Fn163.
[57] *Oberthür/Ott*, The Kyoto Protocol: International Climate Policy for the 21st Century, p.169.
[58] *Ibid.*

Thirdly, the role of CDM is limited by other factors such as high transaction costs, policy uncertainty, and technology risk, which are enunciated as follows:

High transaction costs: both the procedures involved in demonstrating additionality on a case-by-case basis, and the technology risks lead to high transaction costs.[59] Moreover, it has proved difficult to establish methodologies for energy efficiency in sectors dominated by small and medium-sized enterprises and for transport infrastructure and demand management, which may be more relevant to poorer countries and can bring about more long-term effects.[60]

Technology risk: the CDM does not necessarily cover the learning costs associated with the higher risks of using new technologies including advanced renewable energy technologies.[61]

Policy uncertainty: the Kyoto Protocol is only binding in the period from 2008-2012. The uncertainty of future policy makes the projects with long-term effects not favourable to the investing parties.[62]

Under the present CDM, "Even the mid-range estimate of 250 million tons of reductions per year amounts to only 1.5 percent of current developing country emissions. This amount is not trivial, but neither is it commensurate with the scale of the climate problem".[63] In addition, there are still relatively few projects that can cause a long-term reduction in GHG emissions.[64]

[59] *Stern*, Stern Review on the Economics of Climate Change, p.505
[60] *Ibid.*
[61] *Ibid.*
[62] *Ibid.*
[63] *Baumert*, 38 Geo. Wash. Int'l L. Rev. 365.
[64] *Stern*, Stern Review on the Economics of Climate Change, p. 505.

C. The Future International Climate Legal Framework and the Participation of Developing Countries

The effective participation of developing countries and the return of the USA to the international climate protction agreements are regarded as the two most important factors in the success of future international climate agreements.[65] Developing countries are predicted to make corresponding commitments in a variety of proposals concerning the future international climate agreements.[66] Several comprehensive assessment models have been established towards these proposals.[67]

A comprehensive assessment of these proposals will be helpful for the development of future international climate agreements. However, the proposals which score highest in a comprehensive assessment model will not necessarily be accepted by the developing countries. Developing countries and developed countries usually have different visions regarding the relationship and importance of environmental eligibility, economic efficiency and legal fairness. While the developed countries rank environmental eligibility and economic efficiency higher than legal fairness, developing countries rank legal fairness higher than the other two.

This chapter provides an assessment of the participation of developing countries in future international climate agreements from their perspective. Instead of a comprehensive assessment, it will be conducted from the view of legal fairness, since legal fairness is the most important concern of developing countries. The discussion on the participation of developing countries begins with "equity" issue. The possible legal forms of developing countries' participation in future climate agreements are discussed according to this criterion of "equity".

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[65] *Buchner/Carraro*, International Environmental Agreements 6(2006), p.64.

[66] The detailed review over this proposals refer to *Bodansky/Chou*, International Climate Efforts Beyond 2012: A Survey of Approaches, Pew Centre Global Climate Change(December, 2004) ; *Kuik* (ed.), Post-2012 Climate Policy: Assessing the Options International Climate, Amsterdam 2005.

[67] *Kuik* (ed.), Post-2012 Climate Policy: Assessing the Options International Climate; *Höhne et al.* , Options for the Second Commitment Period of the Kyoto Protocol, p.12, available at:http://europa.eu.int/comm /environment/climate /future_action.htm.

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I. Equity :The Main Concern of Developing Countries in the Future International Climate Agreements

Although so many different kinds of proposals for the commitments of developing countries are put forward, these proposals have gotten little positive response from developing countries themselves. The divarication between the developed countries and developing countries can be observed in almost every international environmental conventions. While developed countries emphasize the effectiveness of the environmental protection, developing countries always underline the justice of the environmental convention. [68] The international climate convention can promote the participation of developing countries in climate protection only if the developing countries' concern of justice is embodied in it. The policy alternatives' incompatibility with the deeply held principles of justice will alert the parties to the impossibility of reaching an agreement on those actions.[69]

1. The Dispute on the Equity of Climate Protection Treaties

The "equity" of a treaty is an important precondition for promoting the participation of developing counties in climate protection. However, turning this principle of equity into concrete provisions has posed many problems and generated considerable conflicts, as the concept of equity is highly controversial.[70] Grubb et al. have given seven possible equity rationales applicable to greenhouse gas burden sharing:[71]

- "Per capita" rationales: all humans should be entitled to an equal share in the atmospheric commons.
-"Polluter pays" rationales: which countries should pay for the pollutions that they generate or have generated.
-Preservation of the status quo: the present emitters have established some common law rights to use the atmosphere as they presently do.

[68] *Carter,* The Politics of the Environment: Ideas, Activism, Policy, pp.241-245.
[69] *Paterson*, Principles of Justice in the Context of Global Climate Change, in:*Luterbacher and Sprinz*(eds.), International Relations and Global Climate Change, p.119.
[70] *Carter*, The Politics of the Environment, p.250.
[71] *Grubb and Sebenius,* Participation, Allocation, and Adaptability in International Tradeable Emission Permit Systems for Greenhouse Gas Control, in:*OECD,* Climate Change: Designing a Tradeable Permit System. pp.312-314; *Grubb,* International Affairs 71(3):463-496; *Paterson*, Principles of Justice in the Context of Global Climate Change, in: *Luterbacher and Sprinz(eds.)*, International Relations and Global Climate Change, p.120.

-"Reasonable" emissions compatible with basic needs, which distinguishes between "necessary" and "luxury" emissions. Ensures the "necessary" emissions which help fulfil the basic needs of people and reduces the "luxury" emissions which do not fulfil the basic needs of people.

- Each participant should shoulder a "comparable" burden.

-"Willingness-to-pay" justification (derived from welfare economics)

- The Kantian categorical imperative: justice requires that we act on principles that can be universally applicable, such as not endangering the global climate system. Such a rule-based position also suggests that the distributional effects of social institutions should benefit the people who are "worst off".

The IPCC sums up the following four options regarding the equity of the international climate legal framework:

The rights-based option contends that all individuals have an equal right to use the atmospheric commons.[72] "A formulation that carries this insight to its logical conclusion is that of 'contraction and convergence' , whereby net aggregate emissions decline to zero, and per capita emissions of Annex I and non-Annex I countries reach precise equality."[73] According to this approach, the countries whose emissions are below their total allocation (mainly non-Annex I countries) could sell excess emission rights to deficit countries, which would lead to a financial transfer from developed countries to developing countries.[74] It is a justifiable transfer, because if the developed countries will enjoy more from the commons, they should pay for it.

The liability-based option is " based on the right of people not to be harmed by others' actions without suitable compensation."[75] This literature focuses on the damage caused by overuse of the commons, and seeks to establish mechanisms through which those who cause such damage are penalized and the victims of the damage are compensated.[76] This perspective opens up possibilities of financial instruments, such as insurance, which would distribute risk across the society. "Countries or groups that believe that the risk of harm is overstated could offer insurance to others against liability".[77]

The poverty-based option "is based on the need to protect the poor and vulnerable against the impact of climate change as well as climate policy."[78]

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[72] *IPCC,* Climate Change 2001:Mitigation, p.90.
[73] *IPCC*, Climate Change 2001:Mitigation, Cambridge University Press, p.90.
[74]*IPCC*, Climate Change 2001:Mitigation, Cambridge University Press, pp.90-91.
[75] *IPCC*, Climate Change 2001:Mitigation, p.90; *Rayner/Malone/Thompson*,Equity Issues in Integrated Assessment, in: *F. Toth,* (ed.), Fair Weather*?* Equity Concerns in Climate Change, pp.11-44.
[76] *IPCC,* Climate Change 2001,p.91.
[77]*IPCC,* Climate Change 2001:Mitigation, p.91; see also *Sagar and Banuri*, *Energy Policy,* 27(9), 509-514 .
[78] *IPCC*, Climate Change 2001:Mitigation, p.91.

The opportunity-based option is based on the opportunity for all people to achieve a standard of living enjoyed by those with greater access to the commons. [79] It is in essence consistent with the right-based option.

2. The Different Equity Principle between Adaptation and Mitigation

a) Three Dimensions of Equity in the International Climate Conventions

In the context of international environmental law, the justice issue involves three legal dimensions: procedural justice, distributive justice and retributive justice.[80] Procedural justice is defined as the right to being treated as an equal, especially with respect to the procedure of decision-making.[81] It involves how a decision is made and what voting procedures and decision-making structures are adopted to formulate international environmental policy.[82] Distributive justice involves the equitable distribution of environmental benefits and burdens which may result from environmentally threatening activities.[83] In a climate context it concerns the distribution of the costs and benefits of climate protection. Retributive justice refers to the fairness of how society assigns punishments for lawbreaking and addresses damages inflicted on individuals and communities.[84]

Perceptions about the equity of the international climate framework remain varied and confusing. The controversy on the justice of the climate convention can be attributed to differences in political motivation, economic interest and cultural background. Nevertheless there is also a technological cause. One reason is that there is no explicit identification of the differences in how the equity principle is applied to adaptation and mitigation. This makes reaching on accord of understanding on equity more difficult. Article 3.1 and 3.2 UNFCCC provide general principles on climate protection, which include the equity principle, the principle of common but differentiated responsibility, the principle of historical responsibility, the capability principle and the principle of "full consideration for the specific needs and special circumstances". Nevertheless, the provision can not give us a clear idea about how the

[79] *IPCC*, Climate Change 2001:Mitigation, p.91.
[80]See *Kuehn*, ENV'T REP30(2000):10681-84, 10688-89, 10693-94, 10698-700; *Quan,* Georgetown International Environmental Law Review 14(2002 Spring),471-476. But there are also another authors who have not differentiated the distributive justice and corrective justice in the disscussion of the justice of international environmental convention, see *Anand,* International Environmetnal Justice:A North-South Dimension, pp.122-136.
[81]See *Kuehn*, ENV'T REP30(2000):10681-84, 10688-89, 10693-94, 10698-700.
[82]*Anand,* International Environmetnal Justice:A North-South Dimension, p.132.
[83]*Quan,* Georgetown International Environmental Law Review14 (2002 Spring), 471-476.
[84]See *Kuehn,* ENV'T REP30(2000):10681-84, 10688-89, 10693-94, 10698-700.

relationship between these principles should be dealt with, and how these principles are to be applied in the distribution of obligations for mitigation and adaptation, which needs further explanation. The problem is that there are so many principles for allocation of the obligations as noted in Article 3 UNFCCC, that it leads to confusion about how criteria should be applied in concrete situations. Thus, it is necessary to identify the differences between obligations for adaptation and mitigation, and to find the main criterion for allocating those obligations.

On the one hand, retributive justice means that those who cause the damage have the responsibility to make amends for it.[85]This is the principle of justice which underlies the criminal legal system and the compensation legal system. Retributive justice should also be regarded as the principle of justice that underlies the responsibility of adaptation. Adaptation entails taking measures to handle the adverse effects of climate change. These may include investment in capacity building and protection of poor and vulnerable groups to enable them to enhance their livelihoods in an emerging climate change. Who should assume the costs of adaptation is a legal question concerning who should take obligation for damage attributed to past behaviour. To answer this question, the principle of historical responsibility should be the main principle of equity, which is based on the idea that the sharing of responsibility for adaptation and other damages are to be proportionate to historical contributions of GHG emissions.

On the other hand, mitigation concerns the control on the GHG emissions. The historical obligation principle cannot be the only main principle of justice in analysing this legal question. This is because mitigation obligations are directly related to the distribution of emissions rights among interdependent parties. In the discussion of the justice of mitigation, the principles of need, capability and equal development right should be introduced.

b) Damages due to Climate Change, Adaptation and Retributive Justice

The effects of climate change will be huge in developing countries. Adaptation " refers to changes in processes, practices, or structures to moderate or offset potential damages or to take advantage of opportunities associated with changes."[86] It has the potential to reduce adverse impacts of climate change and to enhance beneficial impacts.[87] But adaptation cannot

[85] *Paterson,* Principles of Justice in the Context of Global Climate Change, in: *Luterbacher and Sprinz*(eds.), International Relations and Global Climate Change , p.123.

[86]*IPCC*, Climate Change 2001: Impacts, Adaptation and Vulnerability, p.881.
[87]*IPCC*, Climate Change 2001: Impacts, Adaptation and Vulnerability, Summary for Policymakers,p.6.

prevent all damages and will incur costs.[88] Reparations for damages due to climate change and adaptation are concerned the following legal questions: who should be liable for the cost of adaptation and the unavoidable damages? Which principle should be used for the distribution of cost of adaptation and the unavoidable damages?

As above mentioned, the reparation for damage due to climate change and adaptation concerns the issue of retributive justice. These issues involve at first the sharing of costs for adaptation among different countries. In international law, there are two kinds of state duties for environmental damages:responsibility for internationally wrongful acts and strict liability. [89] State responsibility for internationally wrongful acts aims at protecting the international legal order, the enforcement of international obligations and the compensation for damages.[90] In order to obtain reparations, a breach of an international obligation needs to be proven.[91] The legal requirements of this kind of state responsibility include: cessation of the wrongful acts, guarantees of Non-Repetition and reparation for material and immaterial damages.[92] In contrast to state responsibility for internationally wrongful acts, strict state liability does not require the precondition of wrongful acts.[93] It aims at achieving a "balance of interest" and providing for repartition for risks as well as damages.[94] Thus, the legal consequences concern measures to reduce the damages, and reparations for material damages.[95].

In terms of adaptation and damages caused by climate change, there are no international pacts to define which kind of state's duties should be applied. From the perspective of retributive justice, the historical contribution should become a major criterion to distribute the duties, as the "No-Harm" principle has widely been accepted in legal theory and is becoming an international custom law principle. The share of duties for adaptation and damages due to climate change should be proportional to the contribution to climate change.

However, even if the strict state liability is established for adaptations and damages, there still exist difficult legal questions. In the legal framework, the existence of damage must be ascertained and a causal link must be established between the damages and the conduct of

[88] *IPCC*, Climate Change 2001: Impacts, Adaptation and Vulnerability, Summary for Policymakers,p.6-7.
[89] *Wolfrum* et al., Environmental Liability in International Law-Towards a Coherent Conception , p.455.
[90] *Ibid.*,p.455.
[91] *Ibid.,* p.455.
[92] *Ibid.,* pp.476-487.
[93] *Ibid.,* p.455.
[94] *Ibid.,* p.455.
[95] *Ibid.,* pp.487-492.

emission. Due to scientific uncertainty and the complexities of the problem of climate change, it is very challenging to define which damages are brought about by the climate change and to attribute those damages directly to emissions.

This paper is centred on the legal question of mitigation of GHG emissions, so the adaptations and damage problem will not be thoroughly discussed here. However, it is certain that the legal system dealing with adaptations and damages is very important for the success of a legal system for mitigation. The establishment of a legal system for adaptations and damage due to climate change will provide motivation for mitigation. Only if such a legal system is established, can the phenomena of "hitch-hiking" in mitigation be effectively avoided.

c)The Obligation for Control of the GHG Emissions and Distributive Justice

Distributive justice concerns who should take the obligation to reduce GHG emissions. It is different from adaptation, in which the principle of historical contribution [96] can be theoretically incontestably applied in the distribution of costs for adaptations. The legal discussion on the allocation of obligations of mitigation of GHG emissions can be traced back to the UNFCCC.

The principle of common but differentiated responsibility has been adopted in the UNFCCC to meet the developed countries' concern that all countries must have obligations and the developing countries' concern that those obligations are not the same. However, this concept has done little to resolve equity conflicts over the control of GHG emissions, because it itself cannot give a concrete explanation of what kinds of obligations are the same and which are differentiated and furthermore, how differentiated these obligations should be in terms of controlling GHG. To answer such concrete questions, it is necessary to transform the common but differentiated responsibility into specific commitments for participating parties, especially the developing countries. For this sake the main criterion of distribution must be established. The distribution of obligations for mitigation differs from that for adaptation in that the share of obligations for mitigation is mainly decided by the distribution of GHG emissions rights, rather than by the historical contribution of GHG emissions.

[96] The historical contribution can be different when we definite at different time, the present emissions contribution will be the historical contributions of tomorrow.

3. " Equal per Capita Entitlement" as the Main Criterion of Distribution for the Obligations of GHG Control

a) The Justification of the" Equal per Capita Entitlement"

In terms of the allocation of emissions rights, "equal per capita" has been taken as the main criterion in some literature.[97] In spite of the differences between the three allocation models— "contraction and convergence", "multi-sector convergence", and " multistage approach" — "equal per capita entitlements" is the common factor and main criterion of each. It has a normative persuasion that other allocation criteria cannot substitute. Just as Malik Aslam, the former Pakistani Environmental Minister, has said: "although some valid concerns exist regarding the application of the per capita approach: it remains very difficult to ethically justify why unequal claims to global commons such as the atmosphere (should) exist."[98] From the perspective of democratic legitimacy a fair allocation criterion is only in the case that it can accepted by the majority of people in the world. As Vajpajee stated, "We don't believe that the ethical principles of democracy could support any norm other than that all citizens in the world should have equal rights to use ecological resources."[99]

"Equal per capita entitlement" is based on such a conception: the "limited assimilative capacity" of the earth's atmosphere with respect to GHG belongs to a kind of global common resource. A resource is literally defined as "a stock or reserve, which can be drawn on when necessary."[100] This means that a resource should possess a reserve "value" and could be quantifiably "drawn on" in case of need (or should possess the capacity of being quantified and allocated). In the case of the GHG emissions, what really is being discussed is that the capacity of the atmosphere to absorb GHG is limited.[101] Such limitation of assimilative capacity is the reason for the scarcity value of GHG emissions. Furthermore, this kind of value has been intrinsically recognized, quantified, and capitalized through the scheme of emissions trading which anchored in the Kyoto Protocol.

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[97] *WBGU*, Über Kioto hinaus denken-Klimaschutzstrategie für das 21.Jahrhundert, pp.27-28; *Höhne et al.,* Options for the Second Commitment Period of the Kyoto Protocol, available at: http://europa.eu.int/comm/environment /climat/future_action.htm.

[98] Cited from *Aslam,* Equal Per Capita Entitlements. In: *Baumert,/Blanchard,/Llosa /Parkhaus*(eds.) Building a Climate of Trust: the Kyoto Protocol and beyond, p. 185.

[99] This is the statements by India's former Prime Minister Vajpajee at the COP 9 Conference in New Delhi. Cited from *Wicke*, Beyond Kyoto - A New Global Climate Certificate System: Continuing Kyoto Commitsments or a Global ´Cap and Trade´ Scheme for a Sustainable Climate Policy? p.133.

[100] *Müller,* "Fair Compromise in a Morally Complex World", Paper presented at Pew Equity Conference, Washington, DC, April 17—18, 2001.

[101] *Aslam,* Equal per Capita Entitlements. In: *Baumert/Blanchard/Llosa/Parkhaus*(eds.), Building a Climate of Trust: the Kyoto Protocol and beyond, p. 183.

As a global common resource, the "limited assimilative capacity" of the earth's atmosphere with respect to GHG should be distributed in light of the equity principle. According to property rights theory of Coase, the clearness of the property right relationships rather than the distribution of the property rights is directly related to the efficiency of the institutions. As far as GHG emissions are concerned, the introduction of emission trading has fulfilled the efficiency concern and provided the possibility for developed countries to enjoy higher emissions level per capita than other countries. However, the initial distribution of emission entitlements should fulfil the equity concern, otherwise it would become a normative unjustified institution.

Egalitarianism widely resonates on the issue of initial distribution of a global common resource,[102] because "equal per capita entitlement" provides an equal opportunity for development to all people in the world. It is not contrary to economic efficiency. On the contrary, equal opportunity for development will promote it. There are many reasons to oppose the equity principle, which aims at balancing the unfairness of the consequences, such as the "need principle". But it is difficult to provide opposition to the principle of equal opportunities.

Furthermore, equal entitlement per capita can be derived from the human right to equal treatment and, in relations between contracting parties, from the principle of equity in Article 3(1) UNFCCC.[103] The Decision -/CMP.1 on Cop 11 states that " the Parties included in Annex I shall implement domestic action in accordance with national circumstances and with a view to reducing emissions in a manner conducive to narrowing per capita differences between developed and developing country Parties while working towards achievement of the ultimate objective of the Convention".[104] Although this statement does not directly deal with the equal entitlement per capita principle, it takes equal emissions levels per capita as a future aim.

Therefore, the principle of equal entitlement per capita has managed to progressively expand its support base in the years since its introduction. China and India called for "equitable allocations" of emission entitlements on a per capita basis as a prerequisite for

[102] *Ibid.,* p. 184.
[103] *WBGU*, Über Kioto hinaus Denken-Klimaschutzstragie für das 21.Jahrhundert, pp.27-28.
[104] *UNFCCC*, Decision -/CMP.1, Principles, nature and scope of the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol, available at: http://unfccc.int/files/meetings/cop_11/ application/ pdf/cmp1_14_ principles_nature_and_scope_art6_12_17.pdf.

allowing trading to commence.[105] Subsequently, the European Parliament has also adopted a resolution on climate change, which advocates that "a future regime should be based on common but differentiated responsibilities aiming at contraction and convergence."[106]

b) Putting "Equal Entitlement per Capita" into Practice

"Equal Entitlement per Capita" can be used in different senses and different scopes. In the narrowest sense, emissions per capita should be the most important indicator to decide the timing and type of commitments. Further, "Equal Entitlement per Capita" principle can be used to decide the quantitative distribution of emissions rights and corresponding quantitative mitigation obligations.

aa) "Emissions per Capita" as a Threshold Indicator

In light of the "Equal Entitlement per Capita" principle, emissions level per capita should be an important threshold indicator for the policy debate on the timing of commitments and differentiating emission commitments among countries.[107] The "Equal Entitlement per Capita" principle requires that countries whose per capita emissions are higher should make the commitment earlier than countries whose per capita emissions are low. When the per capita emissions of a country are below the world average level, it is difficult to justify the absolute quantitative commitment for this country. However, if a country's per capita emissions have surpassed the world average level, this country should take mandatory quantitative commitments (quantitative increase limitations or quantitative reduction limitations), unless there exist exceptional justifications.

bb) " Equal Entitlement per Capita" as an Aim

Though there are proposals recommends that the "equal per capita allocation of emission rights" should be put into practice in the near future, it cannot be realized over night. Given the current (year 2000) extremely unequal allocation of energy-related emissions— for example, 60 t in Qatar, 20.6t in USA, 10.1t in Germany per capita of the population compared to 2.4t in China, 1.73 t in Brazil, and 0.94t in India — it can only be realized after a long enough period of time (e.g. in 2050 or 2100).[108] This is the "principle of constancy", in

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[105] See "Submission of India on Article 12 of the Kyoto Protocol." Document number:FCCC/SB/2000/Misc.1. Online at: http://unfccc.int.
[106] European Parliament resolution on "Winning the Battle Against Global Climate Change" (2005/2049(INI))
[107] *Aslam,* Equal per Capita Entitlements. In: *Baumert/Blanchard/Llosa/Parkhaus*(eds.) Building a Climate of Trust: the Kyoto Protocol and beyond, p. 182.
[108] *IEA*, World energy outlook 2002, p.465.

which abrupt measures leading to drastic effects should be avoided in socio-economic systems, as these may have severe consequences affecting the economies of all regions. The principle of rule of law requires that the legal norm has the character of accountability, i.e. the reform of the law should take the adaptation capacity of the concerned legal subject into account. The industrialised countries have the right to argue for the enough time to adapt from long-time cost-free and compensation-free GHG emissions to equal emissions rights. After all, the transformation to the new system is comprehensive, involving the reform of current basic economic models and is dependent on technological development. Neither can be accomplished overnight.

There are two famous models which put the "equal per capita allocation of emission rights" into practice: Contraction & Convergence(C&C) and Common but Differentiated Convergence (CDC). The C&C model is the equal and practical model concerning allocation of GHG emission rights, which combines the ethical normative imperative and the legal imperative, the concerns of both South and North. "Under this approach, the global emissions budget resulting at each point in time from the target path for global emissions is broken down such that the per-capita emission rights of all countries or regions converge and are equal from a set convergence year onwards. This process can be linear or non-linear, at a rate that must also be set. Thus, for pragmatic reasons (principle of constancy), realization of the right to equal per-capita emissions is aimed at with a time lag of several decades."[109] The CDC model is also based on "equal per capita allocation of emission rights". According to this model, Annex I countries' per capita emissions converge within several decades to a low level.[110] "Individual non-Annex I countries also converge to the same level within the same time period but start when their per capita emissions are a certain percentage above global average".[111] The difference of the C&C and CDC can be illustrated clearly with the following figures.

[109] *WBGU,* Über Kioto hinaus Denken-Klimaschutzstragie für das 21.Jahrhundert, pp.27-28.
[110] *Höhne et al*., Options for the Second Commitment Period of the Kyoto Protocol, p.12, at: http://europa.eu.int /comm/environment/climat/future_action.htm.
[111] *Ibid.,* p.12.

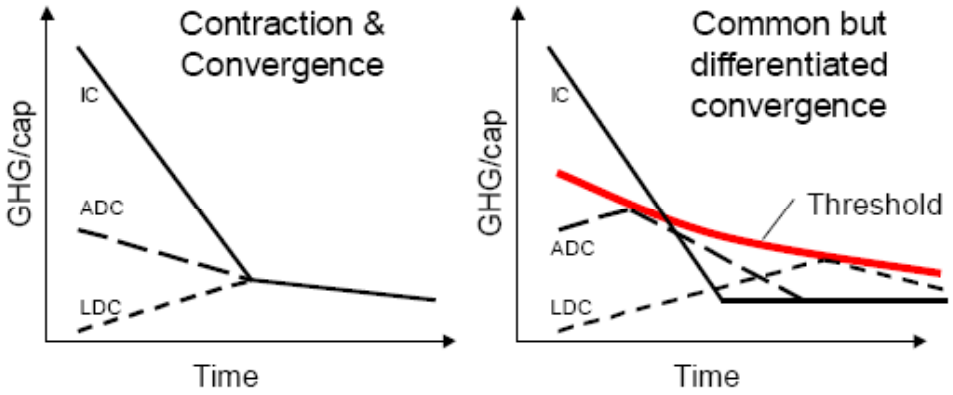

Figure C. Schematic representation of greenhouse gas emissions per capita for three countries (an industrialized country (IC), an advanced developing country (ADC) and a least developed country (LDC)) under Contraction & Convergence (left) and under Common but Differentiated Convergence (right)

source: *Höhne et al*., Options for the Second Commitment Period of the Kyoto Protocol

In contrast to the C&C, the CDC attaches more importance to the development rights of the developing countries and permits developing countries to increase emissions per capita at first and then to reduce it later. It is regarded as the model that could be accepted by a wider range of countries and at the same time could ensure stabilization of greenhouse gas concentrations.[112] So, just as the advocates of the CDC model have said: "Even if the CDC approach is not implemented in its entirety, we strongly believe that these step-by-step decisions can be guided by the principles provided in the CDC approach: that developed countries per capita emissions converge and that developing countries do the same but delayed and conditional to the developed countries' action."[113]

4. Effective Participation of a Developing Country before Its Emissions per Capita Reach the World's Average Level

a) Graduation and the Commitments of Developing Countries

As far as the participation of developing countries is concerned, "graduation" sets forth a pathway for developing countries first to participate in the commitments regime and then to assume progressively more stringent commitments, as they develop economically and pass

[112] *Ibid.,* p.11.
[113] *Ibid.,* p.11.

the defined differentiation/graduation thresholds.[114] Graduation is a good concept as it is consistent with the principle of "the common and differentiated obligation" and takes a practical stance towards developing countries. "Graduation" is based upon the criterion of differentiation(e.g., per capita income, per capita emissions, emissions per unit GDP).[115] As addressed above, "per capita emissions" is the most convincing criterion to use in the distribution of obligations for GHG control, which has gained wide recognition in the world, especially in developing countries. Therefore, from the perspective of developing countries, "per capita emissions" should be the main criterion of graduation.

The developing countries where the per capita emissions have reached or surpassed the world's average level, should first be evaluated on their involvement in the commitment regimes. The group of least developed countries, where per capita emissions are among the lowest in countries of the world, cannot be expected to participate in commitment regimes. The important and challenging issue is the involvement of rapidly industrializing countries in the commitment regimes. The "per capita emissions" of this type of country is less or much less than the world average level, but due to their size, their growing population and their rapidly evolving economy, these countries will make an increasingly large contribution to global emissions.[116] Thus, the most important question for their participation developing in international climate protection is how to promote effective participation in GHG control before their per capita emissions reach the world average level.

b) Justifications for the Involvement of a Developing Country in a Commitment Regime before its Emissions per Capita Reaches the World's Average Level

Firstly, the involvement of a developing country in a commitment regime before its emissions per capita reach the world average level can be justified from the perspective of equal development rights between present and future generations. As above stated, equal development right is the idea underlying "equal entitlements to emissions". However, "equal entitlements to emissions" can only be justified under the condition that the effectiveness of climate protection is not sacrificed, since, the effectiveness of climate protection is directly

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[114] *Bodansky/Chou/Jorge-Tresolini,* International Climate Efforts Beyond 2012: a Survey of Approaches, Pew Center on Global Climate Change(December 2004).
[115] *Bodansky/Chou/Jorge-Tresolini*, International Climate Efforts Beyond 2012: a Survey of Approaches, Pew Center on Global Climate Change(December 2004).
[116] *Action on Climate Change Post 2012: A Stakeholder Consultation on the EU's Contribution to Shaping the Future Global Climate Change Regime,* available at: http://europa.eu.int/comm/environment/climat/future_action.htm.

related to the development rights of future generations. Although it is controversial whether future generations have a legal subjective right, it is generally acknowledged that the present generation has a legal duty to ensure that the development opportunity of future generations is not sacrificed for the sake of the development of the present generation.[117] If developing countries continue to pursue the same conventional development path with dramatic increases in per capita use of fossil energy and per capita GHG emissions that developed countries have taken,[118] the aim of climate protection that is stipulated in Article 2 UNFCCC is unlikely to be met. Our generation will then fail in our duty to future generations.Only when developing countries pursue a development path in accordance with the principle of "the follower do better" in terms of GHG emission control, will the climate effectiveness not be sacrificed by the development of developing countries. The principle of equal entitlements to emissions can preserve the effectiveness of climate protection, only if the average world GHG emissions per capita can be reduced. Although developed countries should take the main responsibility in reducing the average world GHG emissions per capita, it is impossible to achieve this aim without the active participation of developing countries. "Equal entitlements to emissions" principle does not support the arguments that developing countries should enjoy the same per capita emissions level as that of developed countries at present and that they should not be involved in any commitment regime before their emissions per capita reach the world average level, because such arguments only emphasize intragenerational equity between countries, neglecting intergenerational equity and are unlikely to achieve the aim of climate protection in Article 2 of UNFCCC. The involvement of developing countries in the commitment regime before their emissions per capita reach the world average level is a good approach to balance the intragenerational and intergenerational equity. Of course, the involvement of developing countries in a legally-binding commitment regime is conditional on major mitigation commitments and technological and financial support commitments of developed countries.

Secondly, the inequality of GHG emissions within developing countries provides another argument for their involvement before their emissions per capita reach the world's average level. According to "equal entitlements to emissions" principle, not only people in developed should take an obligation to GHG emissions mitigation, but also people in developing countries, whose GHG emissions have surpassed the world's average level, should be

[117] *Gündling,* American Journal of International Law84 (1991), pp.207-212.
[118] *Baer/Athanasiou/Karta,* The Right to Development in a Climate Constrained World: The Greenhouse Development Rights Framework, p.10.

involved in the commitment regime. Although GHG emissions per capita of rapidly industrializing countries, such as China and India, are lower than the world average level, the rich groups in these countries enjoy much higher GHG emissions than the world average level and these high emissions are not at all regulated. As Paul Baer & Tom Athanasiou have stated:

> "The ethical principles by which we navigate our lives are primarily intended to apply to persons, but the agents negotiating the climate regime are nation-states. It is reasonable but by no means unproblematic to treat countries as if they had the uniform characteristics of their 'average' citizen. Inequality within countries is as great as or greater than inequality between countries, and the *practices* of international relations which place domestic inequality outside the bounds of global regulation should not prevent us from discussing its implications. "[119]

The equal entitlements to emissions principle requires that emissions higher than the world average level should be regulated or restricted. Although it is a matter of state's sovereignty to decide what kind of national policy to take,both developed and developing countries should commit to taking measures to regulate the individuals whose emissions are much beyond the world average level and the basic needs. This is the right method to interpret and apply the principle of equal entitlements to emissions. If luxurious emissions in developing countries are not regulated, the principle of equal entitlements to emissions can not really bring about equity to people in developing countries.

Thirdly, as above stated, Article 4.1 (b), (c) UNFCCC provides mitigation commitments for developing countries. Developing countries cannot be shielded from any effective mitigation commitments. However, they will be able to rely on the common and differentiated principle to make their commitments (including mitigations obligations) contingent upon the fulfilment of financial and technology transfer obligations, and the leadership of the industrialised countries, which means the industrialised countries should undertake GHG mitigation firstly, and provide corresponding financial and technology support when they argue for the developing countries to take mitigation obligations.

[119] *Baer/Athanasiou/Karta*, The Right to Development in a Climate Constrained World: The Greenhouse Development Rights Framework, p.12.

II.The Commitment Model of Developing Countries in Future International Climate Conventions

The issue of future international climate legal framework has drawn special attention both from the academic field and at a political level, and many proposals have been put forward regarding it. This thesis will not offer a detailed review of these proposals;[120] rather, here it will focus on the commitments model of developing countries in future climate agreements. It involves two important questions. What kind of commitments should the developing countries take? What kind of results could be brought about by different types of commitment?

1. Legally Binding Commitments or Non-binding Commitments

The critical reviews on the participation of developing countries in the present climate agreements concentrate on the fact that developing countries have taken no legally binding commitments in present climate agreements. Therefore, it is considered necessary that developing countries should take concrete legally binding commitments in future climate agreements, since legally binding commitments will trigger them to take more effective measures in climate protection. However, such a general viewpoint about the function of legally binding commitments deserves a more careful review and investigation in the fields of international climate protection law.

a)The Definitions of Legally Binding Commitments and Non-binding Commitments

In international law, especially in the fields of international environmental law, the line between legally binding and non-binding commitments remains blurred. The legally binding commitments fall into the category of "hard law"; while non-binding commitments in that of the "soft law". However, the characteristics of "hard law" and "soft law" are increasingly difficult to identify,[121] especially international environmental law.

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[120]The detailed review over this proposals can refer to *Bodansky/ Chou*, International Climate Efforts Beyond 2012: A Survey of Approaches, Pew Center Global Climate Change(December, 2004); and *Kuik* (ed.), Post-2012 Climate Policy: Assessing the Options International Climate.

[121]*Shelton,* Law, Non-Law and the Problem of "Soft Law", in *Shelton*(ed.),Commitments and Compliance: The Role of Non-Binding Norms in the Interantional Legal System,p.10.

The division between "hard law" and "soft law" are usually made considering the form of legal sources. The generally accepted categories of hard law are treaties, general principles of law, customary international law and "… judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determinations of rules of law."[122] These four sources are regarded as the source of international law. Soft law is described as "… either not yet or not only law".[123] The forms of soft law include declarations, codes of conduct, guidelines and other promulgations of the political organs of the United Nations systems, operational directives of the multilateral development institutions, resolutions and other statements by non-governmental organizations.[124] "It is thus generally understood that 'soft' law creates and delineates goals to be achieved in guidelines rather than actual duties, programs rather than prescriptions, guidelines rather than strict obligations."[125]

In the majority of cases, the softness of the form or instruments corresponds to the softness of its content. However, there exist many exceptions in practice, in particular in international environmental law.[126] A potential incoherency can be observed between the instruments or forms of the legal source and the "softness" of the content.[127] An increasing number of treaty provisions can be found in which the wording used is so "soft" that it seems impossible to consider them as creating a precise obligation or burden on parties to the treaty,[128] such as the provisions of general commitments in the UNFCCC and many provisions of Part XII of the 1982 UN Convention on the Law of the Sea. On the other hand, there are cases where the content of a formally non-binding instrument has been so precisely defined and formulated that some of its provisions could be perfectly integrated into a treaty.[129]

It is therefore difficult to define the scope of "hard law" and "soft law" just by the formal criterion.[130] The "substantial criterion" is another way to make a distinction between "hard law" and "soft law". However, even according to this criterion, a clear borderline between "hard law" and "soft law" is still not easy to draw. In most cases, "hard law" instruments can

[122] Article 38(1) of Intrnational Court.
[123] *Maggio/Lynch,* Human Rights, Environment, and Economic Development: Existing Standards in International Law and Global Society 6-19(World Resource Institute,1996). Cited from:*Hunter/Salzman,Zaelke*(eds.), International Environmental Law and Policy, p.203.
[124] *Ibid*., p.203.
[125] *Hunter/Salzman,Zaelke*(eds.), International Environmental Law and Policy, p.256.
[126] *Ibid.*, p.256.
[127] *Ibid.*, p.256.
[128] *Ibid.*, p.256.
[129] *Ibid.*, p.256.
[130] *Dupuy*, Mich. J. Int'l L.12(1991), 420-435.

be distinguished from "soft law" by internal provision and final clauses,[131] since legally binding obligations require the accurate, specific, and measurable provisions and the corresponding effective compliance mechanism. Yet both the accuracy of the content and the effective compliance mechanism remain great challenges which the international environmental law must confront. Sometimes the interests are too differentiated to give an accurate provision in the agreement, and there is no mandatory power to enforce the law in international society. That is why there are many ambiguous contents in international environmental law and in some cases even accurate and specific obligations cannot be enforced.

After all, form in law may also follow function. It is generally acknowledged that denominating something as "Law" makes a difference in expectations of compliance and consequences of non-compliance.[132] For example, it was apparent at the Rio Conference on Environment and Development that the non-governmental representatives had a strong preference for a binding Earth Chapter over the ultimately adopted Rio Declaration, but states were unwilling to accept a legally binding text due to consequences which would result from legal obligations.[133] Both the non-government group and the government group recognized that the form of the commitment made a difference.[134]

In conclusion, "if the norm is included in a non-binding instrument, it should be considered presumptive evidence of the 'soft' nature of the norm; at the same time, the 'hard' or 'soft' nature of the obligation definite in a treaty provision should not necessarily be identified on the sole basis of the formally binding character of the legal instrument in which the concerned norm is integrated and articulated."[135] Whether or not the commitments in the form of a treaty are legally binding or not, depends on the specificity of the commitment, the compliance mechanism and the intentions of the governments making the treaties. It should be considered in each specific case.

[131] *Shelton,* Law, Non-Law and the Problem of "Soft Law", in *Shelton(ed.)*:Commitments and Compliance: The Role of Non-Binding Norms in the Interantional Legal System,p.10.
[132] *Ibid.*, p.10.
[133] *Ibid.*, p.10.
[134] *Ibid*., p.10.
[135] *Dupuy*, Mich. J. Int'l L.12(1991), 420-435.

b) Legally Binding Commitments and Non-binding Commitments in the Case of Climate Protection

The current climate regime involves both legally binding commitments and non-binding commitments. The general commitments in UNFCCC taken by all parties of the treaty are assumed to be legally non-binding, because the provisions are defined so generally that it is difficult to examine and enforce them (except the commitments to submit the national inventories of GHG emissions according to Article 4.1(a) UNFCCC). While the developed parties have taken commitments to reduce their GHG emissions individually or jointly to 1990 levels by 2000, it remains disputable whether these commitments are legally binding or not. Some argue that these reduction commitments in UNFCCC are indirectly formulated: Annex I Parties shall adopt national policies by "recognizing that the return by the end of the present decade [1990's] to earlier levels of emissions […] would contribute to the modification of long term trends" (4.2(a)); Annex I parties shall *report* information on these policies and measures "with the aim of returning individually or jointly to their 1990 levels" (4.2(b)); the word 'stabilization' is avoided and a return to earlier emission levels is referred to.[136] Such indirect formulation is one factor which exerts an impact on the legal effects of these commitments,[137] because such loose phrasing of the commitments renders the developed parties to view them as inspirational rather than mandatory commitments.[138]

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According to the literal analysis it remains unclear whether the mitigation commitments made by developed parties in UNFCCC are legally binding or not. Yet if the compliance mechanism and the intention of the parties are taken into account, it is evident that these commitments are not legally binding. There is no accompanying compliance mechanism established in UNFCCC and some developed parties(for example, USA and Australia) lack the intention of fulfilling these commitments in practice to return the GHG emission to the level of 1990 in the practice. Therefore, although the mitigation commitments of developed countries are written into the UNFCCC, it is widely assumed that they are not legally binding.[139]

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[136] *Höhne et al.,* Evolution of Commitments under the UNFCCC: Involving Newly Industrialized Economies and Developing Countries, p.25.
[137] *Ibid.,* p.25.
[138] *Baumert/Kete*, Introduction : An Architecture for Climate Protection, in: *Baumert et al.(*ed.), Building on the Kyoto Protocol: Option for Protecting the Climate. p.29, note 12.
[139] *Ibid.,*p.29, note 12.

The mitigation commitments of developed countries in the Kyoto Protocol are assumed as legally binding. Firstly, they are in Article 3.1 of the Kyoto Protocol precisely and directly formulated. More importantly, the Kyoto Protocol is backed by procedures and mechanisms to determine and address cases of non-compliance, including through the development of an indicative list of consequences.[140] Article 18 of the Kyoto Protocol refers to non-compliance in the following terms:

> The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session, approve appropriate and effective procedures and mechanisms to determine and to address cases of non-compliance with the provisions of this Protocol, including through the development of an indicative list of consequences, taking into account the cause, type, degree and frequency of non-compliance. Any procedures and mechanisms under this Article entailing binding consequences shall be adopted by means of an amendment to this Protocol.

The procedures and mechanisms under Article 18 are laid down by the Marrakesh Accords in 2001. The procedures and mechanisms relating to compliance under adopted by the protocol include not only facilative, managerial mechanisms, but also enforcement mechanisms.[141] The COP-7 Decision establishes a Compliance Committee divided into a facilitative branch and an enforcement branch.[142] The facilitative branch is aimed at promoting compliance through positive, managerial measures. It is responsible for providing advice,facilitating financial and technical assistance, formulating recommendations to the Party concerned, and providing an early warning of non-compliance.[143] The enforcement branch is responsible for determining whether an Annex I Party is in compliance with its commitments, and applying the consequences for non-compliance.[144]

According to the Marrakesh Accords, if an Annex-party does not comply with its mitigation targets, the Enforcement Branch has the authority to declare the party as being in non-compliance and to apply specific consequences.[145] The specific consequences includes:

―Deduction from the Party's assigned amount for the second commitment period of a number of tonnes equal to 1.3 times the amount in tonnes of excess emissions;

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[140] *Fitzmaurice,* The Kyoto Protocl Compliance Regime and Treaty Law, Singapore Year Book of International Law(2004):23.
[141] *Crossen*, Resource Management Journal 2004(1), p. 2.
[142] *Crossen* , Resource Management Journal 2004(1), p. 2.
[143] *Crossen*, Resource Management Journal 2004(1), p. 3.
[144] *Crossen*, Resource Management Journal 2004(1), p. 3.
[145] Marrakesh Accords, Decision 24/ CP. 7 Procedures and mechanisms relating to compliance under the Kyoto Protocol in Report of the Conference of the Parties to the United Nations Framework Convention on Climate Change on its Seventh Session, U.N. Doc. FCCC/CP/2001/13/Add.3(2002), <http:// unfccc.int/reource/docs/cop7/13a03.pdf.> [hereinafter Marrakesh Accords Desion 24/CP.7]. Annex, Section XV.

— Development of a compliance action plan; and

— Suspension of the eligibility to make transfers under the emissions trading scheme until reinstated[146].

The combination of facilative and enforcement mechanisms is an innovative feasure of the compliance regime under the Kyoto Protocol. During the commitment period, managerial mechanisms are used to facilitate Annex I Parties in the implementation of their substantive obligations. After the commitment period ends and the Parties' progress is evaluated, punitive legal consequences can be imposed on the non-compliant Parties.

Although both facilative and enforcement mechanisms are used to ensure the compliance of legally binding commitments of annex-countries, only facilative mechanisms can be used for the compliance of commitments of developing countries.The commitments of developing countries for the GHG emissions reduction under the Kyoto Protocol are assumed to be legally non-binding, because the provisions are too general and there is no enforcement mechanism to ensure compliance of these commitments.The Facilitative Branch is responsible for addressing questions of implementation in regard to the adverse effects of measures on developing countries. But the punitive legal consequences enacted by the Enforcement Branch cannot be put on the developing countries, because the punitive legal consequences only bind the Annex-I parties who take the legally binding quantitative commitments.

c)The Effects of Legally Binding Commitments

The assuming of legally binding commitments by the developing parties means not only that the content of the commitents are specific and accurate, but also that both the facilitative mechanisms and enforcement mechanisms are applied to ensure the compliance of the commitments.

A non-compliance procedure is necessary for developing countries' legally binding commitments. "A non-compliance procedure needs both to reduce/eliminate the economic benefit to be derived from non-compliance and to facilitate compliance where obstacles relating to lack of capacity, particularly for developing states, are identifiable."[147] A facilative compliance mechanism alone is not sufficient for developing countries' legally binding commitments. It is necessary to introduce a coercive, sanction-based compliance

[146]Marrakesh Accords, Decision 24/ CP. 7, see supra, Annex, SectionXV(5)(a) (b)and (c).
[147] *Redgwell,* Non-Compliance Procedures and the Climate Change Convention. In:*Chambers*(ed.), Inter-Linkages: The Kyoto Protocol and the International Trade and Investment Regimes, p.57.

mechanism.This is applied to the developed parties under the present regime, because positivist approaches to law generally define a norm as a law if its breach is followed by sanctions or other means of enforcement.[148] However, will the presence of the punitive legal consequence promote the compliance of mitigation commitment in the developing parties? If so, to what extent does the presence of the "punitive" legal consequence promote the GHG mitigation commitments of the developing parties?

One important characteristic of international environmental law is that the realization of legal consequences due to non-compliance needs the cooperation of the non-compliant party.[149] International climate law is also confronted with such problems. If a party fails to comply with WTO regulations, other parties could resort to the organization's dispute settlement procedure. Receiving authorization from the Dispute Settlement Body, these can suspend the application of a previous given concession to the non-compliant party or other punitive measures.[150] The implementation of the punishments towards the non-compliance in the international trade does not need the cooperation of the non-compliant party. The implementation of punitive legal measures in the climate protection law is different from that in the international trade law. According to the present compliance regime, if a party is not complying with its emissions target, the party will receive reduced assigned amount emissions quotas with a penalty in the next commitment period.[151] These consequences cannot be implemented simply by the other party or by the Enforcement Branch. It is only the non-compliant party itself which can do this.[152] Another legal consequence for non-compliance is the suspension of the participation in the emissions trading mechanism. However, both legal consequences are significant only when the non-compliant party wants to enforce the commitments.[153] The non-compliant party may choose to back out of the climate agreement in the next commitment period. Such a withdrawal is rarely possible in the WTO regime because the interests are reciprocal. The withdrawal of a party is a great challenge for international climate agreement, since the climate is a global common good and the non-cooperator can still enjoy benefits from the actions taken by other parties. Jon Hovi and Bjart Holtsmark argue that the punitive legal consequences are likely having only a modest effect

[148] *Maggio et al*., Human Rights, Environment, and Economic Development: Existing Standards in International Law and Global Society 6-19(World Resource Institute,1996). Cited from:*Hunter/Salzman/Zaelke*(eds.), International Environmental Law and Policy, p.203.
[149] *Halvorseen/ Hovi,* International Environmental Agreements 6(2006), p.166.
[150] *Ibid.,*p.166.
[151] *Ibid.,* p.166.
[152] *Ibid.*, p.166.
[153] *Ibid.*, p.166.

on compliance levels.[154] If non-compliance is due to insufficient financial and technical capacity for compliance (non-intentional non-compliance), the punitive legal consequences cannot improve the compliance level.[155] If the non-compliant party deliberately fails to abide by its commitments (intentional non-compliance), it is likely to resist the application of punitive consequences through claiming more emissions quotas in the next commitments period or backing out of the agreements.[156] The capacity of punitive legal consequences to deter non-compliance and to induce a party to return to compliance is very limited.

2. Action-based Commitments, Target-based Commitments or Mixed Commitments

The commitments of developing countries under the present climate agreements are defined so generally (except for the commitment to submit the national GHG inventories) that it is difficult to make an assessment on whether the commitments are being upheld or not. It is widely accepted that compliance would be better with concrete norms which clearly convey what behaviour is expected than with ambiguous or vague norms. Therefore, the commitments for developing countries in future climate agreements should be concrete rather than general.

In regard to the mitigation commitments of developing countries, there are different approaches to make them specific. Generally speaking, all the commitments can be regarded as action-based commitments, because the legal commitments concern the regulation of the behaviour of the legal subject. In this thesis, the commitments of developing countries are classified into three types: Firstly, the commitments emphasising the specific measures to reduce emissions (in contrast to the business as usual level) rather than quantitative emissions reduction targets are classified as "action-based" commitments. Secondly, the commitments placing emphasis on quantitative mitigations targets rather than specific measures (the party has the freedom to choose measures regarded as suitable for its national situation) are called "targets-based" commitments. Thirdly, the commitments that combine these two kinds of commitments are mixed commitments.

[154] *Ibid.*, p.158.
[155] *Ibid.*, p.169.
[156] *Ibid.,* p.169.

a)Action-based Commitments

aa) Sustainable Development Policies and Measures(SD-PAMs)

The so-called "Protecting the Climate by Putting Development First" is a proposed action-based commitment for the developing countries provided by the World Resource Institute.[157] It focuses on making the developing countries take up obligations for the Sustainable Development Policies and Measures (SD-PAMs) in their national development plans. According to one WRI report, " SD-PAMs are defined broadly in this report as policies and measures taken by a country in pursuit of its domestic policy objectives—energy security, provision of electricity, improved urban transportation, for example—but which are shaped so as to take a lower-emission path to those objectives." [158] The commitments can be taken in the following forms[159]:a *single country* might pledge one or more SD-PAMs that is unique to its national circumstances and not directly related to the pledges of other countries; two or more countries may make *mutual pledges*, perhaps consisting of simultaneous pledges by both a developing and a developed country; and lastly a group of countries could make *harmonized pledges* in an SD-PAMs negotiation process. This approach acknowledges the global nature of many industrial activities, and opens the door to multiple countries agreeing to the same kind of measures to promote or maintain an "even playing field" for competitive industries.

bb) Extended CDM

Extended CDM would allow sector policies to be eligible CDM projects. Comprehensive climate change action would be rewarded in part with emission reduction credits that can be sold on the market.[160] The Extension of the CDM to sector policies serves to remove the hurdles of project-focused CDM, and to put the CDM in full play. In light of this suggestion, "the Sector-CDM represents an expansion of the scope of the CDM to cover entire national sectors (such as cement or power production) or geographic areas (such as a municipality). This approach could support emission reductions and sustainable development benefits—the

[157] *World Resource Institute*, Grow in the Greenhouse: Protecting the Climate by Putting Development First, p.7.
[158] *World Resource Institute,* Grow in the Greenhouse: Protecting the Climate by Putting Development First , p.7.
[159] *World Resource Institute,* Grow in the Greenhouse: Protecting the Climate by Putting Development First , p.7.
[160] *Joséluis/Christiana*, Evolving to a Sector-Based Clean Development Mechanism, in : *Baumert et al*.(eds.), Building on the Kyoto Protocol: Options for Protecting the Climate, pp.89 et seq.

two expected by-products of the CDM—across a wider array of activities"[161]. This approach could also bring financial resources to fund sustainable development measures and policies.

cc) Harmonized Domestic Policies and Measures

Since the international climate change negotiations first began in the early 1990s, commitments related to Policies and Measures (PAMs) have been seen as the principal alternative to emission targets. PAMs commitments could supplement or serve as an alternative to emission targets,which include such policies and measures as follows[162]:

Coordinated carbon tax

In the "coordinated carbon tax", developing countries are required to agree to tax domestic carbon emissions at "harmonized" rates, which are also applied in developed countries.[163]

Several rationales have been given for harmonized carbon taxes over emission targets. A harmonized carbon tax would be more efficient and effective; it would provide certainty about marginal compliance costs (although the emissions reductions resulting from the carbon tax would be uncertain); and it would increase the transparency of those costs.

Technology approaches

Given the difficulties in negotiating and enforcing emissions targets, a technology-centred approach involves the negotiation of protocols to finance collaborative research and development, to develop common technology standards, and to support deployment of new technologies. The main components are as follows:

"(1) an R&D protocol to "push" the development of new technologies; (2) protocols establishing technology standards to provide a "pull" incentive to commercialize new, low-emitting technologies; (3) a multilateral fund to help spread new technologies to developing countries; (4) a short-term system of pledge and review; and (5) a protocol for adaptation assistance."[164]

[161] *Iisd(International Institute for Sustainable Development),* Issues and Options: The Kyoto Protocol's Second Commitment Period, p.4.
[162] *Bodansky/Chou,* International Climate Efforts Beyond 2012: A Survey of Approaches, Pew Center Global Climate Change(December, 2004).
[163] *Ibid.*
[164] *Bodansky/Chou,* International Climate Efforts Beyond 2012: A Survey of Approaches, Pew Center Global Climate Change(December, 2004), p.59.

b)Targets-based Commitments

aa) Quantitative Mitigation Targets

Under quantitative mitigation commitment, developing countries are required to confine their emissions to a certain level within a certain year.[165] They would face legal consequences, if their emissions surpass the required level. The target can be reached in a flexible manner across sectors and borders through emission trading.

The great advantage of this approach is that it can control GHG emissions at a level needed to prevent dangerous anthropogenic interference with the climate system, because emissions targets provide certainty about the future emission levels of developing countries.

bb) Indexed targets

To address the issue of cost uncertainty and take development rights of developing countries into account, targets could be indexed to some other variable, such as GDP, rather than set absolutely. Different from a quantitative mitigation target that sets the absolute quantitative limitation on the national GHG emissions, developing countries are permitted to increase their GHG emissions under the indexed target commitment. On the other hand, developing countries are also required to control the strong increase trend of GHG emissions[166]. The report of Pew Centre on global climate change summarizes six different kinds of dynamic targets commitments:[167]

Intensity targets—On the grounds that, "the challenge for most developing countries is not to reduce absolute emission levels but to lower the greenhouse gas intensity of their economies",[168] developing countries are obliged to reduce their GHG intensity, since the intensity indicator provides a more realistic and practical framework for participation by

[165] *Höhe/Lahme,* Types of Future Commitments under the UNFCCC and the Kyoto Protocol Post 2012, p.7.

[166] *Bodansky/Chou,* International Climate Efforts Beyond 2012: A Survey of Approaches, Pew Center Global Climate Change(December, 2004).

[167] *Bodansky/Chou*, International Climate Efforts Beyond 2012: A Survey of Approaches, Pew Center Global Climate Change(December, 2004), p.11.

[168] *Baumert/Bhandari/Kete,* What Might a Developing Country Climate Commitment Look Like? Washington, DC: World Resource Institute, 1999.

defining the emissions that an economy generates *per unit of output.* This GHG intensity indicator can be illustrated as:[169]

$$GHG\ intensity\ indicator = \frac{GHG\ emissions}{gross\ domestic\ product}$$

Performance targets or sector targets—Performance targets define an amount of allowed emissions relative to a unit of production (for example, tons of steel produced, or kilowatts of electricity). In essence, they are carbon intensity targets defined for a particular sector or product, rather than for the economy as a whole.[170]

No lose targets—The developing countries are obliged to control the total GHG emissions or reduce the GHG intensity in accordance with their specific domestic situation. But such kinds of commitments are in essence non-binding, since if the developing countries haven't achieved the goal, there are no negative consequences. But if a state's emissions are below the "no lose target", it would be allowed to sell the surplus emissions to other countries and thereby receive a benefit.

Dual intensity targets—Dual intensity targets combine dynamic and "no lose" targets in a further effort to address the problem of economic uncertainty. Developing countries would receive two targets: a relatively weak "compliance" target and a more stringent "selling" target.[171] The compliance target is legally binding, which means a country would suffer compliance consequences in the case of non-compliance.[172] In contrast, the selling target would be "no lose": if a country exceeds its target, it would not suffer any compliance consequence but, if it betters the target, then it could sell its excess allowances internationally.[173]

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[169] *Baumert/Bhandari/Kete*, What Might a Developing Country Climate Commitment Look Like? Washington, DC: World Resource Institute, 1999.

[170] *Baumert/Kete*, Introduction : An Architecture for Climate Protection, in: Baumert et al.(eds.), Building on the Kyoto Protocol: Option for Protecting the Climate, p.15-16.

[171] *Bodansky/Chou*, International Climate Efforts Beyond 2012: A Survey of Approaches, Pew Center Global Climate Change(December, 2004), p.11.

[172] *Bodansky/Chou,* International Climate Efforts Beyond 2012: A Survey of Approaches, Pew Center Global Climate Change(December, 2004), p.11.

[173] *Baumert/Kete*, Introduction : An Architecture for Climate Protection, in: Baumert et al.(ed.), Building on the Kyoto Protocol: Option for Protecting the Climate, pp.15-16.

Conditional targets—According to the Human Development Goals proposal,GHG emissions of a developing country should serve to meet basic human development needs rather than luxurious needs. If this developing country target goes beyond projected business-as-usual improvements in carbon intensity, it should be made conditional on the receipt of financial assistance or technology from developed countries.[174]

c) Mixed Commitments

Under the Multi-Stage approach, developing countries can shoulder the action-based commitments or target-based commitments according to their specific development stage.
Mixed systems consider both the egalitarian principle that all people are entitled to equal access to atmospheric resources, and the burden-sharing principle which differentiates obligations according to abilities to contribute to abatement.[175] The Multi-stage proposals, for example ,combine differentiation in the stringency of commitments with differentiation in the type of commitments, identifying four stages through which developing countries pass: (1) no targets, (2) a GHG intensity target, (3) a target to stabilize absolute emissions, and (4) a target to reduce absolute emissions.[176]

d) Are the Target-based Commitments More Climate-effective than Action-based Commitments?

Under the present climate regime, developing countries make the commitment to "formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change."[177] Such a commitment is a typical action-based commitment. But this type of commitment is assumed to have a lack of accuracy. It is difficult to measure whether a party has accomplish its commitment or not. Therefore, the GHG reduction targets cannot be ensured with such action-based commitment, whether the aim of climate protection can be achieved or not, is unpredictable.

However, target-based commitments cannot necessarily result in environmental effectiveness. The environmental effectiveness of target-based commitments depends not only

[174] *Pan,* International Environmental Agreements 5 (2005), pp.89–104.
[175] *Grubb/Sebenius*, Participation, Allocation, and Adaptability in International Tradable Emission Permits Systems for Greenhouse Gas Control. In *OECD* (Ed.), Climate Change: Designing a Tradable Permit System, pp.4 et seq.
[176] *Den Elzen* et al., 'Exploring Climate Regimes for Differentiation of Commitments to Achieve the EU Climate Target', RIVM-report 728001023, RIVM, Bilthoven, The Netherlands.
[177] Article 4.1(b) UNFCCC.

on what kind of target commitments are taken, but also on the practical compliance of the commitments. If the emissions targets are too loose, or the developing party does not accomplish the target, then the target-based commitments cannot be effective. Given the uncertainty of future emissions in developing countries and their practical situations,both kinds of risk—loose target or non-compliant targets in spite of its environmental effectiveness— exist.

On the other hand, action-based commitments do not necessarily mean environmental ineffectiveness. Action-based commitment can be defined accurately, specifically and measurably. For example, international climate agreements can stipulate the mandatory technological standard for a certain sector or product, require that every party use a certain percent of their budget for GHG control, and require the party to abolish the subsidies for the fossil energy, etc.. Such action-based commitments are likely to bring about environmental effectiveness in the long run, if they are well-designed. Since, the reduction of GHG emissions in developing countries depends in the lung run on energy transformation and the technology development, if developing countries take the specific measures which can promote and accelerate energy transformation and technology development, the aim of climate protection can also be achieved in this way.

III. Effective Participation of Developing Countries in Climate Protection: the Commitments of Developing Countries and the Future International Climate Protection Legal Regime

The equity of the international climate regime, and the possible types of commitments for the developing countries are presented above. In this part, the discussion of equity and the types of commitments is combined for a conclusion on what kinds of commitments will effectively promote the participation of developing countries in climate protection.

1. Creating Incentives for the Developing Countries' Participation with Different Types of Commitments

As above discussed, the main problem with international climate regime is the lack of a supranational authority that could coerce countries into the implementation of globally efficient climate policies. Therefore, even if a party has made a legally binding target-based

commitment, the implementation is in the end self-enforcing.[178] The main challenges to the climate regime come not only from creating incentives for sovereign states to enter agreements, but also from creating incentives for implementing the cooperation agreement. The main commitments of developing countries can be divided into four types: legally binding target-based commitments, non-binding target-based commitments, legally binding action-based commitments and non-binding action-based commitments. In the following the incentive of developing countries in the four types of commitments is discussed.

a) Legally Binding Target-Based Commitments

The incentive problem cannot be solved through legally binding target-based commitments (an absolute quantitative commitment or an indexed target commitment). In legally binding target based commitments, if a developing party cannot achieve its emissions mitigation targets, it should take punitive consequences. It is difficult to persuade a developing party to take such target-based commitments with legal punitive consequences before their emissions per capita have reached the world average level. Even if they have made such commitment, can the punitive consequences deter non-compliance in the present commitment period, and induce a developing party to continue the cooperation and return compliance in next commitment period? As noted above, the ability of punitive effects to deter non-compliance and to induce long-term compliance in the case of climate protection needs questioning even if the parties are the developed countries, whose emissions per capita have surpassed the world average level. For developing countries whose emissions per capita are below the world average level, such punitive, coercive consequences under the non-compliance of target-based commitments have no legitimacy basis, since, if the emissions per capita of a developing party have not reached the world average level, it should have the right to emissions and should not be punished due to non-compliance with mitigation target."The effectiveness of any enforcement mechanism will be determined by its measure of legitimacy."[179] The ability of punitive, coercive consequences to deter non-compliance and to induce long-term compliance in the case of a developing party with lower emissions per capita compared to the world average level is less than in the case of a developed country, as illegitimacy is "one of the principal rationales against the use of coercive enforcement in international law."[180]

[178] *Halvorseen/Hovi,* International Environmental Agreements 6(2006), pp.157-158.
[179] *Crossen*, Georgetown International Environmental Law Review(2004), p.473.
[180] *Crossen*, Georgetown International Environmental Law Review(2004), p.473.

The ability of legally binding commitments with punitive consequence to deter non-compliance and to induce compliance in the future can be enhanced through issue linkage, consisting of the exchange of concessions across different policy dimensions.[181] The incentive of developing countries to contribute to GHG abatement can be invoked via a threat of not enjoy the benefits of other agreements, such as trade treaties and R&D cooperation treaties.[182] Issue linkage thus boils down to reducing the pure public good character of GHG abatement and thereby lowering free-rider incentives of developing countries.[183]

However, such issue linkage might also be confronted with legitimacy problems in the case of target-based commitments of a developing country. It is unfair to require a developing country to assume a legally binding target-based commitment when its emissions per capita have not reached the world average level, and therefore, the penalty linked with trade measures for non-compliance with the target-based commitments will lose its legitimacy basis.

b) Non-binding Target-Based Commitments

Before the emissions per capita of one country reach the world average level, it is unfair and difficult to force that country to make a target-based commitment or to punish it if it cannot accomplish its target-based commitment. The incentive of developing parties whose emissions per capita are below the world average level to make the GHG abatement can not be created in this way. On the contrary, non-binding target-based commitments can provide incentive for developing countries with lower emissions per capita compared to the world average level to make GHG mitigation, if their achievement of non-binding commitments can be promoted and encouraged by facilitative and "stimulative" mechanisms.

The managerial, facilitative mechanisms in the Marrakesh Accords can help a developing country achieve of non-binding commitments. Insufficient financial and technological capacity is a key barrier to effective GHG mitigation. The capacity building mechanism in the Marrakesh Accords should be further strengthened.

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[181] *Böhringer,* The Kyoto Protocol: A Review and Perspectives, Discussion Paper No.03-61 of Center for European Economic Research(Mannheim).p.11.
[182] *Ibid.*, p.11.
[183] *Ibid.,* p.11.

Moreover, "stimulative" mechanisms can be introduced to encourage developing countries below the world average emissions per capita to achieve the non-binding commitments. "No-lose" target commitment is a good approach in encouraging developing countries to take and meet a non-binding commitment. A developing country would be required to control their total GHG emissions or to reduce GHG intensity in accordance with its specific domestic situation. If it has not achieved this goal, there are no compliance consequences. But if a state's emissions are below the "no-lose" target, it would be allowed to sell the surplus emissions to other countries and thereby receive a benefit. If the benefits from selling the surplus emission reductions are invested into programs relating to GHG abatement, then this developing party would be headed in a good development direction.

c) Legally Binding Action-Based Commitments

If the content of action-based commitments is accurate and measurable, and compliance with the commitments is backed up by both facilitative and enforcement mechanisms, the action-based commitments are legally binding.

Action-based commitments can be defined accurately and measurably. For example, the international climate agreement can stipulate the mandatory technological standard for a certain sector or product, can require that every party make a certain percent of its budgets into GHG control, and can require the party to abolish the subvention for the fossil energy product and service, etc.. Action-based commitments do not mean necessarily environmental ineffectiveness. They are likely to bring about environmental effectiveness in the long run, if they are well-designed, since, in the lung run, the reduction of GHG emissions in developing countries depends on energy transformation and technology development, if developing countries take the specific measures which can promote and accelerate the energy transformation and technology development, the aim of climate protection can also be achieved in this way.

Action-based commitments are different from target-based commitments in that they have not set any mandatory emissions targets for developing countries before their emissions per capita reach the world average level. Therefore, the use of enforcement mechanisms in the case of non-compliance is not against the principle of equal emissions per capita, and is likely to be accepted and enforced by developing countries below the world average level.

However, there are different kinds of action-based commitments. Whether a legally binding action-based commitment can be justifiable and accepted by the developing countries or not relies upon the concrete content of the commitment. There are two kinds of action-based commitments which are justifiable and likely to convince developing countries to accept and implement them.

The first kind of commitments are the "no-regret" commitments, which refer to measures for controlling GHG which can bring about net benefits certainly not just for the world, but also for the countries that adopt these measures. Such "no-regret" commitments include: the grdual abolishment of subsidies for the fossil energy, ensuring that a certain percent of the public budget used in the programs related to GHG mitigation, creating the necessary condition for competition of renewable energy with the fossil energy, promoting energy conservation and so on. It is necessary for developing countries to assume these "no-regret" commitments in the international agreement, though they may also adopt these measures by itself. This is because some developing parties may give up some "no-regret" measures or hesitate to take these measures on their own due to domestic political pressure, even if they acknowledge that these measures will definitely bring about benefits in the long run. But if they are confined to the international agreements, the government will gain the legal support to deal with the domestic political pressure.

Another kind of commitment is to make investments in cooperative R&D programs and to accept common technology standards in a certain product or service. Semilar technology approaches have yielded successful results in the Montreal Protocol on Substances that Deplete the Ozone Layer and the Marpol Agreement. Taking the Montreal Protocol as an example, it chooses a technology-focused model: developing countries are committed to transform into the new technology and phase out the old technology, whereas the developed countries take reciprocal commitment, to provide financial compensation for the "agreed incremental costs" for the transition to new technology. [184] Such technology-based commitments can be accepted and implemented by some like-minded developed and developing countries. They also have the potential to be extended to even more developing

[184] *Brenton,* The Greening of Machiavelli: the Evolution of International Environmental Politics, London: Royal Institute of International Affairs, GE170.B74, 1994.

countries with the help of the development of the market, especially in sectors such as the automobile industry, the wind energy industry, etc..

Both kinds of commitments are justifiable and can be accepted as well as implemented by the developing countries, if the developed parties have made the mandatory quantitative commitments. The principle of common but differentiated obligation entails the necessity of both the differentiated obligation and the common obligation. All countries have the obligation to take effective action; developing countries are not excluded, even if their emissions per capita are lower than the world average level. They should be exempted from legally binding quantitative commitment before their emissions per capita reach the world average level, but they should not be exempt from the action-based commitments, as long as such a commitment is not beyond their capacity.

The acceptance possibility of the first kind of action-based commitment, i.e. the "no-regret" commitment, needs no more argumentation. In fact, many developing countries have already adopted or will adopt some of these measures. Nevertheless, it is a question of whether or not the developing countries would take part in the R&D programme and accept the common new technology standards[185]. In contrast to a legally binding target-based commitment, it has a higher possibility of persuading more developing countries to participate. It can bring about more benefits to participating parties, if the R&D and technology protocols are designed as "club-good" agreements, in which the benefits from cooperation are exclusive to signatories,[186] and if the major industrialised countries have participated. The power of the market will create incentives for developing countries to join in on this kind of agreement, and if they are supported by special funds, the acceptance possibility of such commitment by developing countries will increase even further.

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To enhance the implementation of these two kinds of commitments, both punitive and facilitative measures can be used to deal with non-compliance. Compliance can be enhanced to a great extent because of the incentive of developing countries to implement these commitments, as well as the "issue linkage" possibility. Because action-based commitments

[185] *Barrett*, Kyoto Plus, in: *Helm*(ed.), Climate-change Policy, p.300.
[186] *Eyckmans/Finus*, International Environmental Agreements 7 (2007) , pp. 90-91.

for developing countries have gained the legitimacy basis, trade measures can possibly be used to punish non-compliance and to induce compliance. [187]

d) Non-binding Action-based Commitments

The commitments of developing countries under the present international climate regime falls into the category of non-binding action-based commitments. Such commitments cannot ensure their implementation and environmental effectiveness. In the future international climate legal regime, this type of commitment should not become the main commitment, although it can play a supplementary role in climate protection.

2.The Commitment Model of Developing Countries and Future International Climate Protection Legal Regime

To achieve the aim stipulated in Article 2 of the UNFCCC, developing countries, particularly the quickly-industrializing countries must take an active and significant participation in the mitigation of GHG emission. In light of the principle of "equity" in Article 3 UNFCCC, the approach for GHG mitigation is clear: decade by decade industrialized countries must gradually reduce emissions, while developing countries must curb the expected increase in their emissions to the slowest sustainable rate before their emissions per capita reach the world average level.

Before the emissions per capita of a developing country reach the world average level, it is unjustifiable to require it to make a legally binding target-based commitment. However, the current commitment model for developing countries (a non-binding action-based commitment) under UNFCCC and the Kyoto Protocol is not sufficient for effective climate protection. The justifiable, acceptable and enforceable commitments are non-binding target-based commitments and legally binding action-based commitments. In particular, action-based commitments can play an important role in the future climate agreement for the

[187]The detailed discussion concerning using trade measures to promote compliance of climate protection commitment, see *Stokke*, International Environmental Agreements: Politics, Law and Economics 4(2004), pp.339-357.

countries below the world average level emissions. The first step is to involve a developing country in legally-binding action-based commitments. In COP 13, the parties agreed to enhance "nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner".[188] This is an important step to involve a developing country in a legally binding action-based commitment. At the same time, if developed parties can successfully reduce their GHG emissions, then it is likely to induce a developing country take non-binding target-based commitments supported by facilitative and stimulative mechanisms before its GHG emissions per capita reach the world average level.

[188]Bali Action Plan, Decision -/CP.13, 2007.

D. National Climate Protection within the Legal Framework of China

I. Climate Protection as the State's Legal Duty

Climate protection as a public task can not be accomplished without the effective implementation of the state. A state can choose how specifically to use public or private law instruments to control the GHG emissions. Climate protection firstly involves several questions of public law: a)What kind of legal effects on the Chinese legal system do the legal commitments as defined in international climate protection law have? b) What is the current legal status of climate protection in the Constitution of China? c) How can climate protection implemented through the specific instruments? The first two will be dealt with in this section.

1. Legal Effects of China's Commitments in International Climate Law

China has adopted a positive attitudes towards the negotiation and implementation of multilateral environmental agreements. In the international arena, China has classified itself as a developing country and has signed as well as ratified the UNFCCC and the Kyoto Protocol. According to the UNFCCC and the Kyoto Protocol, China as a developing country at present only assumes general commitments.

Though the Chinese Constitution has nothing to say on the relation between international and national law, several national laws explicitly recognize the supremacy of international treaties. As for environmental protection, Article 46 of the "Environmental Protection Law" (1989) stipulates that if an international treaty regarding environmental protection acceded to by China contains provisions differing from those contained in the laws of China, the provisions of the international treaty shall apply, unless China has announced reservations to them.[189] Article 46 of the Environmental Protection Law is also applicable to climate protection. Concerning climate protection, the UNFCCC and the KP have supremacy effect over national laws, as China has not announced any reservations towards the two. As Part A states, although developing countries are exempt from the legal commitments in Article 4.2

[189] *Song,* The Chinese Environmental Law Making Framework, Chinese Journal of International Law, 2002(1), p.230.

UNFCCC, they have assumed legal commitments in Article 4.1 UNFCCC that deal with the common duty to manage climate protection. According to Article 4.1 (b), (c) UNFCCC, developing countries commit themselves to "formulate, implement, publish and regularly update national and where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions" and to "promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices, and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases". Since China has certified the UNFCCC and the KP, it is obliged to implement these commitments in the national legal system.

2. Climate Protection as a State Duty in the Constitution of China

The current constitution of China was promulgated by the NPC in 1982 and amended in 1988, 1999 and 2004. Article 26 and Article 9(2) CC directly concern environmental protection. Article 9(2) CC states that, "[t]he state ensures the rational use of natural resources and protects rare animals and plants. The appropriation or damages of natural resources by any organization or individual by whatever means is prohibited." Article 26 CC stipulates, "T(t)he state protects and improves the environment in which people live and the ecological environment. It prevents and controls pollution and other public hazards."

Article 9(2) CC and Sentences 1 and 2 of Article 26 CC are interpreted as the environmental protection clause in China, which grants the state the power to protect the environment and ensure rational use of natural resources.[190] Furthermore, it is the obligation of the state to take such measures.[191] Article 26(1) is directly related to climate protection, because the climate plays an essential role in the "living environment and the ecological environment". If the trend of increasing GHG in the atmosphere can not be effectively relieved, global warming will bring about a series of risks and public hazards, including harm to the living environment and the ecological environment, natural catastrophes and so on. Climate change is the most important public hazard that all people face. The state has the duty to "protect and improve the living environment and the ecological environment, and prevent and control pollution and other public hazards", thus, it is the duty of the state to

[190] *Song*, Chinese Journal of International Law 1 (2002), p.227.
[191] *Song*, Chinese JIL 1 (2002), p.227.

protect the climate. Furthermore, the measures adopted by the state should be effective enough so that the public hazards due to climate change can be controlled or prevented.

Thus, the state undoubtedly has the duty to take measures to protect climate. However, it is difficult to define which measures are effective enough to control and to prevent public hazards which result from climate change, especially considered that this control and prevention needs the cooperative endeavour of all countries around the world. In domestic legal and political practice of China, climate protection is inclined to be overlooked, underestimated, and even sacrificed due to attempting to accomplish other state duties, such as the provision for people's basic needs, energy security, and other environmental protection tasks. In the following section, the relationship between the duty of climate protection and other duties will be discussed, and then, the necessary(but insufficient) requirements for the effectiveness of state duty to protect climate will be dealt with.

3. The State Duty to Protect the Climate and other Important Duties

a) Provision for Peoples' Basic Needs and Climate Protection

aa) Provision for the Peoples' Basic Needs as the State's Duty

Chinese and Western conceptions of human rights differ from each other.[192] Chinese notions of human rights attach more importance on economic rights than do their counterparts in the West.[193] The Chinese government has in the past placed economic development, as well as national independence and sovereignty, ahead of full-fledged political freedom.[194] Such emphasis is embodied in the fact that China has ratified the Convention of the United Nations on Economic, Social and Cultural Rights, but not the Convention of United Nations on Political Rights and Civil Rights.

[192]Here it is refered to the official standpoint.
[193]*Angle,* Human Rights and Chinese Thought:A Cross-Cultural Inquiry, p.239.
[194]*Angle*, Human Rights and Chinese Thought:A Cross-Cultural Inquiry, p.239.

The state's duty to provide for the people's basic needs is an essential element of the right to subsistence and to development, which is anchored in the Convention of the United Nations on Economic, Social and Cultural Rights(hereinafter referred as "UNESC") and highlighted by the Chinese government. According to Sentence 1 of Article 11(1) of UNESC, "(T)the States Parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions". As a state party that has certified this covenant, the Chinese government has the duty to "take appropriate steps to ensure the realization of this right, recognizing to this effect the essential importance of international co-operation based on free consent".[195] The right to subsistence is also highlighted by the Chinese government as "the foremost human right the Chinese people long fight for" in the first Governmental White Paper on Human Rights issued by the Information Office of the State Council in 1991. Since it is assumed as the foremost human right, it is necessarily inclusive in the conception of "human right" in item 8 of Amendment Fourth of Constitution of China, which added a third paragraph to Article 33 ,"(T)the State respects and preserves human rights."

bb) The Relation between the Provision of the People's Basic Needs and Climate Protection

In order to fulfil the people's basic needs, it is necessary to build energy-intensive stocks and energy flows to levels that are sufficient to satisfy basic needs.[196] This will result in a substantial GHG increase. To provide basic needs for the people, "large amounts of energy-intensive investment has to be made to accumulate fixed stocks of physical infrastructure, capital and durable goods".[197] Compared with developed countries, in which fixed stocks have already been built up, "a rapidly industrializing China is at the stage of increasing both stocks and flows of carbon".[198] By the end of 2005, 56% of the total population (750 million)was still living in the countryside, and the annual per capita income of 23.65 million

[195]Sentence 2 of Article 11(1) UNESC.
[196] *Pan/Zhu/Chen*, Fulfilling Basic Development Needs with Low Emissions: China's Challenges and Opportunities for Building a Post-2012 Climate Regime, in: *Sugiyama*(ed.), Governing Climate: the Struggle for a Global Framework Beyond Kyoto, Pubished by International Institute for Sustainable Development(Manitoba, Canada) 2005, p.91, Web Site: http://www.iisd.org/
[197] *Ibid.*, p.91.
[198]*Ibid.,* p.91.

of these people was less than 683 RMB.[199] "As China is in the process of rapid industrialization and urbanization, energy consumption and emissions have been increasing quickly to build energy-intensive, man-made capital stocks and to raise energy flows".[200] Even if the Chinese economy develops quickly within the next 20 years, it would still have a low level of economic development on the whole. The GDP per Capita of China in 2005 was USD 1,714(based on exchange rate of that year), only one fourth of the world average.[201] In order to ensure that the basic needs of people in China can be fulfilled, China is unwilling to take on any legally binding obligations for mtigation of GHG emissions, worrying that such obligations would deter economic development and result in bearing an unjust cost, which would make it more difficult or impossible for the government to fulfil the basic needs of the people.

On the other hand, just as Stern Review has stated,

"The evidence shows that ignoring climate change will eventually damage economic growth. Our actions over the coming few decades could create risks of major disruption to economic and social activity, later in this century and in the next, on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century. And it will be difficult or impossible to reverse these changes."[202]

If the problem of GHG emissions control would not be solved in a reasonable way and climate change cannot be controlled on a level "that would prevent dangerous anthropogenic interference with the climate system", the satisfaction of people's basic needs could not be realized in China. Even if it could, such achievements would be damaged by climate change. Scientific research has shown that climate change will bring about a food supply problem, and will further increase water shortages and health problems due to a deteriorated environment in China.[203] Although the food problem may be solved through imports from other

[199] *Gao*, Policies and Measures of China on Climate Change Mitigation under the Framework of Sustainable Development, The 2nd Workshop of Dialogue on Long-term Cooperation Action. Available at: unfccc.int/files/meetings/dialogue/application/vnd.ms-powerpoint/061115_cop12_dial_3.pps.
[200] *Pan/Zhu/Chen*, see supra, p.91.
[201] *Gao,* Policies and Measures of China on Climate Change Mitigation under the Framework of Sustainable Development, The 2nd Workshop of Dialogue on Long-term Cooperation Action.
[202] *Stern*(ed.), Executive Summary of "Stern Review: The Economics of Climate Change", p.2.
[203] "Stern Review: The Economics of Climate Change" and "National Assessment on Climate Change" have summarized the main effects, which will be brought about by climate change across China's regions. These serious effects due to climate change have been envisaged in the China's National Programme on Climate change. Please refer to: *Stern*, Stern Review: The Economics of Climate Change, pp.72-73; *LIN Erda, XU Yinlong, JIANG Jinhe, et al.,* National Assessment on Climate Change (II): Climate change impacts and adaptation(Chinese), Advances in Climate Research(Qihou Bianhua Jingzhan), Vol. 2 No. 2 March 2006 :56-62. Here I cite the main effects of climate Change as summarized in "Stern Review: The Economics of Climate Change":

There is significant variation in climatic patterns across China's regions including arid,

countries, but the health and water scarcity problems will become a great threat to the people's existence rights.

cc) Excessive GHG Emissions Beyond Basic Needs Cannot Be Justified in the Name of Provision of the Peoples' Basic Needs

Under present technological conditions, the usual path from poverty to prosperity is via a development process that involves dramatic increases in per capita use of fossil energy.[204] According to the rights to equality, subsistence and development, it is unfair to require a country to take absolute GHG emission reduction obligations before its GHG emission per capita reaches the world average level.

However, merely relying on national per capita averages would fail to capture both the true depth of the development need and the actual extent of national wealth, because inequality within countries is even more serious than inequality between countries in terms

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temperate and mountainous regions. The average surface air temperature in China has increased by between 0.5 and 0.8°C over the 20th century with increases more marked in North China and Tibetan Plateau compared to southern regions. Temperature rise will lead to temperate zones in China moving north as well as an extension of arid regions. Cities such as Shangai are expected to experience an increase in the frequency and severity of heat waves causing significant discomfort to fast growing urban populations.

Overall water scarcity is a critical problem in China with existing water shortages, particularly in the north (exacerbated by economic and population growth). Climate change is expected to increase water scarcity in northern provinces such as Ningxia, Gansu, Shanxi and Jilin province. An increase in average rainfall in southern provinces such as Fujian, Zhejiang and Jiangxi is anticipated over the next 50 to 100 years leading to more instances of flooding. From 1988 to 2004, China experienced economic losses from drought and flood equating to 1.2% and 0.8% of GDP respectively.

Climate change is expected to have mixed effects on agricultural output and productivity across different regions with impacts closely related to changes in water availability. On average, irrigated land productivity is expected to decrease between 1.5% to 7% and rain fed land by between 1.1% to 12.6% under rain- fed conditions from 2020s to 2080s under HadCM2, CGCM1 and ECHAM4 scenarios in China. Overall a net decrease in agriculture production is anticipated with seven provinces in the north and northwest of China particularly vulnerable (accounting for 64 of total arable land and 14% of China's total agricultural output by value).

[204] *Baer/Athanasiou/ Kartha*, The Right to Development in a Climate Constrained World: The Greenhouse Development Rights Framework, p.10.

of the GHG emissions and wealth distributions.[205] The case of China is typical of the serious inequality between individuals in terms of wealth and GHG emissions. China has made great improvement in economic and social development: in the past 26 years, China's GDP has grown an average of 9.4 percent a year, and the absolute poor population in rural areas has dropped from 250 million to 26.1 million.[206] Nevertheless, this development has not brought fair benefits to people. "China remains plagued by imbalances in development most notably between urban and rural areas, between regions, between sexes, and between different population groups."[207] According to the estimate of the World Bank, China's national Gini coefficient for income distribution rose from 0.30 in 1982 to 0.45 in 2002, a 50 percent increase in two decades. The average income of the highest-income decile group in China is eleven times that of the lowest-income decile group.[208] As far as the GHG emissions is concerned, while the emissions per capita of China accounts for only 2 /3 of the world average level, the wealthy class can enjoy the high level of emissions freely. On the one hand, China needs enough emission rights to ensure economic and social development and to fulfill the basic needs of the people, on the other hand, the wealthy classes waste the large emission capacity to meet their luxurious needs. Such luxurious emissions currently do not bear any kinds of restrictions or ecological costs, and even enjoys the public subsidy in the name of "provision for the people's basic needs".

The national legal system's hesitation in regulating and even encouraging such luxurious emissions is far from the requirement of the "equal entitlement to GHG emissions" principle and can not be justified in the name of "provision for the peoples' basic needs". Firstly, the principle of "equal entitlement to GHG emissions" is the normative criterion dealing with the distribution of responsibility and emission rights between countries on an international level. However, the starting point of "equality" should be with the individual.[209] The political entity is in essence a union of individuals and serves as the representative of the citizen in the negotiation of climate treaties. Today, because the individual is not the subject of the international climate convention, it is the state's duty to carry out the "equality" principle within the national legal system.

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[205] *Ibid.,* p.17.
[206] *UNDP* , China Human Development Report 2005, p.1.
[207] *Ibid.,* p.2.
[208] *Ibid.*, p.3.
[209] *Qing,*Tianbao*:* Law Environment and Development Journal(2007), Vol. 3/1 p.56-69.

Secondly, the aim of international equality is to ensure that each individual on the globe has an equal chance to develop himself/herself, to fulfil their basic needs as well as to pursue higher welfare. The developing countries attach more importance to collective development rights and argue the equal rights of each person, to receive their share of emissions capacity, but if their national legal systems can not ensure the proper execution of the equality principle, it can not be achieved in practice. The protection of collective development rights can promote the realization of individual development rights, but not necessarily.[210]

b) The Duty of Climate Protection, Energy Security and other Environmental Problems

aa) Climate Protection and Energy Security

(1) Dimensions of Energy Security

Energy security is the most important concern of the national energy policy. There is no internationally agreed upon definition of energy secuity. Accoding to UNDP, energy security is a term that applies to the availability of energy at all times "in various forms, in sufficient quantities, and at affordable prices", without unacceptable or irreversible impact on the environment.[211] APERC(Asia Pacific Energy Research Centre, Japan) defines energy security as "the ability of an economy to guarantee the availability of energy resource supply in a sustainable and timely manner with the energy price being at a level that will not adversely affect the economic performance of the economy".[212]

Although differences exist in the concrete definitions concerning energy security, they vary only to a limited extent and often include the following similar dimensions:[213] availability, affordability and sustainability. Availability refers to the ensuring a supply of energy. It covers essential elements such as diversification of energy sources, reducing import dependency and market concentration, and accessibility to the energy infrastructure ect. Affordability means that the price of energy is affordable to all consumers. Sustainability requires that availability and affordability should be ensured in a sustainable way.

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[210] *Ibid.*

[211] *UNDP* (United Nations Development Programme), 2001, World Energy Assessment: Energy and the Challenge of Sustainability, p.112.

[212] *AEPRC*(*Asia Pacific Energy Research Centre*), A Quest for Enegy Security in the 21st Century, 2007, p.6.

[213] *Kessels/ Bakker* (2005):ESCAPE: ENERGY SECURITY & CLIMATE POLICYEVALUATION :Linking climate change and energy security policy in post-2012 climate strategies, ECN-C--05-032, ECN, Petten, the Netherlands, April 2005, p.14-15.

(2) Climate Protection and Energy Security

Energy security is a key policy goal for many developed and developing countries alike, including the USA, the EU, Japan, China, India etc., whose energy supplies rely to a great extent on imports. As Stern points out, "Climate change and energy security drivers will often work in the same direction, although there are important exceptions".[214] Reducing greenhouse gas emissions may yield considerable benefits for energy security. Possibly even more significant is that energy security policy measures may have a positive or negative impact on GHG reduction.[215]

Improving energy efficiency can meanwhile meet climate change and energy security objectives. Policies to promote efficiency have an immediately positive impact on the reduction of GHG emissions and other emissions compared with BAU(Business As Usual); at the same time, such policies can reduce energy demand and put less pressure on power generation and distribution networks, and lower the need to import energy or fuels. For developing countries in particular, which often have relatively low energy efficiency, measures to promote energy efficiency can, to a certain extent, enhance energy security and also bring about a reduction in GHG emissions.[216]

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A more diverse energy mix is an effective way to enhance energy security. Climate policy tends to encourage a more diverse energy mix as it is generally good for energy security. On top of that, policies to promote energy variety may have benefits for climate change. Even so, the interaction between climate policy and the policy carried out for the energy diversity vary from case to case. The expansion of a range of sources of renewable energy and, where appropriate, nuclear energy can make a contribution not only to energy diversity, but also to GHG reduction. However, the promotion of the use of coal is beneficial to the energy security but detrimental to climate policy.

Whether or not the increase in gas consumption will reduce GHG emissions depends on how the concrete policy is designed. If, for example, more gas-fired power stations are promoted instead of coal-fired ones, emissions will decrease compared to the baseline. On

[214] *Stern*, Stern Review: The Economics of Climate Change, p.107.
[215] *Kessels/ Bakker*, ESCAPE: ENERGY SECURITY & CLIMATE POLICYEVALUATION :Linking Climate Change and Energy Security Policy in Post-2012 Climate Strategies, ECN-C--05-032, ECN, Petten, the Netherlands, April 2005, p.10.
[216] Stern, Stern Review: The Economics of Climate Change, p.107.

the other hand, if the continued availability of relatively cheap natural gas prevents the implementation of renewable electricity capacity, the gas supply measures are not synergetic with climate change policy in the long term. The impact of hydrogen on energy security as well as climate change also depends on how it is produced. It will be beneficial provided that it is produced from fossil fuels with CCS, biomass or CO_2 neutral electricity. If it is produced from fossil fuels without CCS, it will conducive to energy security but make little contribution to climate change.[217]

The main synergies between energy security and climate change are in the fields of renewables, hydrogen, nuclear fission and energy efficiency.[218] The main antinomy between energy security and climate change lies in coal. Coal is much more carbon intensive than other fossil fuels (for example, coal combustion emits almost twice as much carbon dioxide per unit of energy as does the combustion of natural gas) and is regarded as the energy source most harmful to climate change. China has abundant domestic coal supplies, and hence consider coal to be important for its energy security. Such antimony between energy security and climate change can be ruled out, only when the CCS technology is widely put into practice.[219]

bb) Climate Protection and Other Environmental Problems in China

(1) Other Environmental Problems in China

The priority of national environmental protection is not always consistent with international climate protection. In China, some environmental problems are so serious that they have posed an actual threat to peoples' health. These problems directly related to peoples' health are ranked as the primary priority in national environmental protection policies.

Environmental problems in China has drawn attention from the world. Vaclav Smil and Kenneth Lieberthal noted over a decade ago that the environmental problems in China are more serious than those of any other country in human history at a comparable stage of

[217] *Kessels/Bakker*, ESCAPE: ENERGY SECURITY & CLIMATE POLICYEVALUATION :Linking climate change and energy security policy in post-2012 climate strategies, ECN-C--05-032, ECN, Petten, the Netherlands, April 2005, p.19.
[218] *Ibid.,* p.19.
[219] Stern, Stern Review: The Economics of Climate Change, p.108.

economic development.[220] The pressures of human activities in China stress natural ecosystems to an extent rarely seen in other places on the planet,[221] because the process and preconditions of the industrialization of China differ quite a bit from that of already-industrialized countries. Firstly, the industrialization of China is closely associated with the unprecedented globalization and transplanting of factories from developed countries to the developing countries. Secondly, as the most populous country in the world, China is afforded no good opportunity for emigration, which was enjoyed by the industrialized countries in the process of their industrialization.

These serious environmental pollution in China poses a direct threat to people's health and lives. China's air quality is generally low. 16 of the 20 worst cities for air pollution in the world are in China.[222] Three out of four city dwellers live below China's air-quality standard.[223] A quarter of its cities, for more than 60% of rainy days per year in the 1990s suffered from acid rain and now it affects a quarter of China's area, which make China amongst the world's most severely affected countries.[224] Due to industrial and municipal waste water discharges, plus agricultural run-offs of fertilizers, pesticides and manure causing widespread eutrophication, water quality in most Chinese rivers and groundwater sources is very poor.[225] About 75% of lakes are polluted. Although the percentage of treated industrial waste water has been increasing, only 20% of domestic waste water is treated, much lower than 80% in the developed world.[226] China's per capita quantity of fresh water is only a quarter of the world average. This underlying water shortage and wasteful use, causes over 100 cities to suffer from severe shortages and even halts industrial production.[227]

These environmental problems have brought about health problems. For example, there are about 300,000 deaths per year, which can be attributed to air pollution.[228] The risk of

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[220] *Lieberthal*, 'China-Domestic Issues: Economic Energy and Security', Vital Speeches of the Day, vol 64, No.3 (15 Nov 1997), p.75.
[221] See *Smil*, China's Environmental Crisis: An Inquiry into the Limits of National Development, New York and London, 1993.
[222] *Watts,* The Lancet, Volume 366, Issue 9499, Pages 1761-1762
[223] State Environmental Protection Administration of China (in Chinese) http://www.sepa.gov.cn/eic/652466692596695040/20040602/1050958.shtml (2004).

[224] *Liu/Diamond,* Nature 435, 1179-1186 (30 June 2005).
[225] *Johnson et al.,* Blue Skies: China's Environment in the New Century, vol. II in the series *China 2000.* World Bank, Washington DC, 1997 (forthcoming).
[226] *Liu/Diamond,* Nature 435, 1179-1186 (30 June 2005).
[227] *Liu/Diamond,* Nature 435, 1179-1186 (30 June 2005).
[228] *Johnson et al.,*, Blue Skies: China's Environment in the New Century, vol. II in the series *China 2000.* World Bank, Washington DC, 1997 (forthcoming).

respiratory disease has increased thanks to the outdoor concentration of total suspended particles[229] and respiratory diseases have been a leading cause of death among both children and adults. Even short-term exposure to air pollution can cause low infant weight and increased morbidity and mortality.[230]

Given the seriousness of environmental problems in China climate protection can not become the policy priority. Although the developed countries are being confronted with other environmental problems, there is no environmental problems as serious as China's. For China, the policy priority must be placed on this issue to deal with the urgent and direct environmental threats, and to ensure that citizens can drink clean water and breathe clean air.

(2) The Links between Climate protection and other Environmental Protection Aims

The link between climate protection and local environmental protection cannot be overlooked. Much of the air pollution in China arises from fossil fuel burning in transportation, power plants, and buildings. By far, most of carbon monoxide, nitrogen oxide, and sulfur oxide emissions come from fuel burning. Fossil fuel burning is the main contributor not only to the climate change, but also to local air pollution.

Examples of the energy-pollution-climate connection abound. Sulfur dioxide (SO2) comes mostly from coal-burning electricity production and is a serious air pollutant that contributes to acid rain, a very serious problem in China. In the atmosphere, SO2, with the help of moisture and other air pollutants, leads to the formation of small aerosols that have a regional cooling effect, offsetting some of the global warming. However, increasing SO2 can not be a method to deal with the climate change, considering the extent of the cooling effect and the direct serious damage of acid rain to human health and the ecosystem. The policies to reduce GHG will help enhance energy efficiency and adoption renewable energy, and consequently the decrease of SO2. But the policy to control SO2 is not necessarily to help control CO2, because if electricity companies are encouraged to set up equipment to eradicate sulfur, they will continue to use the coal as fuel on a larger scale. A better solution is to design a policy to control both SO2 and CO2 in a comprehensive way.

[229] *Liu/Diamond,* Nature 435, 1179-1186 (30 June 2005).
[230] *Xu/Wang/Niu*, Ecosystem Health Vol. 4, Issue 4: 199−209 (1998).

Another example is ground-level ozone, which is both a harmful pollutant and a significant greenhouse gas. Carbon monoxide, a hazardous air pollutant emitted by motor vehicles, is removed from the atmosphere by chemical reactions that have the effect of increasing concentrations of methane, a powerful greenhouse gas. Nitrous oxide (N2O) is a greenhouse gas and stratospheric-ozone depleter. The climate policy is good for the control of all the three pollutants.

The national priority of environmental protection does not always keep areast with the international climate protection. The national government is inclined to attach more importance to the regional environmental problems, which pose actual threats to people's health and wealth. Fossil fuel has been the most important resource for both national environmental problems and global warming up to now. There are important opportunities for "no regrets" strategies that achieve benefits at both national and international levels.[231] For example, if greenhouse gas controls are targeted to reduce solid fuel use in households and other energy systems with large health impacts, significant improvements can occur not only on a global level, but also at national level, local and community levels.[232]

cc) Integrated Regulation on GHG: Giving Priority to Synergistic Policies for Climate Protection, Energy Security and National & Local Environmental Problems

A review of the relationship between the state's duty of climate protection, its duty to ensure energy security, and its duty to deal with the national or local environmental problems shows that while synergies exist between them, so do conflicts. The rapidly growing fossil energy consumption is the common challenge for the state to fulfil its obligations to protect climate, deal with national & local environmental problems, and ensure energy security. Thus, an integrated strategy should be adopted rather than separate policies, which aim at only one political task. Policy priority should be given to synergistic measures rather than measures that promote one political task at the sacrifice of another.

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[231] *Holdren*, John P./ *Smith*, Kirk R.: Energy, the Environment, and Health. In *Goldemberg,* Jose(ed.), The World Energy Assessment: Energy and the Challenge of Sustainability, p. 62.

[232] *Ibid.,* p. 62.

According to the study of McGranahan *et al.,* environmental burdens are shifting from the local to the global, from the immediate to the delayed, and from issues that threaten health to issues that threaten life support systems.[233] Such a model of shifting environmental burdens can be observed in China. In recent years, energy security has become a major political concern for the Chinese government as energy consumption has increased. Some coal gasification and coal fluntification programmes without CCS are promoted by the government, which can promote energy security but do harm to local and national environment and climate protection. In another aspect, some synergistic measures have not been given policy priority. For example, the electrical bicycle, a new kind of transportation tool that can help promote local environmental protection, national energy security and GHG reduction with appropriate regulations, has made significant developments in past few years. But it is banned in cities such as Beijing, Fuzhou, Wengzhou, Guangzhou,Wuhan, Haikou, and Zhuhai. There are many cases that show how climate protection has not been well integrated into local and national decision-making due to different kinds of barriers such as institutional arrangement and capacity, lack of knowledge, the legal barrier and so on;[234] even where there are opportunities for integrated policy choices that have synergistic effects on local, national and global concerns.

4. The Duty of Effective Climate Protection

The state's duty of effective climate protection can be directly inferred from the provision of Article 26(1) of Constitution of China. Under the present legal system, such duties given in the Constitution can only be interpreted as political rather than legal duties due to the absence of a judicial review system over the constitution. Even as a political duty, it is very difficult to define the "effectiveness" of climate protection, given the fact that it must be implemented globally and that developed countries assume the main responsibility for GHG reduction. As a developing country, China is confronted with many other important political duties, making a definition for "effectiveness" of climate protection more complicated.

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[233] *McGranahan et al.* (2001), The Citizens at Risk: From Urban Sanitation to Sustainable Cities. Cited fom *Dhakal*,Urban Energy Use and Greenhouse Gas Emission in Asian Mega-Cities, Policies for Sustainable Future. Published by Institute for Global Environmental Strategies((Japan), 2004, p.14.

234*Dhakal,*Urban Energy Use and Greenhouse Gas Emission in Asian Mega-Cities, Policies for Sustainable Future. Published by Institute for Global Environmental Strategies((Japan), 2004, pp.54-58.

It is impossible determine sufficient requirements for the "effectiveness" of climate protection from the perspective of the national legal system. They should be defined in international climate law. But it is possible to define necessary requirements for the "effectiveness" of climate protection from the following two points:

Firstly, it is not practical to require the reduction of subsistence emissions. However, it is unjustifiable not to regulate luxurious emissions or even to subsidize them in the name of "provision for the people's basic needs". This would lead to an increase in luxurious emissions and make controlling of GHG emissions impossible. In addition, to do this would be in contradiction with the principles of "equal entitlement to emissions" principle and "common and differentiated responsibility". Only if these principles are carried out in the national legal system, can they gain legitimacy on an international level. It is then necessary to restrict luxurious emissions by making the luxurious emitter pay for the external costs or other regulation instruments. This is the first necessary requirement for the "effectiveness" of climate protection from a national legal perspective.

Secondly, energy security and environmental problems directly related to the people's health are more urgent political duties for the state than climate protection. But the urgency of these two duties should not become excuses for overlooking and underestimating climate protection in national policy-making, especially when there are synergistic, comprehensive policies that can bring about solutions for all three issues in the long run. Thus, for climate protection, the policy that promotes one policy aim at the cost of sacrificing another must give way to a synergistic, comprehensive policy. This is the second necessary requirement for the "effectiveness" of climate protection from the perspective of national law. Still, which policies are synergistic needs investigation from case to case. Parts E, F, and G will be discuss synergistic policies in road transportation regulation.

II. An Overview of Political Programmes and Important Legislation Directly Related to Climate Protection

1. Political Initiative of Climate Protection

a) The Establishment of an Institution for Climate Protection

China was one of the active countries during the negotiation of the text of UNFCCC and the implementation of UNFCCC. China signed the UNFCCC on June 11, 1992, and ratified it on January 5, 1993. China was also active in negotiating the Kyoto Protocol, which it signed on May 29, 1998 and ratified on August 30, 2002. Like other developing countries, the Chinese government is a strong advocate of the principle of "common but differentiated responsibilities" and has argued that the developed countries should take the lead in the climate protection.

In 1992, China established a special committee, the National Coordinating Committee on Climate Change Policy, which serves to address policy issues related to climate change.[235] It is made up of ministerial officials from related departments and organizations.[236] The State Development and Reform Commission chairs the Committee and is responsible for coordinating the its activities.

b) China's National Climate Change Programme (CNCCP)

According to Article 4.1(b) of the UNFCCC, all parties, including developing countries, should "formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and measures to facilitate adequate adaptation to climate change". To accomplish this commitment, China issued in June 2007 *China's National Climate Change Programme* (hereafter referred to as the CNCCP), which outlines objectives, basic principles, key areas of actions, policies, and measures to address climate change up to 2010. Although many specific measures are stipulated in this document, CNCCP cannot be viewed as a law, because it was not passed in the National Congress or the Standing Committee of National Congress and there is no provision concerning legal obligations in

[235] *The Woods Hole Research Centre(2003),* Implementation of the UNFCCC by Select Developing Countries,p.31.
[236]*The Woods Hole Research Centre(2003),* Implementation of the UNFCCC by Select Developing Countries, p.32.

this document. Still, CNCCP is the first national climate change programme to provide a basic political framework for GHG control and adaptation to climate change. Adaptation measures are not the focus of this work. In the following, the main content concerning GHG control in the CNCCP will be reviewed.

aa) The Objective of GHG Control

In terms of controlling GHG, CNCCP sets active objectives that consist of general objectives, structural objectives and other specific objectives.

The general objective: "achieve a target of about 20% reduction of energy consumption per unit GDP by 2010, and consequently reduce CO2 emissions".
Structural objective: "raise the proportion of renewable energy (including large-scale hydropower) in the primary energy supply up to 10% by 2010, and the extraction of coal bed methane up to 10 billion cubic meters."
Other specific objectives:
– control the emissions of nitrous oxide from industrial processes and make it stable by 2010 as that in 2005
– control the growth rate of methane emissions
– increase the forest coverage rate to 20% and realize the increase of carbon sinks by 50 million tons above the level of 2005 by 2010

bb) The Principle to Address Climate Change

The Chinese government has chosen integrated strategies to control GHG emissions and to adapt to climate change. It will address the climate change through integrating the climate protection policy into the sustainable development strategies, implementing "its fundamental national policy of resources conservation and environmental protection to develop a circular economy", "protecting ecological environment and accelerating the construction of a resource-conservative and environmentally-friendly society", and promoting "the harmonious

development between economy, population, resources and the environment".[237] According to section 3.2 of CNCCP, the principles to address climate change are as follows:

— To address climate change within the framework of sustainable development;
— To follow the principle of "common but differentiated responsibilities" of the UNFCCC;
— To place equal emphasis on both mitigation and adaptation;
– To integrate climate change policy with other interrelated policies;
– To rely on the advancement and innovation of science and technology

cc) Measures and Policies to Address GHG Mitigation

In CNCCP, the measures and policies to address GHG mitigations focus on two key issues. One is "energy production and transformation" (4.1.1 of the CNCCP), while another is "energy efficiency improvement and energy conservation" (4.1.2 of the CNCCP). The measures and policies employed in "energy production and transformation" are as follows:

—Formulate and implement relevant laws and regulations
— Strengthen institutional innovation and mechanism construction, including accelerating China's institutional reform in the energy sector, further promoting mechanisms and construction for renewable energy development
—Intensify policies and measures to adjust the structure of the energy sector, including:
- Properly develop hydropower on the precondition of protecting the ecosystem
- Actively promote the development of nuclear power
- Expedite technology advancement in thermal power generation
- Vigorously develop the coal-bed methane (CBM) and the coal-mine methane (CMM) industry
- Promote the development of bio-energy
- Actively support the development and utilization of wind, solar, geothermal and tidal energy

—Strengthen the development and dissemination of advanced and suitable technologies, including technologies for the clean and efficient development and utilization of coal, technologies for exploration, exploitation and utilization of oil and gas resources, nuclear power generation technology, renewable energy technology, etc..

"Energy efficiency improvement and energy conservation" is another "key issue" for the GHG mitigation. Its main policies and measures are as follows:

[237]Part 3 of CNCCP:

— Strengthen institutional innovation and mechanism construction, including establishing target-oriented responsibility and assessment systems for energy conservation; Carrying out comprehensive resource planning and electric power demand side management; Actively promoting the authentication of energy-saving products and implementing energy-efficient labelling management systems; Putting forward contract-based energy management; Establishing energy-saving investment assurance mechanism; Popularizing energy-saving voluntary agreements

— Other measures to promote the energy efficiency and energy conservation, include:

- Vigorously adjusting industrial structures and its regional distribution
- Strictly implementing the *Industrial Restructuring Guiding Catalogue* by controlling the scale of energy-intensive and pollution-intensive industries and encouraging the development of new and high-tech industries
- Formulating preferential policies for energy-saving products
- Studying financial and tax policies to encourage the development of energy-saving and environmentally-friendly vehicles, and to speed up the elimination of fuel-inefficient vehicles

—Strengthen the development and dissemination of energy conservation technologies in key sectors

2. Important Legislations Directly Related to Climate Protection

a) The Renewable Energy Law of People's Republic of China (RELC) and Auxiliary Regulation

Although the Chinese government adopted some policies to promote renewable energy before 2005, they were unsystematic, unstable and confined to special fields.[238] To promote the development of renewable energy, it needed a congress act which can provide a legal framework on which to lay out general conditions for the development of all forms of renewable energy, i.e. wind, solar, water, biomass, geothermal and ocean energy etc.. In 2003, the national government began formulating a law for the promotion of renewable energy development and utilization. On Feb. 28th, 2005, *The Renewable Energy Law of China* was issued and came into effect on 1st of January, 2006. It is regarded as one of the fastest-passed legislations in the Chinese legislation history, since it took no more than two year from the suggestion of the act to the final passing in the congress. Apart from the RELC, China's legal system consists of auxiliary regulations to promote renewable energy, which include but are not limited to the following:

[238]For example, In the 1980s, the State Council issued several Recommendations on Promoting the Development of Rural Energy, which made renewable energy a part of the plans for the development of rural energy and rural electrification; in 1994, the then Ministry of Power issued Several Recommendations on the Construction and Management of Wind Farms, establishing a firm foundation for wind power in China.

-*Regulation on Power Generation by Renewable Energy*, promulgated and effective on January 5, 2006, by the State Development and Reform Commission

-*Tentative Administrative Rules on the Pricing of Electricity Generated by Renewable Energy and the Apportionment of Generation Costs,* promulgated and effective on January 4, 2006, by the National Development and Reform Commission (the Tentative Administrative Rules)

-*Tentative Rules on the Administration of Renewable Energy Development Funds*, enacted by the Ministry of Finance and effective on May 30, 2006 (the Fund Administration Rules)

-*Circular on the Catalogue Issue for the Guidance on Industrial Development of Renewable Energy* by the National Development and Reform Commission (NDRC), promulgated and implemented on November 29, 2005（the Guidance Catalogue ）

Article 1 of *Renewable Energy Law of China* stipulates the aim of the law: to promote the development and utilization of renewable energy; to improve the energy structure and diversify energy supplies; to safeguard energy security; to protect the environment, and to realize the sustainable development of the economy and society. Accordingly, several critical instruments, including renewable energy target system, feed-in system, public cost sharing system etc., are adopted to ensure its aim can be achieved.

aa)Renewable Energy Target System

RELC requires the government to formulate development targets and strategic plans, and to guarantee measures for renewable energy. According to Article 7(1) RELC, "energy authorities of the State Council set middle and long-term target of the total volume for the development and utilization of renewable energy at the national level, which shall be implemented and released to the pubic after being approved by the State Council". At present, National Development and Reform Commission (NDRC) , one department of the State Council, is responsible for the overall implementation and management of the development and utilization of renewable energy at a national level.

The most recent goals announced by China are to achieve 16% of primary energy from renewable sources by 2020, including large hydroelectric facilities—this includes renewable energy capacity targets of 300 GW from hydropower, 30 GW from wind, 30 GW from

biomass, 1.8 GW from solar photovoltaics, as well as targets for solar thermal, geothermal and solar hot water.[239]

bb) Feed-in Model[240] and the Price of Renewable Energy

In light of Article 14 RELC, project developers that have obtained an administrative permit will be guaranteed a connection to the grid. Grid enterprises have the obligations of entering into grid connection agreements with renewable generation enterprises that have legally obtained administrative license, buying the grid-connected power produced by renewable energy within the coverage of their power grid, and providing grid-connection services for the generation of power with renewable energy. "If the power grid enterprises breach Article 14 hereof and fail to purchase renewable power in full, which results in economic loss to the renewable power generation enterprises, such power grid enterprises shall be liable for compensation, and the national power supervisory institutions shall order them to make correction within a stipulated period of time; in case of refusal to make correction, a fine of less than the economic loss of the renewable power generation enterprises shall be imposed."[241]

All output can be sold to the grid company at guaranteed prices. Recently, NDRC issued a new regulation on pricing renewable energy for power, which indicated that a "feed-in tariff" system will be adopted for all the renewable energy power. The electricity price produced by biomass will be calculated at the rate of coal-fired electricity plus 0.25 Yuan RMB per kWh. Wind electricity will adopt the tendering price and lowest bid price will be used as the fixed

[239] *Wang,* Mingyuan: Modern Legal Science(Xiandai Faxue), 2007(6): 156.
[240] There are two legislation models to promote the development of renewable energy: one is the feed-in model, according to which the grid enterprise is obliged to buy all the output of renewable energy with the regulated price; Another is the Mandatory Quota model, according to which the energy enterprise has the obligation to ensure that the renewable energy is accounted for in a required quote in the total energy sold. Under the Mandatory Quota model, certified renewable energy generators earn certificates for every unit of electricity they produce and can sell these certificates to others. The energy enterprise can accomplish its obligation through buying certificates of green electricity from others. In China, there is not a well-developed electricity market, like European and American countries, due to the lag of market-oriented reform of the electricity sector. This is the main reason why China has adopted the feed-in legislation model. See: *Wang,* Mingyuan: The Visible Hand Sustains Bright and Beautiful Sky for the Renewable Energy Industry in China?Analysis based on the Renewable Energy Law of the PRC(Chinese), Modern Legal Science(Xiandai Faxue), 2007(6): 156-158; and *Martha M. Roggenkamp, Anita Ronne, Catherine Redgwell, Inigo Del Guay* (eds.): Energy law in Europe: national, EU and international law and institutions, pp. 558-559.
[241] Article 29 CREL.

purchase price for 30,000 hours, solar and other renewable energy prices, will adopt the project based approval price.[242]

The RELC also states that where electricity, generated by renewable energy is priced higher than that generated by traditional energy, the premium shall be carried by all the electricity customers. Besides that, reasonable expenses of purchasing electricity generated by renewable energy incurred by the grids are allowed to be calculated as transmission costs and reimbursed from the proceeds of electricity sales.[243]

cc) Subsidies for the Development of Renewable Energy

The central government or local governments provide a variety of financial subsidies for renewable energy, including investment subsidies and favourable taxation measures.

(1) Investment Subsidies

The central government and some local governments provide investment subsidies for the development of renewable energy through special purpose funds. Such special funds support the following activities: scientific technology research, standard establishment and demonstration projects of renewable energy utilization; renewable energy utilization programs for life in rural and pastoral areas; construction programs of independent power stations with renewable energy in remote areas and islands; resource research, estimation of renewable energy and relevant information systems construction; and projects promoting the local utilization of renewable energy.[244]

(2) Favourable Tax Incentives

According to Article 26 of *PRC Renewable Energy Law*, projects listed in the Guidance Catalogue for Development of Renewable Energy shall be granted preferential tax treatments, the specific implementation of which shall be determined by the State Council. Such

[242] *Li/ Shi/Ma*, CHINA: PROSPECT FOR RENEWABLE ENERGY DEVELOPMENT, p.14, Supporting research for *Stern Review on the Economics of Climate Change,* available in: http://neweconomist.blogs.com/new_economist/2006/10/climate_change_.html or http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_supporting_documents.cfm
[243] Article 20 und Article 21 RELC
[244] Article 24 of RELC.

preferential tax treatments are tariff reductions or exemptions,[245]Value-added Tax (VAT) reduction(See the following table), and/or deduction and exemption of corporate income tax(see the following Table).

Table1. Classification of Taxation in China

Items	VAT	VAAT (Value-added annex tax)	Income Tax
General	17%	8% of VAT	33%
Small hydro power	6%	8% of VAT	33%
Biogas	13%	8% of VAT	15%
Wind	8.5%	8% of VAT	15%
Landfill gas	0	0	33%

Note: The VAT on wind power and urban refuses for power are newly issued in early 2001.

b) Amendments to the Energy Conservation Law of China

aa) The Background of the Revisions to Energy Conservation Law of China

Energy conservation is one important policy priority of Chinese energy policy. On November 1, 1997 the Energy Conservation Law was enacted by the Standing Committee of the National Congress. It became effective as of January 1, 1998. This law has made many contributions to energy conservation in China.[246] According to the Report by the Law Enforcement Inspection Group of the Standing Committee of the National People's Congress on the implementation of the People's Republic of China Energy Conservation law, "energy consumption per GDP unit decreased from 1.56 TCe per 10000 RMB in 1998 to 1.43 TCe in 2005 (all based on the comparable price of 2000)".[247] If calculated at the constant price of 1990, "energy consumption per 10,000 Yuan of GDP dropped from 5.32 tce in 1990 to 2.68 tce in 2002, a 50% decrease, representing an average annual rate of 5.6% for energy intensity improvement."[248]

[245]The equipment which can enjoy these tariff reductions reductions include the main components of wind turbines, wind turbines themselves, and PV modules; Customs duty exemption depends on whether the equipment is considered high-tech.

[246] *Wang Mingyuan*, Issues Related to the Implementation of China's Energy Law: Analysis of the Energy Conservation Law and the Renewable Energy Law as Examples, Vermont Journal of Environmental Law, Vol.8, Issue 2, 2007: 227-228.

[247]*Wang Mingyuan*, p.227.

[248]Article 2(1), Part I of China Medium and Long Term Energy Conservation Plan, Issued by National Development and Reform Commission(November 25, 2004).

However, there are some problems with the Energy Conservation Law of China (1997). Firstly, it is a law heavily influenced by the planned economy. A direct-intervention administrative approach, utilizing administrative plans and demand-and-control as major tools, was largely effective in the planned economy system. However, it was not effective since the economy structure in China was fundamentally changed after 1990. Secondly, the Law of 1997 was designed mainly for manufacturing industries. There are few or no provisions concerning other important areas for energy conservation, such as construction, transportation, residential energy use, and public units. Thirdly, the law of 1997 has only 6 chapters and 50 articles, lacking in certainty and adequacy and weak in enforcement. Most of the provisions in the law of 1997 are overly principle-oriented. The law of 1997 establishs the policy framework for energy conservation, but it stipulates few measures to deal with violators of these clauses.

On October 28, 2007, the NPCSC passed a revision of the energy conservation law of 1997. The new energy conservation law was enacted on October 28, 2007 and will come into effect on April 1, 2008.

bb) The Main Amendments and Systems in the New Energy Conservation Law

(1) Energy Conservation as a Basic National Policy

Energy conservation is declared as "a basic national policy" in Article 4 ECL. This is not merely a political declaration; it is an important political duty that all levels of government are required to accomplish. According to Article 5(1) ECL, energy-saving work should be included in the economic and social development plan. The state council and local governments at and above the county level are required to prepare and implement specific medium and long term energy-saving plans and annual energy conservation plans.[249] The State Council and governments at and above the county level shall report energy conservation work to the People's Congress or the Standing Committee thereof at the corresponding levels every year.[250] Energy-saving work carried out by local government officials is integrated into the assessment of their political performance. It is required that the governments of each

[249] Article 5 ECL.
[250] Article 5 ECL.

province, autonomous region or municipality directly under the central government shall report their fulfilment of energy conservation targets to the State Council every year.[251]

(2) The Expanding of the Regulation's Scope

The law of 1997 mainly concerns the industrial energy conservation. The revised law expands its coverage to include energy conservation in industry, construction, and transportation sectors and energy conservation by public institution.[252] Building design, construction, supervision and development companies or units are required to ensure that the building reaches the national mandatory energy consumption standard.[253] Moreover, real estate developers must ensure the accuracy of information regarding energy consumption.[254] According to Article 40, the state encourages the use of energy-saving building materials and energy-saving equipment in the building, as well as renewable energy systems. As far as the transportation sector is concerned, Article 42 ECL gives the State Council and its department the duty to guide and promote an energy-effective, integrated transportation system, in which different kinds of transportation means are harmoniously developed and interconnected. Local governments at and above the county level are required to give priority to development of public transportation, increase investment in public transportation, and improve the public transportation service system.[255] Moreover, the use of non-motorized transportation means are encouraged.[256] In addition to implementation of mandatory fuel consumption limitation standards for automobiles,[257] the state encourages the development, production and use of environment-friendly, energy-saving automobiles, ships and other means of transportation.[258]

Public agencies are required to take the lead in energy conservation.[259] A strict energy conservation management system is designed for the public agencies: Firstly, the State Council and local governments at and above the county level are required to formulate and implement a conservation plan for public agencies. Secondly, all public institutions are obliged to develop annual conservation goals and to submit annual reports regarding energy

[251] Article 6 ECL.
[252] Chapter III ECL
[253] Article 35 ECL.
[254] Article 36ECL.
[255] Article 43 ECL.
[256] Article 43 ECL.
[257] Article 46 ECL
[258] Article 45 ECL.
[259] Article 47 ECL.

consumption to the energy management department. Thirdly, the State Council and local governments are authorized to set annual energy consumption limits for public institutions. In addition, according to Article 51 ECL, energy-saving products and equipment should be given priority in the public procurement.

(3) Incentive Measures and Legal Liability

The amendments specify reward and punishment rules concerning energy conservation. On the one hand, the incentive measures are introduced to encourage and promote energy conservation.[260]On the other hand, public agencies, enterprises and other legal subjects which fail to accomplish their legal obligations concerning energy saving are required to bear legal liability.[261]

The important incentive measures in the ECL are economic measures. Special energy conservation funds established by the central- and the provincial-level governments will be used to fund conservation technology research, education, training and major energy conservation projects.[262] Other economic measures include tax and financial subsidy policies for energy conservation technologies and products;[263] preferential loans to qualified projects for conservation technologies and products;[264] and price policy for energy conservation.[265]

In the 1997 law, there are only 8 articles concerning legal liabilities, while the revised law has 17 articles. The energy conservation management agencies have been authorized to impose several different administrative punishment measures, including a ban on products or projects which are not consistent with the national mandatory energy conservation/efficiency standards, a fine, a suspension or closure of business, a requirement to reach the national standard in the fixed period, and so on. For example, according to Article 70 ECL, if anyone produces, imports, or sells products or equipments that do not meet mandatory energy efficiency standards, the product quality supervision departments can issue an order to stop the production, import, and sale of this product or equipment and to confiscate any illegal

[260] Chapter 5 ECL.
[261] Chapter 6 ECL.
[262] Article 60 ECL.
[263] Articles 61-63 ECL.
[264] Article 65 ECL.
[265] Article 66 ECL.

earnings. In addition, the supervision department can impose a fine of up to five times the earnings made. In severe cases, the supervision department can revoke their business license.

3. The Effectiveness of the Political Programs and Legislation of China on Climate Protection

According to a report from the CCAP(Centre for Clean Air Policy), "China is taking significant action to reduce its greenhouse gas emissions and these efforts equal or surpass currently proposed U.S. Climate policy through 2010".[266] In *Stern Review,* the EU, California and China are viewed as "those with the most ambitious policies that will reduce greenhouse gas emissions".[267] Without specific mandatory commitments in international climate agreements, China has successfully developed a comprehensive legal system to control its GHG emissions through unilateral action. Rather, although China has set GHG mitigation aims till 2010 in CNCCP, there is no political or legal aim concerning GHG control beyond 2010. Furthermore, there is no law directly internalizing the external costs of the GHG emissions. The most important regulation instruments, those being a GHG emissions trading system and carbon tax, which would directly internalize the external costs of GHG emissions, have not been introduced in China. Finally, the luxurious emissions by the relatively rich groups in China have not been regulated. To achieve the aim of effective climate protection, China needs to take more action in the future.

III. The Choice of Regulation Instruments and Future Legislation to Protect Climate

1. The Regulation Instruments- an Overview

The regulation instruments which can be employed to realize the aim of climate protection are various. Firstly, there are domestic instruments which attempt to enable individual

[266] *CCAP(Washington*), Greenhouse Gas Mitigation in Brazil, China and India: Scenarios and Opportunities through 2025(executive summary), Published by CCAP(2006), available at: http://www.ccap.org/international/developing.htm

[267] *Stern(ed.),* Stern Review:the Economics of Climate Change,Summary of Conclusion: viii.

nations to achieve specific goals and international(bilateral, multilateral, or global) instruments which can be employed jointly by groups of nations.[268] Secondly, there are so-called command-and-control and non-command-and-control instruments.[269]

Command-and-control instruments are conventional public legal instruments. They include the openness control through administrative admission systems, the obligations of the owner or user of facilities etc. One typical method is the regulatory standard, which can be categorized as either technology- or performance-based, although the distinction is often not clear.[270] Technology-based standard typically requires the use of specified equipment, processes, or procedures. It could be required that particular types of energy efficient motors, combustion processes, or landfill gas collection technologies are utilized by firms.[271] In contrast to the technology-based standard, the performance-based standard is more flexible, as it specifies allowable levels of pollutant emissions or polluting activities, while leaving the specific methods of achieving those levels up to regulated entities. Command-and-control can also take the form of absolute bans of certain products or processes, but in the case of controlling GHG emissions, bans are not of much interest.[272]

Non-command-and-control instruments have become more and more favourable nowadays. These involve plans, economic instruments, informational instruments, and voluntary agreements.[273] Voluntary agreements are negotiated agreements between the regulating authorities and the emitting industries.[274] However, the effectiveness of the voluntary agreements usually come from the threat of mandatory intervention. Forward-looking firms may undertake some steps in controlling GHG emissions if they fear more costly mandatory controls in the absence of voluntary reductions.[275] If there is no mandatory control on GHG emissions, it is doubtful how much contribution the voluntary agreements can make. Another problem of voluntary agreements arises from the huge negotiation cost if there is a high

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[268] *Stavins,* Policy Instruments for Climate Change:How Can National Governments Address a Global Problem? January 1997, Prepared for The University of Chicago Legal Forum published by The University of Chicago Law School.
[269] *Ibid*.
[270] *Ibid.*
[271] *Ibid.*.
[272] *Holtsmark/Alfsen*, Coordination of Flexible Instruments in Climate Policy, CICERO Report 1998:4, p.9.
[273] *Sparwasser, Engel, Vosskuhle,* Umweltrecht, p.85-138; *Koch*(ed.), Umweltrecht, pp.99 *et seq*.
[274] *Holtsmark/Alfsen*, Coordination of Flexible Instruments in Climate Policy, CICERO Report 1998:4, p.9.
[275] *Ibid.,* p.9.

number of emitters. Therefore, voluntary agreements can be considered as a reasonable alternative if there are only a small number of emitters.[276]

"Informational instrument" can take the form either of imperative obligations of the regulated entities to disclose the corresponding information or of provision of the information by the government.[277] The informational instrument may be appropriate either instead of, or complementary to, a tax or other instruments, and can be more effective and efficient. On the one hand, market forces unleashed by public information disclosure create incentives for self-regulation not provided by traditional regulatory approaches.[278] Indeed, such self-regulatory behaviour occurs notwithstanding the absence of traditional regulatory controls. On the other hand, raising awareness of the full energy costs and climate impacts can encourage efficient consumption and production decisions. Evidence and guidance on how to assess options and reduce energy bills can explicitly shape the direction and priorities of innovation.[279]

The design and implementation of plan rules can be of great significance for GHG mitigation and can also have the potential to influence the resilience to the impacts of climate change.[280] Both the comprehensive plan and the special plan play important roles in climate protection. Comprehensive plans, such as the Chinese five-year economic and social development plan, have the potential to balance economic development, social development and environmental protection. Special plans, such as the energy conservation plan and the renewable development plan are beneficial to GHG emission reduction. Other important plans such as urban development plans, can have a great influence on the patterns of energy consumption.

Economic instruments have recently been employed by governments to alter price signals so that polluters face direct cost incentives to control emissions.[281] Different from command-and-control measures, which steer behaviour in the desired direction by requiring or forbidding specific conducts, economic instruments employ the price system, which imposes

[276] *Ibid.,* p.9.
[277] *Case,* 2005 University of Colorado Law Review, p.379.
[278] *Konar &Cohen*, Information as Regulation: The Effect of Community Right to Know Law on Toxic Emissions, 32 J. Envtl. Econ. & Mgmt. 109, 109- 111, 123 (1997).
[279] *Stern*, Stern Review:the Economics of Climate Change, p. 378.
[280] *Ibid.*, p.378.
[281] *Holtsmart/Alfsen,* Coordination of flexible instruments in climate policy, CICERO Report 1998:4, p.6.

a cost for each unit of pollution and provides continuing incentives action.[282] Therefore, each actor is given the flexibility to determine both the quantity of the pollution ('how much' flexibility) as well as the means for achieving it ('how' flexibility).[283] The main economic instruments to be considered for climate protection include taxes, emissions trading, and subsidies.

2. The Instruments Choice from the Perspective of the Legal and Political Structure

The instrument choice in the domestic context involves complex tradeoffs between efficacy, economic efficiency and equity. In the choice of instruments of GHG management, the following important criteria should be taken into consideration: efficacy of climate protection, economic efficiency, and political and legal feasibility. However, these general criterion can only provide an analysing tool for the choice of regulation instruments. The specific circumstances of different countries and the characteristics of different sectors are important factors to take into account in the choice of regulation instruments.[284] Moreover, while economic efficiency has been given more attention, the international and domestic legal structure, which also plays an essential role in this choice, should not be neglected. In the following section the choice of regulation instruments in China will be discussed from the perspective of the legal structure.

a) The Constraints of International Climate Convention

Like other developing countries, China lays emphasis on the sovereignty in the negotiation of international environmental protection.[285] China insists on the development right, as well as the right to make use of energy according to its own way.[286] However, after ratifying the UNFCCC and Kyoto Protocol, China must accomplish its commitments in these two climate

[282] *Stewart,* International Environmental Protection and Regulatory Innovation, in: *Führ/Wahl/Von Wilmowsky(Hrsg.),* Umweltrecht und Umweltwissenschaft, p.797.
[283] *Ibid.*, p.797.
[284] *Stern*, Stern Review:the Economics of Climate Change,p.309.
[285] *Qing,,*Tianbao: Law Environment and Development Journal (2007), Vol. 3/1 p.65.
[286] *Ibid.,* p.65.

treaties. The international climate pacts will exercise restraints and influence to some extent on the national climate policy, including the choice of regulation instruments.

The extent of constraints of international environmental treaties on the choice of domestic regulation instruments depends on the regulation model of the international environmental treaties. Some international environmental treaties require states to use specified domestic regulatory measures, while leaving states considerable flexibility to determine the precise character and extent of the constraints imposed on domestic actors' conduct.[287] Some international agreements stipulate the designation of protected areas and require states to prohibit or restrict development activities within such areas.[288] However, there are many international environmental agreements that do not specify the regulatory instruments, which states must use.[289] These international agreements provide either general or more specific goals, but leave states wide flexibility of how to achieve them.[290] In some such agreements there are also provisions made for specific measures and regulation instruments, but these provisions are either vague and general or non-compulsory.

As far as international climate agreements are concerned, the Kyoto Protocol specifies quantitative targets and specific timetables for their achievements for developed countries,[291] but leaves these states wide flexibility in how to achieve them. According to Article 12, developed countries can make use of the three flexible mechanisms (ET, JI, CDM) to help themselves to achieve their quantitative targets. However, the application of the three economic instruments is dependent upon the voluntary choice of the country. The annex-I countries can achieve their quantitative target without the use of the three economic instruments. Developing countries only assume general rather than quantitative mitigation commitments. Choosing which instrument to make use of for climate protection, and whether to take part in the CDM or not, are its own decisions. Therefore, there is no mandatory provision in the UNFCCC and the Kyoto Protocol concerning the choice of instruments and measures for developed countries and developing countries.

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[287] *Stewart,* International Environmental Protection and Regulatory Innovation, in: *Führ/Wahl/Von Wilmowsky(Hrsg.),* Umweltrecht und Umweltwissenschaft, p.806.
[288] *Ibid.*, p.806.
[289] *Ibid*., p.806.
[290] *Ibid.,* p.806.
[291] Article 3 Kyoto Protocoll

Although the adoption of ET, JI and CDM is voluntary, the great contrast between the costs of GHG emission reduction in different countries provides strong economic incentives for the wide adoption of an emissions trading system to achieve their targets. Under the framework provided by the Kyoto Protocol, EU has developed its cross-border private Emissions Trading Scheme (the EU ETS) since 2005, which allows over 11,000 energy-intensive installations in 25 countries to cooperate in reducing emissions. California is currently developing specific proposals for a cap-and-trade scheme as part of its goal to reduce emissions 25% by 2020[292]. In an announcement on climate change and clean energy issued by the UK and California On 31 July 2006, they agree to "evaluate and implement market-based mechanisms that spur innovation … (and) evaluate the potential for linkages between our market-based mechanisms that will better enable the carbon markets to accelerate the transition to a low carbon economy".[293]

Owing to the weakness of international institutions, it is difficult to effectively implement uniform command measures effectively in climate protection. However, there is an opportunity for the use of economic instruments. The emissions trading system established by the Kyoto Protocol is a good international cooperation instrument. This system balances the "equity" requirement from developing countries through the primary distribution of the emissions allowances and the "economic efficiency" requirement from developed countries through the trading of the emissions allowances between the public or private entities.

However, in the situation where China takes no quantitative obligations, China does not have the motivation to choose the tradable permits system to control GHG emissions on a national level. In contrast to the carbon tax instrument, the advantage of the tradable permits system lies in the guarantee of a quantitative aim. But the tradable permits system has the disadvantage of cost uncertainty.[294] Due to this, China will hesitate to adopt a national emissions trading system to control the GHG emissions before there are legal quantitative obligations for China in international agreements.

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[292] *Stern,* Stern Review:the Economics of Climate Change, p.81.
[293] *Ibid.*, p.481.
[294] Carbon tax can provide the certainty of cost but can not ensure the achievement of the quantitative aim. *Kopp*, Climate Talk: Regulating with Prices or Quantities---Carbon Taxes vs. Permits, Oxford Energy Forum, Issue 38(August 1999), Published by *the Oxford Institute for Energy Studies* .

b) The Domestic Legal Structure and the Choice of Regulation Instruments

aa) The Discussion about Market-based Instruments

Apart from by the international climate treaties, the choice of regulation instruments is also constrained by the legal structure of China. The introduction of new instruments usually requires corresponding legal reforms, in which the existing legal structure is a starting point. This should seriously be taken into account. Although market-based instruments are theoretically considered to be more efficient instruments than the traditional command-and -control instruments, in practice, the Chinese government prefers to rely more on the traditional instruments than the market-based instruments, for the traditional ones are considered to provide more credibility for environmental protection.

Firstly, China has accumulated abundant experiences in protecting the environment through the use of command-and-control instruments. In order to deal with the environmental problems which become serious thanks to rapid industrialization since 1980, China has enacted a lot of acts. Command-and-control instruments usually play an central roles in these acts. By relying mainly on traditional instruments, China has made great achievements in the energy conservation in the past.[295] From 1980 to 2000, China has experienced spectacular economic growth. At the same time it has cut its energy consumption per unit of GDP by about three-quarters, which is rarely accomplished in other countries at a similar level of development.[296]

Secondly, the deficiency in law enforcement, especially with regards to environmental law is one reason why cautiousness is important when introducing market-based instruments in China, especially the tradable permits system. Taking tradable permits system as an example, a "cap-and-trade" tradable permits system is one way through which the regulator can meet its environmental objective with certainty and economic efficiency, even if there is uncertainty with respect to issues such as firm entry and exit (which undermines the achievement of environmental objectives under direct regulations) or abatement costs (which

[295] *Zhang, ZhongXiang*, "Why Did the Energy Intensity Fall in China's Industrial Sector in the 1990s? The Relative Importance of Structural Change and Intensity Change" (January 2003). Available at SSRN: http://ssrn.com/abstract=267993 or DOI: 10.2139/ssrn.267993

[296] *Ibid.*.

undermine the achievement of environmental objectives under environmental taxes).[297] However, the environmental certainty and economic efficiency depend upon the level of compliance associated with the tradable-permit system.[298] If accurate monitoring of emissions and the credibility of the tradable emission quote cannot be ensured, the environmental certainty and economic efficiency can not be brought about by the tradable-permit system.[299] For instance, the tradable-permit system established for particulate matter in Santiago, Chile has not achieved its environmental objectives, at least in the early years of the programme (actual emissions from regulated sources were 6,500kg/day relative to a permit cap of 4,604.1 kg/day).[300] The cautiousness related to the use of the tradable-permit system in China is reasonable since the enforcement capability of the environmental regulation department in China is not as effective as that of the American or the European countries.

However, the deficiency of environmental law enforcement or the successful experience of past regulations can not offer convincing justifications for rejecting the adoption of market-based instruments in climate protection. First of all, according to the fourth report of ICCP, there are both advantages and disadvantages for any given instrument.[301] Command-and-control instruments may be preferable to others when information or other barriers prevent producers and consumers from responding to price signals. But they may not induce innovations and more advanced technologies,[302] so it is difficult to achieve a long-term environmental protection objective by only relying on command-and-control instruments. Furthermore, the deficiency of environmental law enforcement can not be easily solved through more reliance on direct command-and-control instruments. Chinese government has favoured command-and-control instruments in the past, because the enforcement of the law are considered easily supervised from up-and-down control. Such up-and-down control may match with the Chinese political structure, and some obstacles in the environmental law enforcement have been overcome to some extent through the up-and-down political movements. Yet too much reliance on command-and-control instruments means the regulator will have to make more case-by-case decisions and use discretionary power more often, which will bring about more law enforcement problems, especially since a dependent,

[297] *Johnstone*, Tradable Permits for Climate Change: Implications for Compliance, Monitoring, and Enforcement, In: *Helm(ed.),* Climate-Change Policy, p.238.
[298] *Ibid.*, pp.238-239.
[299] *Helm*, Climate-change Policy:A survey, in:*Helm(ed.),*Climate-Change Policy, pp.20-21.
[300] *Johnstone*, Tradable Permits for Climate Change:Implication for Compliance, Monitoring, and Enforcement, in :*Helm(ed.),*Climate-Change Policy, p.241.
[301] *ICCP* Report 2007, p.27.
[302]*ICCP* Report 2007, p.27.

effective judicial review system has not been established. In fact, the dysfunctions of the command-and-control instruments can be observed in these years when the Chinese government encounters more and more environmental problems and attempts to extend and intensify the exercise of coercive power in the command-and-control mode but the environmental problems has not been relieved.

In contrast to traditional instruments, the environmental tax system and tradable permits system can provide more transparency by the enforcement of law.[303] Under these systems, the use of discretionary power by regulatory authorities, particularly with the likely level of the penalty, is certainly not so endemic as that in direct regulation.[304] Under the command-and-control model, violations of standards or other direct regulations are usually treated on a case-by-case basis and punished through administrative penalties which can vary widely.[305] Issues such as the cause, nature, and degree of non-compliance may add potential for discretion on part of the regulation authorities. Under the environmental tax system and the tradable permits, the discretionary power of the regulator with respect to both the "level" of the penalty and the "probability" of enforcement have been reduced.[306] Non-compliance is treated through the imposition of explicit financial penalties for facilities which do not surrender a sufficient number of permits to meet their emissions level (under emissions trading system) or do not turn in the tax.[307] Therefore, the market-based instruments can provide more "certainty" on the cost of emissions reduction and the penalties. Because this instrument leaves little room for discretion on the part of regulators, it is likely that relatively more resources can be devoted to monitoring and enforcing the policy rather than dealing with the types of rent-seeking behaviour associated with many direct forms of regulations.[308]

The so-called successful experience with command-and-control deserves suspicion. At first, the so-called successful experience is only confined to the field of the energy conservation between 1980 and 2000. In terms of emissions control, how can one say China is successful? Moreover, even in the field of energy conservation, it is unlikely that further achievements will be made only by relying on the traditional instruments, because the economic structure has changed a lot. While some traditional regulatory approaches remain

[303] *Johnstone*, Tradable Permits for Climate Change: Implication for Compliance, Monitoring, and Enforcement, in :*Helm(ed.),*Climate-Change Policy, pp.242-243.
[304] *Ibid.,* p.243.
[305] *Ibid.,* p.243.
[306]*Ibid.,* p.243.
[307]*Ibid.,* p.243.
[308]*Ibid.,* p.241.

appropriate in restructured industries, others may no longer be effective after the introduction of market-based competition.

All in all, given the Chinese legal and political structure, China should take a cautious approach to the introduction of market-based instruments in GHG control. Market-based instruments can not always guarantee an effective result and their success depends on many factors. Nevertheless, due to the fact that command-and-control instruments alone can not deal with complicated environmental problems such as climate protection, it goes without question that market-based instruments should be actively promoted in China.

bb) Emissions Trading System or Carbon/Energy Tax?

In control of GHG emissions, a carbon/energy tax is more legally and politically feasible than an emissions trading system of GHG before China assumes legally-binding quantitative commitments in international climate agreements. The justifications for choosing carbon/energy tax rather than an emissions trading system to regulate GHG emissions at present are as follows:

First of all, a carbon/energy tax can provide the possibility to directly link GHG control and other policy priorities such as environmental problems directly related to people's health. The linkage of GHG control with other policy aims plays an important role in the choice of regulation instruments. As shown in the ICCP report, "Integrating climate policies in broader development policies makes implementation and overcoming barriers easier".[309] In the current situation where many kinds of emissions that directly threaten the people's health have not been successfully regulated[310] and there is no quantitative GHG emissions mitigation obligations for China in the international climate agreements, it is unpractical to introduce the emissions trading system to control GHG in China at first. Different from the emissions trading system, energy tax can be used to achieve the policy aim of energy saving(which makes a contribution to energy security), lower air pollution. At the same time if the energy tax system is well designed, it can help with the controlling of the GHG emissions. An ecological energy tax system has not established in China. The introduction of an ecological energy tax or a carbon tax is crucial to achieving the GHG control aim and other policy aims. One study carried out by CASS(Chinese Academy of Social Science) in

[309]ICCP Report 2007, p.27.
[310] For example, the acid rain problem.

2006 has illustrated how the the introduction of energy taxation might support the delivery of China's energy, environmental and social objectives, including lower air pollution and greater public resources for priorities such as education and health.[311] According to the results of research, if a variable energy tax rates of 120, 100 and 80 yuan/tce on coal, oil, and natural gas respectively to reflect the different carbon intensities of the fuels are adopted, an energy demand reduction of 16.2% (around 400 million tce) would result by 2030. Moreover, the implementation of variable tax rates might be expected to strengthen China's own public finances,[312] and to contribute to the control of air pollution and to the people's health, because the carbon intensity is also in proportion to other pollution emissions(Coal discharges more SO2 and other harmful emissions than oil, and oil discharges more SO2 and other harmful emissions than natural gas). Such variable taxes, which combine the energy tax and carbon tax, is regarded as the one which can also contribute to the air pollution control, energy security and GHG control and, therefore, is advocated the scholars. [313]

Secondly, compared with an emissions trading system, the tax instrument is more congruent to China under the current legal structure. For one thing, although both an emissions trading system and a/an carbon/energy tax require an effective enforcement mechanism, the requirements of an emissions trading system on enforcements is higher,[314] because the implications of non-compliance in a tax system differs in important ways from the corresponding implications in an emissions trading system.[315] In an emissions trading system, overselling of permits by one party can make another party's (buyer's) inaction legitimate, which means, one party's non-compliance can make inaction of another party's non-compliance legitimate.[316] If there is no effective enforcement system to ensure the high level of legal compliance, the entire environmental effect of the emissions trading system might be undermined. In a tax system, by contrast, one party's non-compliance can not make another party's inaction legitimate. Tax will always have some effect, provided that at least some parties comply. Given the situation of environmental law compliance in China, a/an carbon/energy tax is more congruent at present. For another, China's long-standing Pollution Levy System builds a sound foundation for introduction of the carbon/energy tax system, yet China lack the institution foundation for the emissions trading system. China has established

[311] *Stern*, The Economics of Climate Change: The Stern Review, p.495.
[312] *Stern,* The Economics of Climate Change: The Stern Review, p.495.
[313] *Stern*, The Economics of Climate Change: The Stern Review, p.495; Ge/Wang/Gao(ed.), Environmental Taxation and Public Financing(Chinese), p.71.
[314] *Hovi/Holtsmark*, International Environmental Agreements 6(2006), p.137.
[315] *Ibid.,* p.137.
[316] *Ibid.,* p.137.

its mature Pollution Levy System, which is applied to air emissions and water discharges and in most cases also involves a penalty imposed on emissions in excess of the standard for the applicable process. The Pollution Levy System of China is different from the environmental tax system.[317] The levy is imposed and collected by the local environmental protection bureau and is used both to fund the administrative expenses of the local EPB and to provide funds for investment in abatement projects.[318] In spite of the differences between the Pollution Levy System and environmental tax system, the experience gained from PLS can provide a good foundation for the introduction of the carbon/energy tax system, because both are aimed to control the emissions through imposing a social cost on the emissions. By contrast, the emissions trading system has been introduced in China in some cities for the control of SO2 since 1987. However, the operation of these projects is not as good as expected. For example, after the emissions trading system of SO2 was put into practice in seven provinces, there are few trading of SO2 emissions quote, because the electricity market has not come into being, the main players in the electricity market are the state-owned monopoly, which have no interest in trading their emissions quote of SO2. Thus, under the condition of lack of a legal structure to ensure free and equal competition, a tax system is able to play a much bigger role in dealing with environmental problems than an emissions trading system. For, a tax system does not rely upon the trading as does a emissions trading system.

Finally, the most important advantage of using tax instruments to control the GHG lies in the fact that tax is more appropriate to restrict the GHG emissions beyond the basic needs. As above stated, the important strategy for China to harmonize climate protection and provision for the peoples' basic needs is to restrict the emissions beyond the basic needs. Tax is a good vehicle to accomplish this strategy through setting high GHG emission tax rates on luxurious products such as motor vehicles with higher emissions, giving tax exemptions or reductions to the GHG emissions that fulfil the basic needs etc. There are many policy options to harmonize climate protection and provision for the people's basic needs in the introduction of eco-tax. For example, "one option is to return the revenue raised by the eco-tax directly to low-income groups, perhaps through cuts in income tax or increased welfare payments."[319] Another option is to set " a tax-free threshold of energy use which ensures that

[317] *Ellerman*: Designing An Emissions Trading System for the Control of SO2 Emissions in China. In: *Wang, Jinnan et al.(ed.),* SO2 Emissions Trading Program: A Feasibility Study for China(Eryanghualiu Paifang Jiaoyi: Zhongguo de Kexingxing), p.229-230.
[318] *Ellerman,* see supra, p.229-230.
[319] *Carter*, The Politics of the Environment: Ideas, Activism, Policy, p.301.

average energy users will be no worse off under the tax, but that higher and lower energy users in each income bracket will be respectively worse off and better off."[320]

E. Integrating Climate Protection into Road Transportation Regulations

Transport activity is a key component of economic development and human welfare.[321] The abilities of individuals, families, entrepreneurs and firms to exchange goods and services,

[320] *Ibid.*, p.302.

to be where activities are being carried out, and to interact with people on a regular basis are considered crucial not only to the economy but also to quality of life in contemporary societies.[322] However, the increase of transportation activities has yielded many negative side-effects. Expanding transportation has had adverse impacts on natural resources, the environment, urban image, land use, climate change and energy security.[323] In addition, these negative impacts of transportation are not paid for by its users.[324] Costs which are not paid for by the person/agent responsible are called external costs.[325] Climate change is an important negative external impact of transportation that should be incorporated into regulations on transportation on national and local policy levels.

Transportation is an important source of GHG emissions.[326] The present transportation mode predominantly relies on a single fossil resource, petroleum which supplies 95% of the total energy used by world transport.[327] In 2004, transport accounted for 23% of the world's energy-related GHG emissions with about three quarters coming from road vehicles.[328] Over the past decade, GHG emissions from the transport sector have increased at a faster rate than any other energy-using sector,[329] especially in the quickly-industrializing countries such as China and India. This trend is expected to continue over the next several decades.[330]

Due to the fact that China is on its way to fast motorization, the transportation sector is making an ever increasing contribution to the country's total CO2. The transportation sector in China in 2006 accounted for an estimated nine percent of the country's total CO2 emissions.[331] Though this is still far below equivalent levels in developed countries (for developed countries the transportation sector greenhouse gas share is about 30 percent), the

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[321] *IPCC*, Climate Change 2007: Mitigation, p.325.
[322] *United Nations*, Air Pollution from Ground Transportation, p.12.
[323] *Shahin,* Energy Conservation in Urban Areas in the Framework of a Sustainable Transportation Concept, p.1.
[324] *Schopman,* Transportation as a Political Issue, p.33.
[325] *Schopman,* Transportation as a Political Issue,p.33.
[326] *IPCC*, Climate Change 2007: Mitigation, p.325.
[327] *Ibid.,* p.325. .
[328] *Ibid.,* p.325.
[329] *Ibid.,* p.325.
[330] *Ibid.*, p.325.
[331] *Wagner/ Whitworth/ An,* Climate Change Mitigation Strategies for the Transportation Sector in China, by The Auto Project on Energy and Climate Change, prepared for Stern Review on the Economics of Climate Change, at: http://www.hmtreasury.gov.uk/media/9/8/Final_Draft_China_Mitigation_Transport_Sector_Research.pdf

current trend in China shows that this gap is being shortened rapidly.[332] Hence, the Chinese transportation sector is an increasingly crucial factor climate protection.[333]

In order to make a significant contribution to climate protection, China should adopt appropriate measures and policies regarding the integration of climate protection concerns into national and local regulations on transportation. Nevertheless, it is hard to define "appropriate measures and policies", because "transportation policy is made within a complex framework of differing jurisdictions, differing goals, and substantial interactions with other sectors and various aspects of economic and social life."[334] Therefore, a policy to address the GHG emissions should not focus exclusively on GHG mitigation. It needs to be weighed in interwoven policy aims within the different levels of jurisdictions (local and national).

This part is devoted to presenting the general policy context of GHG control in China's transportation and gives an introduction of regulation instruments. It focuses on road transportation, as the road transportation is the main GHG contributor in the transportation sector.[335]

I. The External Negative Effects of Road Transportation

1. Road Transportation and GHG Emissions

a) Directly-related GHG Emissions from Road Transportation

Almost all motorized transportation today involves the combustion of fossil fuels, which produces energy to be transformed into motion. This combustion produces carbon dioxide (CO2) and to a lesser extent methane (CH4) and nitrous oxide (N2O). These three gases belong to the GHGs that can result in climate change.

With the economic development in China, efficiency improvements and the restructure of industry will reduce the share of emissions from manufacturing.[336] By contrast to

[332] *Ibid.*.
[333] *Ibid.*.
[334] *United Nations*, Air Pollution from Ground Transportation, p.1.
[335] Road vehicles account for three quarters of the GHG in the transportation sector. *IPCC*, Climate Change 2007: Mitigation, p.325.
[336] *IEA*, the World Energy Outlook(2007), pp.313-314.

manufacturing, transport is becoming an increasingly important source of greenhouse gases (GHG). According to the forecast of IEA, the share of transport in the total national GHG emissions will increase dramatically in the next few decades,[337] since motorization is growing much faster than GDP in China. With the economic development in China, efficiency improvements and the restructure of industry will reduce the share of emissions from manufacturing.[338]

b) Indirect GHG Resulting from the Increase of Transport

The GHG directly comes from transportation —the combustion of fossil fuels. Moreover, the increase in transportation pushes for a significant development of the transportation infrastructure, particularly in the lengths of roads, which also result in the increase of the GHG.[339] For one reason, the set-up of the transportation infrastructure consumes huge amounts of steel, cement and other materials. Producing such huge amounts of steel, cement and other building materials entails corresponding GHG. For another, the rapid motorization drives both motorists and developers to constantly seek non-congested low-density land. This suburbanization trend in motorization resulted in significant urban land expansion and loss of arable land over past decades.[340] The loss of arable land will occur at a far higher speed if the trend of rapid motorization is not well regulated in the future. The transformation of farmland and forestland into roads releases carbon deposits from within the plant, which leads to the increase of GHG.

2. Other Negative Impacts of Road Transportation as Relating to China

The immense and substantial benefits of motorization attract individuals to car ownership and use, which boosts a powerful car industry. At the same time, the popularity of cars

[337] *IEA,* World Energy Outlook(2007), pp.313-314.
[338] *IEA*, the World Energy Outlook(2007), pp.313-314.
[339] *Wagner/ Whitworth/An,* see supra.
[340] *Schipper/Ng,* Rapid Motorization in China: Environmental and Social Challenges, p.13.

usually prevents legislators and other policy-makers from passing regulations or taxes to internalize the external negative impacts and developing sustainable transportation modes.

The negative external impacts of motorization in China will be more serious than that of other countries such as USA, Germany, France etc., because of the extremely large number of population and the high population densities in the cities. Even at low level of motorization, many side-effects such as congestion and air pollution has brought negative effects on the majority of the population.

a)Air Pollution

Under the present technological mode of motorization, almost all motorized transportation today involves the combustion of fossil fuels, which produces not only GHG, but also a number of other by-products that directly damage the local and regional/national air quality as well as negatively impacting on human health.[341]

aa) Local Air Pollution

Fossil fuel use in transportation produces many local pollutant emissions, which bring about negative impacts on the communities or the cities. In fact, not all pollutants capable of causing damage to human health are regulated.[342] The main pollutants from motor vehicles include lead, particular matter, volatile organic compounds (VOCs), oxides of nitrogen (Nox), carbon monoxide (CO), and oxides of sulphur (Sox).[343] In China, the local air pollution was dominated by industrial production. However, with the rapid motorization, vehicles are making a greater contribution to local air pollution, particularly in the cases of pollutants like carbon monoxide and in-combusted hydrocarbons, which are now dominated by the vehicle emissions.[344]

bb) Regional/National Air Pollution

[341] *United Nations*, Air Pollution from Ground Transportation, New York(2002), p.13.
[342] *Ibid.*, p.16.
[343] *Ibid.*, p.18.
[344] *Schipper/ Ng,* Rapid Motorization in China: Environmental and Social Challenges, pp.16-17.

Many of the pollutants that have an immediate impact on local community also make contributions to regional environmental degradation.[345] These environmentally negative effects are regarded to be related to long-range transport of air pollutants via ozone, peroxyacetyl nitrate (PAN), sulphuric acid, and other compounds.[346] The negative effects involve acidification, eutrophication, and damage from exposure to ozone.[347] Acidification refers to a reduction in the pH balance of the precipitation, exerting effects on surface freshwater bodies, forests and crops. Eutrophication is due to the nitrate run-off from soil depositions, which can cause biological hyper-productivity in fresh and salt water bodies.[348]

b) Reliance on the Imported Oil

Rapid motorization has posed a great challenge for China's energy security, as increasing oil-consumption has made China more and more reliant upon the international oil market. From 1980 to 2005, China's oil consumption increased by a factor of 2.8, accounting for about 21 percent of its total energy consumption.[349] In 1993, China became a net oil importer and in 2003, overtook Japan to be the second largest oil consumer in the world. Its dependence on foreign oil has reached 45 percent in 2005.[350] The increase in oil consumption is boosted by three factors: increasing demand from the transportation industry; the growing chemical industry; and the use of oil-fired power generators as short term solutions.[351] Among the three factors, it is estimated that increasing oil consumption from road transport will continue to be the major force driving China's reliance on the imported oil.[352]

c) Congestion, Parking and Farmland Conversion

Rapid motorization in the road transportation of China has resulted in congestion and parking problems in many cities. Many cities are not equipped with proper road capacity or

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[345] *United Nations*, Air Pollution from Ground Transportation ,p.19.
[346] *Ibid.*, p.19.
[347] *Ibid.* , p.19.
[348] *Ibid.* , p.19.
[349] British Petroleum, (2006), BP *statistical review of world energy 2006*. [Online], Available at: http://www.bp.com/productlanding.do?categoryId=91&contentId=7017990.
[350] Energy Information Administration, World oil balance 2001-05. Washington D.C: U.S.Department of Energy.
[351] *Oliver*, China Environment Series, Issue 8(2006), pp.41-42.
[352] *Ibid.,* pp.41-42.

parking infrastructure which can meet the demands of the increase in total motorized transport volume, as well as rapid shifts towards an increasing number of private passenger vehicles.[353] The city government's response to motor vehicle congestion is to expand existing lanes and build more roads.[354] In spite of road expansion, the congestion problem is difficult to improve. This is simply because the number of vehicles is rising much faster than the length or area of roads in most Chinese cities. Moreover, with the increase in motorization, inadequate parking space is another emerging problem. The rapid increase of parking space has to keep up with this increase in car ownership.[355] A huge amount of farmland and forestland has been converted into roads and parking spaces due to the rapid motorization. Further, rapid motorization will result in changes of the land use model. Rapid motorization leads to congestion that drives both motorists and developers to constantly seek non-congested low-density land, which transforms even more farmland into urban space.[356]

d) Road Safety

Road safety has become a major issue in China. One of the main factors contributing to the increase in traffic fatalities is the increase in the number of automobiles.[357] For example, only in only the first half year of 2007, there were 159 thousand road accidents in China, which resulted in deaths of 37 thousand persons and injuries of 189 thousand persons.[358]

II. Integration of GHG Regulation into National Regulations on Road Transportation

[353] *Schipper/Ng,* Rapid Motorization in China: Environmental and Social Challenges, p.12.
[354] *Ibid.*,pp.11-12.
[355] *Ibid.*, p.11.
[356] *Braley/Baumert*(ed.), Growing in the Greenhouse: Protecting Climate by Putting Development first, p.48.
[357] *Schipper/Ng*, see supra, p.12.
[358] Source: http://politics.people.com.cn/GB/5932734.html

1. Direct Regulation on GHG or Integrated Regulation

a) Direct Regulation of GHG

The European Union and the State of Califonia have taken direct regulation measures on GHG emissions from the transportation sector. In order to help implement the California Global Warming Solutions Act of 2006 (also known as "AB 32") that has a goal of reducing the GHG emissions in California to 1990 levels by the year 2020, Governor Schwarzenegger issued an Executive Order on January 18, 2006, establishing the world's first GHG emission standard for transportation fuels.[359] The order sets a goal of reducing the carbon intensity of transportation fuels sold in California by at least 10% by the year 2020.[360] To ensure that the European Union can reach its GHG targets under the Kyoto Protocol and beyond, the European Commission adopted a proposal for legislation to reduce the average CO2 emissions of new passenger cars on December 19, 2007, which aims to ensure average emissions of new passenger cars in the Community do not exceed 130g CO2/km from 2012 onwards.[361]

This direct regulation on GHG emissions from transportation, however, has not yet be adopted in China. Firstly, China has not assumed any absolute GHG reduction obligations in the international climate protection convention and it is predicted that China will not make any absolute GHG reduction commitments before its GHG emissions per capita reach the world average level. Secondly, the GHG increase in China is directly related to its high-speed economic development, increasing population, and rapid urbanization & industrialization. Therefore, its model of increasing GHG is different from that of the developed countries. Under a business-as-usual (BAU) scenario, the active population of cars and SUVs in the PRC is forecast to grow to 15 times its present size in 30 years (from 12.9 million in 2005 to around 193 million in 2035).[362] Even under the most optimistic scenarios, in which China integrates all expected technological improvements, the development of transportation will lead to a significant GHG increase.[363]

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[359] EXECUTIVE ORDER S-01-07. Available at: http://gov.ca.gov/executive-order/5172/.

[360] Article 1 of EXECUTIVE ORDER S-01-07. Available at: http://gov.ca.gov/executive-order/5172/.

[361] COM/2007/0856 final- 2007/0297 (COD). Available at: http://ec.europa.eu/environment/co2/co2_home.htm. Further introduction about this legislation proposal will be made in Chapter VI(A).

[362] *ADB(Asian Development Bank)*, Comprehensive analysis on the problems associated with energy efficiency and climate change in the transport sector, Printed in Philippines(2006), Publication Stock No. 110406 , p.3.

[363] *Ibid.*, p.61.

However, as stated above, the rapid development of automobile-based transportation brings about not only a significant increase in the GHG emissions, but also causes other national concerns in terms of energy security and environmental problems and local problems. All these problems will be getting worse, if the corresponding policies and measures are not taken as early as possible.[364] These problems have resulted from the rapid motorization in China, but because the establishment of basic transportation infrastructure is not yet finished, these problems can be allievated in an integrated way by developing diversified, balanced transport models.

In the future, China may issue direct regulation on GHG from the road transportation. At present, however, the most practical and urgent regulation of road-based GHG emissions is to make the policy interventions which have co-benefits in GHG reduction, energy security, national and local pollution control and congestion relief.[365]

b) The Integrated Regulation

GHG control does not always confom to the priorities of national or local government. Sometimes there exists a tradeoff between the national or local policy priorities and the GHG control. For example, carbon monoxide, a hazardous air pollutant emitted by motor vehicles, is removed from the atmosphere by chemical reactions that have the effect of increasing concentrations of methane, a powerful greenhouse gas.

Nevertheless, from the perspective of the long-term development strategy of Chinese transportation, GHG controlling can be integrated into other regulation priorities. The most important strategic problem for Chinese transportation development is the advoidance of the high levels of private automobile dependency. If China succeeds in preventing high levels of automobile dependency, it will assist not only in achieving national and local priorities such as environmental protection, energy security, social equality and traffic congestion, but also in reducing GHG. However, if China becomes locked into a model of high automobile dependency as some developed countries are, it will both aggravate the existing problems of environmental pollution, energy security, traffic congestion and social equality and bring

[364] *Ibid.*, p.30.
[365] *Ibid.*, p.30.

about a huge quantity of GHG emissions in the future. Moreover, regulations on motorized transportation such as improving the fuel efficiency of individual vehicles, promoting fuel diversity and adopting fuels with a lower GHG-emissions footprint will bring about positive effects for local, national concerns as well as GHG reduction.[366]

Therefore, the regulations on GHG in China can be carried out through integrated regulations which involve preventing automobile dependency and regulating motorized transportation. An Asia Development Bank report set forth four principal categories of policy interventions for the integrated regulations in Asian developing countries as follows:

"► promote urban reform and land use planning to ensure the development of urban design that reduces the need to travel, requiring fewer passenger- or freight-kilometres;

► adopt integrated transportation planning to ensure a modal shift that promotes lower fuel consumption per passenger- or freight-kilometre travelled;

► improve vehicle engines and fuel technology to increase the energy efficiency of individual vehicles, to increase the distance travelled per unit of fuel; and

►introduce biofuels with lower GHG emissions".[367]

The suggestions of the Asia Bank are appropriate for China. For China, the most important strategic issue is to avoid being locked into automobile dependency. This issue will be discussed in detail.

2. Preventing "Automobile Dependency"

a) "Automobile Dependency"

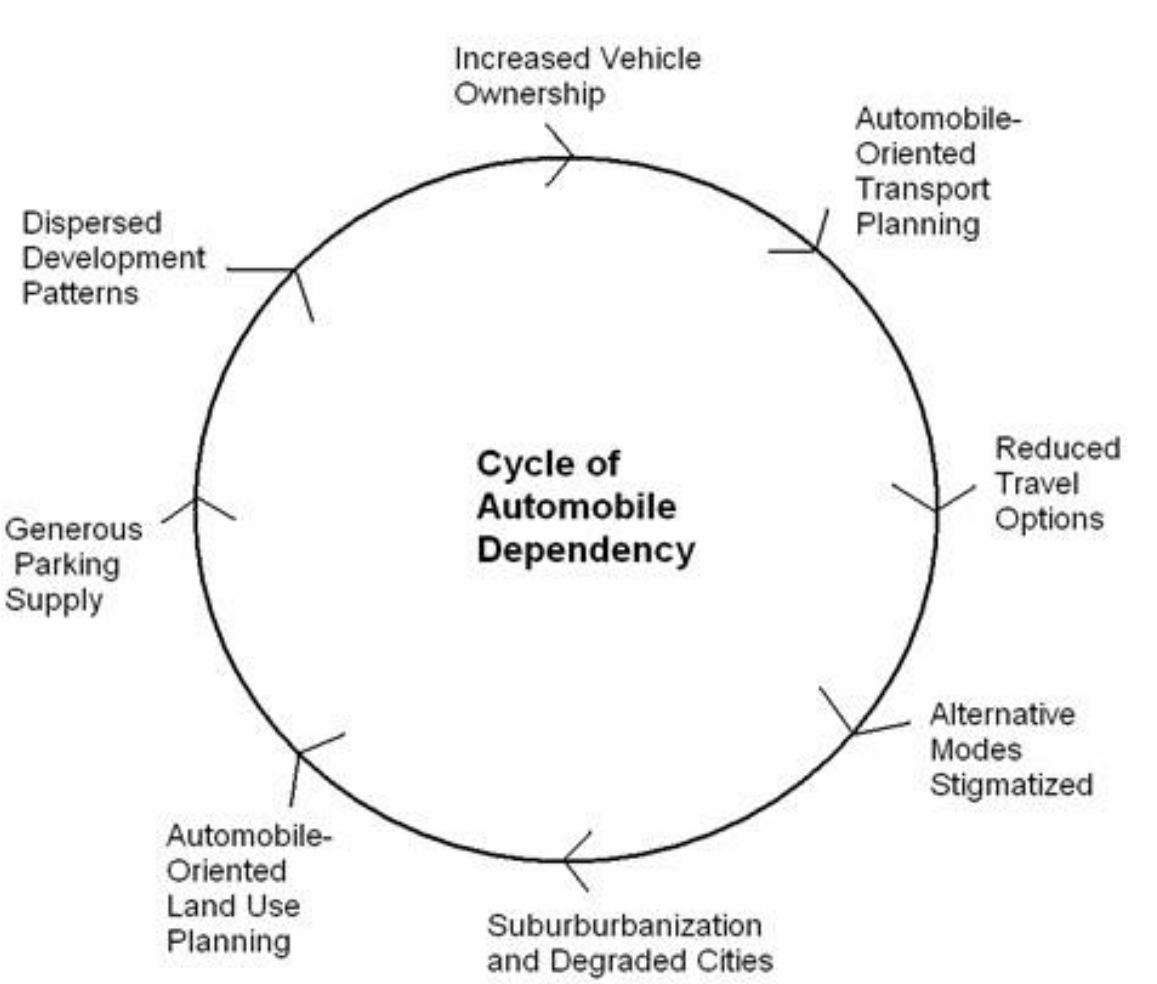
"Automobile dependency" refers to a condition of high levels of per capita automobile travel, automobile-oriented land use patterns, and reduced transport alternatives.[368] Another term for automobile dependency is automobile oriented transportation and land use patterns.[369]

During the last century there has been a self-reinforcing cycle of increased automobile travel, reduced travel options, and more automobile-oriented transportation and land use

[366] *Ibid.*, p.5.
[367] *Ibid.,* p.34.
[368] *Newman/Kenworthy*, Sustainability and Cities: Overcoming Automobile Dependency, cited from *Litman/Laube*, Automobile Dependency and Economic Development, pubished by Victoria Transport Policy Institue(Victoria, Canada), 6 August, 2002, Available at: http://www.vtpi.org/ecodev.pdf.
[369] *Litman/Laube*, Automobile Dependency and Economic Development, pubished by Victoria Transport Policy Institue(Victoria, Canada), 6 August, 2002, Available at: http://www.vtpi.org/ecodev.pdf.

policies which result in a high level of automobile dependency in most communities of developed countries, especially in most cities in the United States, Canada, Australia and New Zealand, and to a lesser extent, large cities in Europe.[370] This self-reinforcing cycle of increasing automobile levels can be illustrated by the following figure.

Cycle of Automobile Dependency



Source: Victoria Transport Policy Institute

In the Cycle of Automobile Dependency, the automobile owner, the automobile industry and automobile-related industry form a strong lobby group who advocate increased construction of roadways, increased parking requirements, and low automobile user

[370] *Newman/ Kenworthy/Gower/Aldershot,* Journal Utilities Policy, 1991(1), Issue 4, pp.352-354.

charges[371].They point out that motor vehicle travel is growing due to increases in population, wealth and suburban lifestyles, resulting in increased traffic congestion.[372] They argue that failing to expand roadway and parking capacity lead to traffic congestion.[373] They insist that efforts to constrain motor vehicle use contradict consumer preferences and will stifle economic growth and reduce personal freedom.[374] As a result, more and more automobile-oriented infrastructures are built up. However, this improved automobile-oriented infrastructure "produce" more automobile ownership and usage, the congestion arises after a short time[375]. The new circle of automobile-oriented infrastructure building and car ownership is perpetuated[376]. In this way, the automobile dependency becomes more and more serious.[377]

According to Victoria Transport Policy Institute, "The opposite of Automobile Dependency is not a total lack of private vehicles; rather, it is a *balanced* or *multi-modal* transport system, meaning that consumers have a variety of transport options, and incentives to use each for what it does best."[378] Such a balanced transport system involves "a variety of specific actions to improve travel options, create more multi-modal land use patterns, correct planning and pricing practices that favour automobile travel, and increase the prestige of alternative modes".[379]

b) China's Rapid Motorization: Towards Automobile Dependency or a Multi-model Transport System?

aa) China's Rapid Motorization

With the rapid economic growth and urbanization, China is undergoing a spectacular increase of motorization.[380] For example, it took 48 years for the first million automobiles to appear in Beijing in 1997, but only six years for the second million, and the third million is

[371] *Victoria Transport Policy Institute,*Automobile Dependency, TDM Encyclopedia, available at: http://www.vtpi.org/tdm/tdm100.htm
[372] *Ibid.*
[373] *Ibid.*
[374] *Ibid.*
[375] *Ibid.*
[376] *Ibid.*
[377] *Ibid.*
[378]*Litman/Laube*, Automobile Dependency and Economic Development, pubished by Victoria Transport Policy Institute(Victoria, Canada), 6 August, 2002, p.2. Available at: http://www.vtpi.org/ecodev.pdf.
[379] *Victoria Transport Policy Institute*, Automobile Dependency, Available at: http://www.vtpi.org/tdm/tdm100.htm
[380]*Schipper/Ng*, Rapid Motorization in China: Environmental and Social Challenges, p.4.

expected by 2008.[381] The per-capita car ownership ratio in China in 2006 is 24 for every 1000, but it increases with the speed of 67% every year.[382] It is expected to reach 40 cars for every 1,000 citizens by 2010.[383]

Considering the significant economic benefits of the automobile industry, the state Planning Commission promulgated Automobile Industry Policy. In this regulation, the automobile industry is ranked as a "pillar industry" and a series of measures and policies are established to promote the development of the automobile industry, especially the household cars. This Automobile Industry Policy is very successful. The Chinese automobile industry has become one of the most rapidly growing in the world.[384] Over the 1999 to 2004 period, Chinese production of motor vehicles increased by 177 percent and China now ranks as the world's third largest automobile producer.[385] This rapid development has resulted in a new auto industry policy in 2004 which aims to slow investment and consolidate the auto industry because of the over-investment in this industry.

Compared with developed countries, the automobile ownership level is still low in China and has not reached the world average level. In 2002, the US had 765 vehicles per 1,000 (2002 data), while Europe (including the FSU countries) has an average of about 300 vehicles per 1,000.[386] In 2005 per capita car ownership in China was roughly 11 per 1,000 people.[387] Even if China will have 40 cars per thousand people in 2015 as envisaged,[388] it is lower than the world average level (120 per 1000). It seems that the discussion about avoiding automobile dependency is too early.

However, if the real distribution of car ownership in different regions and the measures and policies which many cities has adopted or has planed to adopt, are taken into account, it is never too early to discuss this issue. Although the national average car ownership is very low, the car ownership level in some cities of eastern China has surpassed or will surpass the world average level. Due to the strong relation between income and car ownership,[389] car

[381] *Ibid.*, p.4.
[382]Source: Xinhuanet, see: http://news.xinhuanet.com/english/2006-05/24/content-4594750.htm.
[383]Source: Xinhuanet, see: http://news.xinhuanet.com/english/2006-05/24/content-4594750.htm.
[384] *Bradley/Baumert*(ed.), Growing in Green House: Protecting the Climate by Putting Development First, p.52.
[385] *Ibid*., p.52.
[386]UNECE(United Nations Economic Commission for Europe),Statistical Yearbook of the UNECE 2005.
[387] Source:National Bureau of Statistics (NBS). 2006. China Statistical Yearbook.
[388]*Kobos et al*., Contemporary Economic Policy, Volume 21 Issue 2 Page 200-217, April 2003.
[389] *Ingram and Liu*, Determinants of Motorization and Road Provision, World Bank Policy Research Working Paper No. 2042, January 1999. Available at: http://ssrn.com/abstract=569257

ownership is often hugely concentrated in urban cities, where incomes are generally much higher than the national average, particularly the major cities of eastern China. By the end of 2007, there were 3.1 million motor vehicles in Beijing with another 1,000 to 1,200 vehicles are added to Beijing's roads every day.[390]

More importantly, the policies and measures which the major cities have adopted will probably push these cities and lock them into automobile dependency. There are many regulations that give the automobile user a higher priority and convenience at the sacrifice of the non-motorized transportation model (See the below Box). One serious measure that has been taken is the prohibition of the electrical bicycle. Since 2002, several cities such as Zhuhai, Fuzhou, Wenzhou, Nangnin, and Haikou have taken measures to prohibit the use of electrical bicycle in these cities.[391]

Box: Examples of social inequity as a result of road space distribution in Beijing, Shanghai and Shenzhen

[390] Source: xinhuanet. Available at: http://news.xinhuanet.com/english/2007-12/06/content_7212575.htm.
[391] *Zhao,* Academical Journal of Shanxi University(Shanxi Daxue Xuebao), 2006(4): 52.

Beijing

Bicycles are forbidden on certain main roads in Beijing, where car ownership is no longer just a status symbol, but also used as an "invasion" tool. Whenever the roads are congested, automobiles will drive on bike lanes; as a result, cyclists will then ride on sidewalks, leaving inadequate space for pedestrians. Lanes for automobiles, bicycles, and pedestrians were reasonably distributed in the past, where sidewalks for pedestrians were especially wide. Automobiles are now given the priority in transport policies, where sidewalks and bike lanes have been sacrificed to allow more road space for automobiles.

Shanghai

Shanghai residents have pointed out that because non-motorized traffic lanes were not taken into consideration during the design of Pudong's Zhangyang road, the initially wide pedestrian sidewalk has to be divided for non-motorized traffic, e.g. bicycles. Another common sight includes cars being parked on the sidewalks of Shanghai. Due to the lack of parking space, some car owners are treating sidewalks as parking lots, forcing pedestrians to walk on motor lanes.

Shenzhen

Rapid motorization has greatly reduced the space left for sidewalks, with motorists invading bike lanes, cyclists invading pedestrian paths, and drivers treating sidewalks as parking lots. Since pedestrians do not regularly obey traffic regulations, intersections have been greatly reduced together with an increase in road obstacles so as to ensure smooth traffic flows. To prevent the obstruction of the view of the city's landscape, the construction of overhead bridges has been further delayed.

Source: Lee Schipper, Wei-Schiwen Ng, Rapid Motorization in China: Environmental and Social Challenges.

Thus, it is a crucial phase for major cities of Eastern and East-central China to avoid being locked into "automobile dependency". If the automobile-oriented transportation infrastructure and land use model is established, these cities are apt to be locked into the automobile dependency circle and it is very difficult to get out of it, because the transportation infrastructure and transportation policy has a lock-in effect. If the bike lanes are destroyed, they are difficult to be rebuilt. The automobile-favoured policies will bring about more automobile users, which make the cancellation of these policies more difficult, even if these policies are unfair.

bb) Justifications for the Prevention of "Automobile Dependency"

(1) The Constraints of Energy Availability and Space Scarcity

In China, the growth in motorization is confronted with two major constraints. Firstly, China's motorization is constrained by the availability of energy. Its rapidly growing oil demand is making China's reliance on its imported oil an increasing concern. China imported about 44% of the crude oil it consumed in 2005.[392] The figure that is supposed to continue rising. According to the projection of IEA, crude oil demand in China will double between 2004 and 2020.[393] Brown projects that imports may account for as much as 70 percent of total oil supply by 2020 in China.[394] Even with its low level of car ownership, China has become the world's second largest oil importer. Economist *Gu Haibing* criticizes the policies to promote the private car popularity in China.[395] According to him, the huge population in China determines that China cannot follow the developed counties in possession of high level of private car ownership.[396] He points out that with the 13 billion population and 0.5%-1% increase in population each year, it would be impossible to achieve the car ownership level of America, or of Japan. Even the lowest car ownership level of Holland in developed countries is an insurmountable challenge for China, if taking the energy availability into account.[397]

Secondly, the arable land imposes constraints on China's expanding motorization. Although the total area of China covers almost 10 million square kilometres — the same size as the United States or Europe to the Urals, the arable land is very limited, particularly taken into account the enormous population (almost 1.3 billion).[398] China's environmental situation is closely connected to high population pressure on scarce resources: Population density averages 120 people per square kilometre. It seems as if the population density is not so high — slightly higher than Europe's 96. However, the major part of China's Western half—the Tibet- Qinghai plateau, and the Gobi and Taklamakan deserts—can support only limited populations.[399] Thus, the average population density of China can not show the true severity

[392]Source: National Bureau of Statistics (NBS). 2005. China Statistical Yearbook.
[393] *International Energy Agency (IEA),*World Energy Outlook(2006), p.86.
[394] *Downs,*The Chinese Energy Security Debate, 2004,China Quarterly 177.
[395]*Gu* Haibin, An Analysis on the Population of 1.3 Billion from the Perspective of Energy Economics(Shisan Yi Renkou de Nengyuan Jingjixue Fenxi) , Guangming Daily 25/08/2004.
[396]*Ibid*.
[397]*Ibid.*
[398]*UNDP*, China Human Development Report 2002: Making Green Development a Choice, p.2.
[399]*UNDP*,China Human Development Report 2002: Making Green Development a Choice, p.4.

of the situation. Cumulative calculations of the distribution of China's land area and population density can show the severity of the situation:

"•nearly 115 million people—10% of the population—
live on a total area of just 50,000 square kilometres,
merely 0.5% of China's total landmass, an area that
accounts for the most densely populated counties
and cities with an average of ca. 2,500 people per
square kilometre;
• half of China's population occupies less than one tenth
of the country's total land area with an average
population density of 740 people per square kilometre;
• more than 90% of China's population is concentrated
in less than one-third of the country, where the average
density of 350 people per square kilometre equals
that of the most densely populated countries in Europe
(Heilig, 1999)".[400]

The arable land finds itself in a more serious situation, with only 13 percent of the total land area being used for agriculture.[401] Arable land per capita is only 0.1 ha, which is among the least in the world, compared with the world average of 0.24 and the European Union of 0.22 ha per capita.[402] Owing to huge population pressure on agricultural land, the issue of food supply security is one of the biggest priorities in national policy-making. Furthermore, the most fertile land is situated in the area where the urbanization and motorization are under way at rapid speed, which aggravates the scarcity issue of arable land. Merely in the period from 1999 to 2003, new highways totalled an estimated two million kilometres, leading to a loss of 6.69 to 7.03 million Chinese acres (one Chinese acre is 670 square meters) of arable land, which is approximately 0.37 percent of the total arable land area in China.[403] In conclusion, the motorization in China is confined by the high population density and scarcity of arable land. Its large uneven-distributed population means that China cannot follow the motorization model of Western countries.

[400]Cited from China Human Development Report 2002, pp.2-4.
[401]*Heilig*, 1999, Can China Feed Itself? A System for Evaluation of Policy Options, CD-ROM. Laxenburg, Austria, International Institute for Applied Systems Analysis (IIASA).
[402]Source: *World Bank*, 2001, *World Development Indicators*.
[403] *Schipper/Ng,* Rapid Motorization in China: Environmental and Social Challenges,p.14.

(2) The "Universal Transportation Service" Obligation of the State

There is no direct provision for a "universal service obligation" for the state or transportation service provider. However, the "universal service obligation" of state can be inferred from Article 42, Article 43, and Article 46 of the Chinese Constitution in connection with Article 33 (2) of the Chinese Constitution. According to Article 42 and Article 46 of CC, the citizens of China are entitled to work, to rest and to receive education. The state is obliged to take measures to ensure that all these rights can be equally enjoyed by the citizens in light of Article 33 (2) CC. However, if the people cannot be ensured access to reliable transportation, the rights to work, to rest and to receive education and other basic rights can not be realized.

Therefore, it is the state's obligation to ensure transportation accessibility for all. This universal service obligation does not mean that the state must provide the transportation service by itself. It can resort to the market mechanism to fulfill the basic transportation needs of the people, but the government should provide the accessibility for all through regulations, subsidies or other measures when the market mechanism cannot ensure universal transportation service for the people. Although the lawmaker or the executive can exercise their own discretion to choose the measures, they should promote the accessibility for all, not the contrary.

To accomplish the universal service obligation of the state, it is necessary for China to avoid being locked into a cycle of automobile dependency. Automobile-oriented transportation systems cannot fulfill the transportation needs of people who can neither drive or nor afford a private car. These people make up the majority of China. An automobile-oriented transportation system in China can only promote welfare for the minority in China but will make the "universal service obligation" of the state unlikely to accomplish.

F. Regulations of Motor Vehicles

I. Technology-Based Regulations

1. The Mandatory Fuel Economy Standards

a) The Mandatory Fuel Economy Standards for New Vehicles

In order to ensure the adoption of fuel-efficient technology in the new vehicles, and avoid using fuel-wasting old technology, the mandatory fuel economy standards have been put into practice since 2004. *Maximum Limits of Fuel Consumption (L/100-km) for Passenger Cars* as the mandatory fuel economy standards are applicable to vehicles which 1) are equipped with an ignition engine or a compression ignition engine; 2) have a maximum designed vehicle speed of no less than 50km/h; 3) have a maximum designed mass of no more than 3500 kg; 4) are passenger vehicles that have no more than 9 seats (including the driver seat).

These compulsory fuel economy standards are weight-based: for different vehicles with different weights the maximum limits of fuel consumption are different. The same standards are applied to both gasoline and diesel vehicles, which are further subdivided into two separate sets of standards: one for passenger cars with manual transmission and another for those with automatic transmission, SUVs and MPVs (Multi-Purpose Vehicles – vehicles with functions of cars, wagons, vans) with 3+ rows (all transmission types). These compulsory fuel economy standards will be improved and renewed with the development of the technology. In the acts of 2004 the standards were set to be implemented in two phases. For new registered vehicles, phase I to implement these limits began in July 2005; for in-production vehicles, the implementation time is one year later compaed with newly registered vehicles. The Standards of Phase II start in January 2008 for newly registered vehicles and from January 2009 for in-production vehicles. It is predicted that the stricter standards will be taken in the future.

European NEDC test cycle has been adopted in measuring the fuel economy. All newly designed vehicle models and in-production vehicle models are required to conduct this fuel

economy test. The test results of all vehicle models will be publicized, and all information concerning the fuel economy of the vehicle model made available to customers. The vehicle models that cannot meet the required fuel economy standards are forbidden to be sold on the market. In October 2006, The National Development and Reform Commission (NDRC) published the first list of newly designed vehicle models which met the fuel consumption limits and their respective fuel consumption data. All 409 models from 34 producers met the requirements. On 24. July 2007, NDRC released a second list of vehicle models which meet the national standard on limits of fuel consumption for passenger vehicles and those which do not meet the national standards. The fuel consumption data of every vehicle model is also published. A total of 2,374 models from 95 manufacturers meet the standards. 444 Vehicle models from 55 car makers that failed to meet the maximum fuel limits are forbidden to manufacture after 24. July 2007.

The Chinese fuel economy standards are mandatory. For new designed vehicle models, if the fuel consumption exceeds the required Maximum Limits of Fuel Consumption, such vehicle models are forbidden to be put into production. After the publication of the list of vehicle models and their fuel consumption data, the in-production vehicle models that do not reach the mandatory fuel economy standards are forbidden to be produced from then onwards.

To implement of these standards, the manufacturers is legally obliged to ensure that the manfactured vehicle models conform to the type-approved vehicle(production conformity). If the manfactured vehicles cannot meet the conformity requirements, the type approval should be revoked.[404] According to the extent to which the regular inspections made by the manufacturer on the fuel consumption of the type-approved vehicle are passed satisfactorily, the state institution in charge will decide how the production conformity inspection will be conducted.[405] Moreover, for any modification on the type-approved vehicle the manufacturer should report the institution in charge of the type of approval.[406] The institution in charge decides whether the approved vehicle model is applicable to the modified vehicle model. If the modification will not affect the fuel consumption of the modified vehicle, the type approval of the original vehicle will still apply to the modified vehicle;[407] if not, an application of a new vehicle model will need to be submitted.[408]

[404]Article 9.1 Limits of Fuel Consumption for Light-Duty Commercial Vehicles.
[405]Article 9.2 *Limits of Fuel Consumption for Light-Duty Commercial Vehicles.*
[406] Article 10 *Limits of Fuel Consumption for Light-Duty Commercial Vehicles*
[407]Article 10.1 *Limits of Fuel Consumption for Light-Duty Commercial Vehicles*
[408]Article 10.2 *Limits of Fuel Consumption for Light-Duty Commercial Vehicles*

Maximum limits for fuel consumption (L/100-km)[24] and minimum CAFE-equivalent mpg limits, for passenger vehicles in China (excluding Taiwan)

	Maximum fuel consumption limits, based on NEDC cycle (L/100-km)				Minimum fuel economy limits, based on U.S. CAFE equivalent (mpg)			
	Phase I [2005]		Phase II [2008]		Phase I [2005]		Phase II [2008]	
Weight (lbs)	Manual	Auto/SUV	Manual	Auto/SUV	Manual	Auto/SUV	Manual	Auto/SUV
1,567	7.2	7.6	6.2	6.6	36.9	35.0	42.9	40.3
1,922	7.2	7.6	6.5	6.9	36.9	35.0	40.9	38.5
2,178	7.7	8.2	7.0	7.4	34.5	32.4	38.0	35.9
2,422	8.3	8.8	7.5	8.0	32.0	30.2	35.4	33.2
2,678	8.9	9.4	8.1	8.6	29.9	28.3	32.8	30.9
2,933	9.5	10.1	8.6	9.1	28.0	26.3	30.9	29.2
3,178	10.1	10.7	9.2	9.8	26.3	24.8	28.9	27.1
3,422	10.7	11.3	9.7	10.3	24.8	23.5	27.4	25.8
3,689	11.3	12.0	10.2	10.8	23.5	22.2	26.1	24.6
3,933	11.9	12.6	10.7	11.3	22.3	21.1	24.8	23.5
4,178	12.4	13.1	11.1	11.8	21.4	20.3	23.9	22.5
4,444	12.8	13.6	11.5	12.2	20.8	19.5	23.1	21.8
4685	13.2	14.0	11.9	12.6	20.1	19.0	22.3	21.1
5066	13.7	14.5	12.3	13.0	19.4	18.3	21.6	20.4
5578	14.6	15.5	13.1	13.9	18.2	17.1	20.3	19.1
> 5578	15.5	16.4	13.9	14.7	17.1	16.2	19.1	18.1

b) Regulations of the In-use Vehicles

To achieve the aims of energy conservation and emissions reduction, the regulations on in-use vehicles are also important. They consist mainly of regulations concerning the inspection and scrapping policy. The in-use vehicles must be inspected once a year and only those that have passed the inspection (including the emissions inspection) may be driven on the road.

Standards for the Scrapping of Motor Vehicles has provided legal criteria to eliminate the old vehicles which usually consume more energy and give out more emissions. *Standards for the Scrapping of Motor Vehicles* was first enacted in 1986 and renewed in 1997. After that, adjustments were made in 1998 and 2000. The main updated scrapping standards are: commercial-used vehicles (including taxis) have a legally required scrapping period of 8

years; passenger vehicles (including cars and SUVs) with no more than 9 seats have a suggested scrapping period of 15 years; and passenger vehicles with more than 9 seats have a suggested scrapping time of 10 years. Any vehicles beyond the legally required scraping time should be scrapped and should not be utilized any more. If anyone want to utilize a vehicle which has surpassed the suggested scrapping period, it must pass inspection for permission to extend its lifespan.

c) The Effectiveness of Chinese Fuel Economy Standards on GHG in terms of GHG Control

Although almost all industrialized countries apply standards on new vehicles to reduce vehicle oil consumption or CO2 emissions,[409] most developing countries have adopted no standard to control the oil consumption or CO2 emissions. The relationship between GHG emissions and fuel consumption is important because the level of CO2 emissions from automobiles are directly linked to vehicle fuel consumption.[410] Chinese Fuel Consumption Standards play a positive role not only in local and regional environmental protection but also in the reduction of GHG.

The Chinese standards are mandatory standards that set up maximum allowable fuel consumption limits by weight category, rather than being based on fleet average.[411] Every individual vehicle model sold in China is required to stay within the fuel consumption limits. The vehicle models that cannot meet this standard are forbidden to be produced in China. The American credit system which allows vehicles exceeding compliance to offset those that do not, is not adopted in this system.[412] In addition, the different standards are designed for different weight classes and the standards become relatively more stringent in the heavier vehicle classes than in the lighter weight classes.[413] This aims to encourage manufacturers to produce lighter vehicles, as the lighter vehicles consume less fuel and give out less emissions than the heavier vehicles.

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[409] *An/ Sauer*, Comparision of Passenger Vehicle Fuel Economy and Greenhouse Gas Emission Standards about the World, Prepared for the Pew Center on Global Climate Change, December 2004, p.5.
[410] *Ibid.*
[411] The Fuel Economy Standards of USA is based on fleet average, see *An/Sauer*, Comparision of Passenger Vehicle Fuel Economy and Greenhouse Gas Emission Standards about the World, Prepared for the Pew Center on Global Climate Change, December 2004, p.6.
[412] *Ibid.,* p.15.
[413] *Ibid.,* p.15, see also. *Sauer/ Wellington*, Taking the High (Fuel Economy) Road, World Resources Institute(November 2004).

As far as the relative rigidity on the GHG control is concerned, the Chinese fuel consumption limits are assumed to be more stringent than the U.S. standards, but less strict than those in Europe and Japan.[414] According to a study by the World Resource Institute, 66% of passenger cars currently sold in the United States would meet the Chinese standards, while only 4% of light trucks would.[415] However, because the principal aim of Chinese fuel consumption standards is to reduce the fuel consumption, the effectiveness of these standards on GHG control was not taken into account in their design. For example, gasoline and diesel fuel are treated the same in Chinese fuel consumption standards, ignoring the different effects of gasoline and diesel on CO2 emissions. Another problem comes from the inspection and maintenance procedures on in-use vehicles. Inspection and maintenance procedures for in-use vehicles in China are poor. Consequently vehicles consume more fuel and produce more emissions than they would otherwise.

2. Alternative Fuel Vehicle Technology Program

In addition to the mandatory technological standards, many kinds of alternative fuel technologies are introduced, researched, demonstrated, and used in cities to reduce the use of gasoline and diesel. These alternative fuel technology programmes include Hybrid Electric Vehicles (HEVs), Compressed Natural Gas (CNG), liquefied petroleum gas (LPG), Electric Vehicle, ethanol, methanol, dimethyl ether (DME), Fischer-Tropsch diesel (FTD), Hydrogen, etc..[416] Apart from policy support, the government provides direct or indirect fund support for the development of these programs.

China has developed a basic legal framework for the development of an alternative fuel vehicle**.** *The Renewable Energy Law of the People's Republic of China(RELC)* aims at promoting the development of renewable energy, including in the transportation sector. Article 16 Paragraph 3 of *RELC* requires fuel-selling enterprises to include biological liquid fuel conforming to the national standard into its fuel-selling system. According to Article 31 of RELC, " If gas-selling enterprises breach paragraph 3 of Article 16 hereof and fail to include biological liquid fuel that conforms to the national standard into its fuel-selling

[414] *Zhao,* Can the Environment survive China's Craze for Automobile?(submitted to Transportation Research Part D: Transport and Environment), p.12.
[415] *Sauer/ Wellington*, Taking the High (Fuel Economy) Road, World Resources Institute(November 2004).
[416] *Shen/Zhang/Han*, Management Science and Engineering, Oct. 2006, p.1735 – 1739.

system, which results in economic loss to the biological liquid fuel production enterprises, relevant enterprises shall be liable for compensation, and energy authorities of the State Council or people's government at the provincial level shall order them to make correction within a stipulated period of time; in case of refusal to make correction, a fine of less than said economic loss shall be imposed against them" In November 2, 2007 the National Development and Reform Commission (NDRC) enacted a regulation regarding the qualifications for manufacturers of automobiles powered by new energies, which provides procedures and criteria for the production of automobiles powered by new energy. New-energy automobiles are defined by the regulation as hybrid cars -- battery electric vehicles (BEV), fuel cell electric vehicles (FCEV), hydrogen-fuelled vehicles and vehicles powered by other new types of fuel.[417] In this regulation, the new-energy vehicles can be categorized into three types: those in the starting phase, those in the development phase, and those in mature phase.[418] Only the new-energy vehicles in the mature phase can be produced and sold as normal vehicle products. A new-energy vehicle in the starting phase can only be produced in small batches and be demonstrated in the permitted area and conditions. One in the development phase can be produced in batches, but can only be sold and utilized within the permitted area, period, and conditions.[419] The regulation stipulates the specific requirements for the qualification of production of new-energy vehicles.[420]

The most important political incentive in promoting an alternative fuel vehicle programme is to strengthen energy security. Thus, these programmes cannot necessarily make long-term contributions to GHG reduction. Therefore, to what extent these Alternative Fuel Vehicle Technology Programs can promote GHG reduction still needs evaluation from case to case. For example, CNG and LPG can not only make a contribution to energy conservation, but also to GHG reduction in China.[421] Although NG(natural gas)-based and coal-based methanol, have a lower life cycle of petroleum consumption than traditional gasoline and diesel, they may be an answer to Chinese oil security. The production and utilization of them, however, will lead to more GHG emissions than traditional gasoline and diesel.[422] It is

[417] Article 6 of Regulation Regarding the Qualifications of Manufacturers for Automobiles Powered by New Energies(Hereinafter refered as QMANE)
[418] Article 7 of QMANE.
[419] Article 9 of QMANE.
[420] Article 16,17 of QMANE.
[421] *Shen/Zhang/Han*, Management Science and Engineering, Oct. 2006, p.1735 – 1739.
[422] *Shen/Zhang/Han*, Management Science and Engineering, Oct. 2006, p.1735 – 1739.

necessary for China to harmonize its policy aims and to give priority to the programs which can bring about positive effects both to GHG reduction and to national energy security.

3. The Limitations and Risks of Technology-Based Regulations in terms of GHG Control

In the long run, technology is able to play a significant role in reducing the local, national and international environmental problems which arise from the road transportation. In some literatures, the technology-based approaches are thought of as the most important in dealing with the global warming.[423] To address the local, national and international environmental problems arising from road transportation, the Chinese government has attached a high importance to the development of new, green technologies. Local, national and international environmental problems could only be solved with the help of the development and application of new, green technologies. However, too much reliance too much on technology-based regulations will result in social and environmental risks in China due to their limitations.

The technology-based regulations are conducive to reducing emissions (local, regional and global) per kilometre of vehicles, but, in terms of controlling total emissions from road transportation, the technology-based regulations may be inadequate. [424] Firstly, the environmental problems caused by motorization have to do not only with emissions per kilometre, but also with the total distance driven.[425] If the trends in car ownership and car use are not controlled, the huge subsequent increase in number of vehicles and in the distances travelled will result in a significant increase of emissions, hence offsetting much of the promise of improved emissions control through current technology-based regulations.[426] Secondly, technological improvements can exacerbate the growth in activity, through the so-called "rebound" effects, which will bring about more GHG emissions. The improvements of motor vehicles in energy efficiency and in reduction of local pollutants may lull local

[423] *Sugiyama/Ueno/Sinton:*The "Coalition for Climate Technology" Scenario, in:*Sugiyama*(ed.), Governing Climate:The Struggle for a Global Framework Beyond Kyoto, 2005 International Institute for Sustainable Development (IISD), pp.33-58.
[424] *Unated Nations*, Air Pollution from Ground Transportation,p.36.
[425] *Bradley/Baumert*(ed.), Growing in the Greenhouse: Protecting the Climate by Putting Development First, p.62-63.
[426] *Bradley/Baumert*(ed.), Growing in the Greenhouse: Protecting the Climate by Putting Development First, pp.62-63.

policy makers into relaxing or not enacting other non-technological regulations to address transportation activity.

The technology optimists advocate that development of green vehicles and alternative fuels is the best hope for a reduction of GHG in road transportation. However, many green vehicles up to now cannot be considered as truly "green" if viewed from the perspective of climate protection:

Catalytic converters?

Catalytic converters are devices connected to a vehicles exhaust system that can help reduce local emissions, such as nitrogen oxides, carbon monoxide and hydrocarbons by more than 75%. However, catalytic converters cannot reduce CO2 unless CCS (carbon capture and storage) technology is used.

Electric or Hydrogen Powered Cars?

Electric- or hydrogen-powered cars are also sometimes cited as pollution solutions, but this is not always the case. They may contribute to lessening the local environmental problems in the communities of high car using, but they will bring about environmental problems in other places and contribute little to GHG reduction under the current generation process of electricity and hydrogen in China. At present, most electricity generators in China are coal-fired, which causes local, regional pollution and GHG emissions. Electrical or hydrogen powered cars are truly green cars, only if electricity and hydrogen are produced from a renewable energy source.

Alternative Fuels?

Some people argue that other fuels, such as methanol, ethanol, propane or natural gas would be cleaner.[427] Many of the fuels proposed do produce less of certain pollutants. However, the development of bio-fuel will take land away from food production.[428] Considering the fact that the average arable land per capita in China accounts for only one-fourth of the world average level, bio-fuel cannot play an important role as a fuel energy supplier. Moreover, all of these fuels emit CO2 in quantities similar to that of fuels such as diesel and gasoline.[429]

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[427] *Barter/Raad*, Taking Steps: A Community Action Guide to People-Centred, Equitable and Sustainable Urban Transport, for the Sustainable Transport Action Network for Asia and the Pacific, ISBN 983-40313-0-0. March 2000, p. 77. Available at: http://www.geocities.com/sustrannet/actionguide/Outline.htm

[428] *Ibid.*

[429] *Ibid.*

The history of technology has shown that the most cost-effective technologies tend to be adopted first.[430] The technology-based regulations can be successful on the condition that the development of cost-effective technologies can keep pace with the growth in transportation activity. However, climate-friendly technology is unlikely to be cost-effective, if the external cost of vehicles on the climate is not internalized. Even if the external cost of vehicles on the climate is internalized, it is a question of whether or not climate-friendly technologies become cost-effective technologies that can be widely adopted in reality. This is because many so-called green cars today cannot effectively achieve the goal of climate protection. Furthermore, even if cost-effective environment-friendly and climate-friendly cars are developed, it can not address problems such as social inequality or the loss of arable land.

II. Regulations on Motor Vehicle Ownership

Due to limitations of the technology-based regulations, it is risky to overemphasize them. To address the significant negative external effects of motorization and to avoid being locked into high level of private-car dependency, legal instruments to change the behaviour of car consumers or potential car consumers should not be underestimated. The legal instruments aiming at changing the behaviour can reduce both the total number of vehicles and the rates of use of each vehicle, which the technology-based legal instruments cannot do. Legal instruments aiming at changing the behaviour of car consumers or potential car consumers involve regulations on car ownership and on car use. In the general sense, all the regulations aiming at changing behaviour can be viewed as regulations on the car ownership. In this work, regulations are categorized into ones on ownership and ones on utilization. Regulations on vehicle ownership refer to those which focus on the phases of vehicle acquisition and possession, whereas regulations on vehicle utilization refers to those which focus on the phase of vehicle usage.

There are various regulations dealing with motor vehicle ownership, such as rules about ownership registration, rules about the economic instruments aiming at influencing car ownership structure and so on. As far as addressing negative effects of motor vehicles and avoiding high automobile dependency is concerned, there are two main instruments adopted to regulate motor vehicle ownership. One is the fiscal instrument that has been adopted as a

[430] *United Nations*, Air Pollution from Ground Transportation, p. 36.

national policy; another is the VQS(Vehicle Quote System) which so far has only been adopted in Shanghai.

1. Fiscal Measures to Regulate Motor Vehicle Ownership

Motor vehicle purchase and ownership taxes are widespread and are mainly used as a revenue instrument in most countries.[431] Motor vehicle related taxes levied on vehicle purchase or possession can also be used as demand management tools to influence vehicle ownership structure , especially when such taxes are utilized in combination with other fiscal measures, such as subsidies for motor vehicles with low emissions and motor vehicles fuelled by renewable energy. In Hong Kong, motor vehicle purchase and ownership taxes are important tools to control the total number of motor vehicles.[432] With the help of extraordinarily high first registration taxes and annual license fees, Hong Kong has effectively restricted the total number of private cars and succeeded in controlling traffic congestion and other negative effects of automobiles in spite of its high population density.[433] In mainland of China, taxes or fees levied in the phase of vehicle purchase and possession were mainly used as fiscal revenue instruments in the past. Recent reforms on the taxes and fees related to motor vehicles tend to strengthen the demand management function of taxes or fees levied on vehicle purchase and possession. Although they have some effects on the total number of vehicle ownership, they are mainly used as a tool to influence the structure of vehicle ownership rather than the total number of private motor vehicles.

a) An Overview of the Taxes and Fees on Motor Vehicles in China

The general taxes and fees on motor vehicles are classified into three types: those in the vehicle purchasing phase, those in the possessing phase and those in the the usage phase. Although excise tax(consumption tax), value-added tax and tariffs are not levied in the phase of vehicle purchase, they are transferred to consumers when they buy motor vehicles. In this

[431] *ACEA*, Tax Guide 2003, European Automobile Manufacturers Association (ACEA), Brussels; *Barter*, Transport Policy12 (6), 2005, p.525-536.
[432] *ACEA*, *Tax Guide 2003*, European Automobile Manufacturers Association (ACEA), Brussels; *Barter,* Transport Policy12 (6), 2005, 525-536.
[433] *Hau,* Transport for urban development in Hongkong, *The United Nations Centre for Human Settlements*, Transport and Communications for Urban Development, 1997: 267-289.

thesis they are classified as taxes in the phase of vehicle purchase for the convenience of discussion. Thus, taxes or fees in the phase of motor vehicle purchase contain excise tax(consumption tax), value-added tax, tariff ,vehicle acquisition tax, new car checkout fee, and vehicle license plate fees. Though the vehicle usage tax is named as a usage tax, it is levied with a fixed tax rate yearly regardless of whether the vehicle is used or not and how often the vehicle is used. Therefore, it falls into the category of taxes levied in the phase of possession. The main fees in the phase of usage are a road-maintenance fee and an insurance fee, which will be discussed in Part C. Hereafter follows taxes or fees levied on motor vehicles in the different phases:

Taxes or Fees in the Phase of Purchase(One-off Tax): excise tax(consumption tax), value-added tax, tariff on imported automobiles, vehicle acquisition tax, new car checkout fee, and vehicle license plate fees.

Taxes or Fees in the phase of possession: vehicle and vessel usage tax

Taxes or Fees in the phase of usage: road-maintenance fee and insurance fee.

aa) Value-added Tax

The Value added tax of all vehicles is 17%.[434] This tax is levied on the amount of the current amount of tax on sales minus the current amount of tax on purchases.[435] It is levied mainly as a revenue tool in China rather than a regulation on the ownership structure.

bb) Excise Tax(Consumption Tax)

The excise tax is levied on manufacturers but is ultimately shouldered by the consumer. Before April 1, 2006, fuel efficiency was not sufficiently taken into account: the tax rate ranges from 3% to 8% according to engine displacement size**.** To encourage the production of smaller, more fuel-efficient and environment-friendly vehicles, the new excise tax on vehicles reformed the structure of excise tax on vehicles and the tax rate in 2006: the tax rate ranges from 3-20% of sale price and is based on engine size. Cars with an engine displacement greater than 2.0 liters are taxed at much higher rates, up to 20% for the highest category, while cars with displacements between 1.5 and 2.0 liters are taxed at 5%, and cars

[434]Article 2(1) of Provisional Regulations on Value Added Tax of the People's Republic of China(Promulgated on the Order of the State Council [1993] No.134 On Dec. 13, 1993.

[435]Article 4(1) of Provisional Regulations on Value Added Tax of the People's Republic of China

with displacements less than 1.5 liters are taxed at just 3%(see the table below); in addition, the special excises tax rate of 5% enjoyed by the Sport Utility Vehicles(SUVs) has been cancelled.[436] The SUVs are now also levied according to engine displacement with the same treatment as other passenger vehicles.

Vehicle Category by Engine Displacement	Tax Rate
Automobiles	
1.0 to 1.5 liters	3%
1.5 to 2.0 liters	5%
2.0 to 2.5 liters	9%
2.5 to 3.0 liters	12%
3.0 to 4.0 liters	15%
4.0+ liters	20%
Commercial Buses	5%
Motorcycles	
<250cc	3%
>250cc	10%

Ministry of Finance of the People's Republic of China (MOF) (2006). *Consumer Tax Survey*. (In Chinese.)

cc) Motor Vehicle Acquisition Tax

The motor vehicle acquisition tax levied on consumers is currently 10% of the sale price for all vehicles, motorcycles, electric cars, trailers and farm transport vehicles. There is no differentiation by engine size.

dd) Tariff on Imported Automobiles

To accomplish its commitments for WTO accession, the tariff rate for sedans, mini-buses and cross-country vehicles was lowered from 30 percent to 28 percent since January 1, 2005. Then, China lowered the tariff rates on cars, SUVs, and mini-buses to 25 percent from July

[436] *An(2006),* Chinese Transportation Markets and Policy in a High Oil Price Environment. PowerPoint,Presentation. Third Transatlantic Energy and Climate Change Workshop, March 30-31, 2006, Paris. Available at: http://www.autoproject.org.cn/library_en.html.

1, 2006. However, there is no difference in tariff rates between vehicles with high engine displacement and vehicles with low engine displacement.

ee) Fees

In addition to taxes, the vehicle owner must pay fees, including a new car checkout fee as well as a vehicle license plates fee. They are aimed at covering the basic costs for the corresponding public service, without any intention of regulating vehicle ownership structure.

ff) Vehicle and Vessel Usage Tax

This tax is levied on all vehicles and vessels used in districts within China[437]. The owners or managers of the vehicles are the taxpayers and are required to pay a yearly fixed amount vehicle usage tax.[438] The tax amount applicable to vessel and vehicle is levied by the local government[439] and decided according to the schedule of tax items and amount of vehicle and vessel tax[440](see the table below). The governments of the provinces, autonomous regions or municipalities directly under the central government are delegated not only the competency to decide the specific tax amount applicable to vehicles within the specified tax amount under each sub-item,[441] but also the power of decision-making concerning grant tax deduction or exemption to urban and rural vehicles and vessels used for public traffic in light of the actualities.[442]

[437] Article 1 of Interim Rules of the People's Republic of China concerning Vehicle and Vessel Tax(Order of the State Council No.482/2006)
[438]Article 2 and Article 8 of Interim Rules of the People's Republic of China concerning Vehicle and Vessel Tax
[439]Article 5 of Interim Rules of the People's Republic of China concerning Vehicle and Vessel Tax.
[440]Article 2 and Article 8 of Interim Rules of the People's Republic of China concerning Vehicle and Vessel Tax.
[441] Pharagraph 2 Sentence 2 of Article 2 of Interim Rules of the People's Republic of China concerning Vehicle and Vessel Tax
[442]Article 4 of Interim Rules of the People's Republic of China concerning Vehicle and Vessel Tax.

Schedule of the Tax Items and Tax Amount of Vehicle and Vessel Tax

Tax Item	Tax Unit	Annual Tax Amount	Note
Passenger Automobile	Per Vehicle	60 Yuan to 660 Yuan	Including trolley
Cargo Automobile	Per Ton of Its Dead Weight	16 Yuan to 120 Yuan	Including tractor-truck and trailer
Three-wheeled and Low-speed Truck	Per Ton of Its Dead Weight	24 Yuan to 120 Yuan	
Motor Vehicle	Per Vehicle	36 Yuan to 180 Yuan	
Vessel	Per ton of Its Net Tonnage	3 Yuan to 6 Yuan	The tax amount of tugboat or non-motor barge shall be paid at 50% of that of vessel.

b) Restructure of Taxes in the Phase of Motor Vehicle Purchase and Taxes in the Phase of Motor Vehicle Possession to Encourage Environment-Friendly Motor Vehicles

In most of developed countries, to"encourage purchasing but restrict utilization" is a basic principle underlining the vehicle related taxation system.[443] A very significant share of taxation related to motor vehicles is levied in the phase of vehicle utilization mainly through taxes on motor fuels.[444] Taxation in the phase of vehicle utilization usually accounts for about 50% or more than 50% of the taxations related to motor vehicles in the developed countries.[445] In China, taxes and fees in the phase of vehicle purchase, in the phase of vehicle possession, and in the phase of vehicle utilization respectively account for 66%, 12% and 22% of taxes and fees related to motor vehicles.[446] In terms of taxes and fees directly levied on motor vehicles(the motor fuel tax belongs to taxes related to motor vehicles but is excluded from taxes directly levied on motor vehicles), there are two categories of taxes and fees: firstly, one-off taxes and fees which are typically levied at first sale or at first registration of a motor vehicle; secondly, recurrent taxes and fees which are imposed periodically, whether annual taxes the owner must pay, or imposed at every later sale or vehicles registration. [447] In most of the OECD countries, the amount of revenue collected through recurrent taxes on motor vehicles is much higher than that of one-off taxes on motor

[443] *Huang,* leveraging the Chinese Tax System to Promote Clean, Fuel Efficient Vehicle Development, China Automobile Technology & Research Center, 22 October 2005, Beijing. Available at: http://www.cleanairnet.org/caiasia/1412/article-71497.html.
[444] *OECD*, The Political Economy of Environmentally Related Taxes,p.31.
[445] *Li/Ge/Guo,* On Environment Instruments in Automobile Tax at Abroad, in: Environmental Taxation and Public Finance(Chinese), p.161.
[446] *Ibid*. , p.161.
[447] *OECD*, The Political Economy of Environmentally Related Taxes, p.36.

vehicles.[448] However, One-off taxes and fees on motor vehicles in China are much higher than that of recurrent taxes and fees.

There is a historical background to the one-off taxes and fees on motor vehicles. In China, a private car was seen as a luxury good before 1990. Apart from the value-added tax, there were also a high tariff, a consumption tax, a vehicle acquisition fee (after 2001 it was transformed as "vehicle acquisition tax") as well as other administrative fees levied on gaining ownership of a motor vehicle. In 1990s, China mapped out a strategy to develop its automobile industry into a pillar industry. After that, many administrative fees have been abolished or restructured. Notwithstanding these reforms, one-off taxes on motor vehicles still account for a larger proportion in contrast to most of the developed countries and need further reforms.

One important poposal is to reduce the proportion of one-off taxes in the taxes related to motor vehicles to achieve the regulation goal of "encouragement in buying , restraint in using",[449] which is viewed as good experience of developed countries in levying taxes on motor vehicles.[450] However, it is not in all the developed countries where the amount of recurrent taxes on motor vehicle is much larger than the amount of one-off taxes, as is seen in the case of Denmark, Finland, Norway, Ireland and Portugal. The key point is to restructure the taxes on motor vehicles to encourage motor vehicles with low energy consumption and emissions or vehicles fuelled by alternative energy and at the same time to restrict motor those with high energy consumption and emissions. Whether to levy taxes more on first purchase and registration or on later possession is an issue that should be decided "country by country".

The reform of consumption tax on motor vehicles in 2006 is in the right direction for the tax restructure on motor vehicles. This reform has adjusted the old tax rate, ranging from 3%-8%, to the new one ranging from 3%-20% depending on the engine displacement. This reform is very aggressive and may be thought of as a restriction on the freedom of choice of consumer, which is protected by Article 7 of the Consumer Rights Protection Law.

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[448] *OECD,* The Political Economy of Environmentally Related Taxes, p.37.
[449] *Huang*, leveraging the Chinese Tax System to Promote Clean, Fuel Efficient Vehicle Development, China Automobile Technology & Research Center, 22 October 2005, Beijing. Available at: http://www.cleanairnet.org/caiasia/1412/article-71497.html.
[450] *Ibid*.

The restriction on consumption of motor vehicles, especially on those with a high displacement engine is based on the assumption that a private motor vehicle is a luxury good with huge negative effects on others. As a country with a large population, China should give priority to fulfilling the basic mobility needs of its citizens. On the contrary, the motor vehicles with high displacement engines fall into the category of "show-off" consumption goods, which is far from fulfilling basic mobility needs.[451] "Show-off" consumption should be restricted because it does harm to the total welfare of a society.[452] It only increases the welfare of the consumer himself/herself while causing the welfare of others around him/her to decrease.[453] In China, if motor vehicles fuelled by fossil energy continue to develop without any restriction, the fulfilment of the mobility needs of the majority of its citizens will be hindered. Moreover, the consumption of motor vehicles fuelled by oil is posing a threat to the healthy lives of citizens and future generations, if such consumption were to continue without any restrictions.

Another reform proposal on motor vehicle taxes is to increase the proportion of tax on vehicle possession, namely the annual tax that the owner should pay. A good policy choice is to unite the vehicle acquisition tax(with a tax rate of 10%) and the vehicle usage tax into one and make the tax rate linked to the energy consumption level (with a maximum of 10%). This would be levied yearly on the owner. If such a reform is introduced, consumers of motor vehicles with high displacement engine should consider not only one-off costs, but also recurrent costs.

The third reform is to link the fiscal instruments with the technology-based instruments. There are many policy choices to implement this combination which would restrict the energy-consuming motor vehicles and "dirty" motor vehicles and encourage the energy-saving vehicles as well as vehicles fuelled by renewable energy. One example is providing vehicle consumption tax reduction for vehicles that reach compliance with national technology standards ahead of schedule. This can spur the Chinese automobile industry towards cleaner, efficient development. Another is implementing a vehicle consumption tax exemption or tax reduction for electric vehicles (including hybrid electric vehicles, electric vehicles, and fuel cell electric vehicles), gas vehicles and vehicles fuelled by alternative fuel.

[451] *Huo*, Adminstration and Law (Xingzheng Yu Fa), 2005(1):72.
[452] *Qin,*P., Law Science (Falü Kexue), 2006(6):159.
[453] *Qin*, P., Law Science (Falü Kexue), 2006(6):159.

While at the same time levying additional punitive taxes on vehicles that fail to meet the national technology standard. This would restrict their production and consumption.[454]

2. The Vehicle Quota System (VQS)

If the level of earning is high, it is difficult to curb car ownership only by using the motor vehicle taxation, so the Vehicle Quota System is introduced. This system is an easier instrument to reduce the automobile dependency than the motor vehicle taxation, since motor vehicle taxation is a pricing instrument, of which the changing level of taxation is politically sensitive.[455] Under VQS, the government fixes the number of allowable vehicles but not their price, which is determined by the market; prospective vehicle owners obtain a certificate of entitlement (COE) to make ownership of a vehicle valid through open bidding.[456] While usage of fiscal measures to regulate motor vehicle ownership has been widely applied in many countries, the vehicle quota system has been adopted only in two cities and has been critically challenged by legal, and economic expert. VQS is a newly developed but disputed regulation measure to control the motor vehicle ownership. Up to now, only Singapore and Shanghai have introduced the VQS. This section will at first make a general review over the history of legislation of VQS and then focus on the case of VQS in Shanghai, in discussing the legality of this system and the legal possibilities of introducing this system in other mega cities in China.

a) The Legislation History of the Vehicle Quota System

aa) Singapore's VQS

Singapore is a fully urbanised island-state with a population of 4.35 million and a land area of just under 700 kilometres.[457] As a newly industrialised economy, its per capita GNP is comparable that of the OECD countries, yet its per capita car ownership and per capita CO2

[454] *Huang,* Leveraging the Chinese Tax System to Promote Clean, Fuel Efficient Vehicle Development, China Automobile Technology & Research Center, 22 October 2005, Beijing. Available at: http://www.cleanairnet.org/caiasia/1412/article-71497.html.
[455] *Dhakal,* Urban Energy Use and Greenhouse Gas Emission in Asian Mega-Cities, Policies for Sustainable Future, pp.135 *et seq.*
[456] *Ibid.*
[457] *Olszewski,* Transportation 34 (2007), p.320.

from road transport are mere fractions of those in OECD countries.[458] Singapore's successful achievements in the control of transportation energy consumption and GHG control can be attributed to its innovative transportation policies,[459] particularly the institution of VQS.

Before 1990, fiscal measures were the main way of controlling the growth of motor vehicle ownership. In addition to high customs duties,[460] the purchaser had to pay vehicle registration fees and an additional registration fee.[461] These fiscal measures had successfully reduced the growth in the number of vehicle, but by the late 1980s, the increase of motor vehicles was difficult to control only by these fiscal measures. This was because income had significantly increased and thus the demand for cars had become more income elastic than price elastic.[462] In this context the VQS was introduced.

The VQS was announced in February 1990. Under the VQS, the government fixed the allowable number of vehicles according to road and environmental capacities, and all prospective car owners were required to buy a certificate of entitlement(COE). Each quota license allowed a vehicle to be on the road for ten years. At the end of this period, the owner could either de-register the vehicle or renew the license for a further 5-year or 10-year period by paying a "prevailing quota license premium".[463] Transit buses, diplomatic and first aid vehicles are exempt from COE.[464] Without a COE a motor vehicle cannot be registered or admitted onto public roads.[465] The certificates of entitlement were auctioned openly monthly and the price of the certificate of entitlement was decided by the market.[466] Because the quotas of COE are fixed, it can be ensured that the numbers of motor vehicles remains within the road capacity as well as within the environment capacity.

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[458] *Ang/Tan,* Nature Resources Forum 25(2001), p.135. The concrete data contrast see: *International Energy Agency(IEA),* 2000, Energy Balances of OECD Countries.
[459] *Olszewski,* Transportation 34(2007), p.320.
[460] Before March 1998, the custom duty is at 45% of the open market value. Since March 1998, the customs duty has been reduced from 45 to 31% of open markt value. See: *Ang/Tan*, Nature Resources Forum 25(2001), p.137.
[461] The additional registration fee was 25% of the open markt value in October 1975, increased to 175% of the OMV in October 1975, reduced to 160% of OMV in Novermber 1991, to 150% in February 1992, and then to 140% in March 1998. See: *Ang/Tan*, Nature Resources Forum 25(2001), p.137.
[462] *Phang,* Transport. Res.E33(2), 97-106(1997).
[463] *Chin/Smith*(1997), Transportation Research Part A: Policy and Practice, 31, (2), 129-140.
[464] *Ibid.*
[465] *Dhakal*,Urban Energy Use and Greenhouse Gas Emissions in Asian Mega-Cities: Policies for a Sustainable Future, p.142.
[466] *Ibid.,* p.143.

To ensure fairness and allow less wealthy consumers to own cars, seven different categories of COE were established at the outset. The total quotas of COE were distributed in these categories. To allow some flexibility, an open category can be used to register a vehicle falling into any other subcategories.[467] After May 1999, the seven sub-categories were simplified to five.

bb) Shanghai's VQS

Shanghai's VQS has a longer history in comparison with that of Singapore. Since 1986, a certificate of vehicle quota has been a requirement in the application for a vehicle plate in Shanghai. Without a vehicle quota, a vehicle cannot be registered in Shanghai and the vehicle plate cannot be issued.

Certificate of vehicle quotas are issued through open auctions. In fact, Shanghai's VQS lacked a legal basis before December 1997, as there were no national or local laws or acts that had authorized the Shanghai Municipality to adopt the VQS.[468] Due to the fact that the principle of "rule of law" had not formally been accepted before 1999, it was normal that the policy and the will of political leaders overwhelmed the law at that time in China.[469]

Regulation of Road Transportation in Shanghai (Shanghai Daoluo Jiaotong Guanli Tiaoli, hereafter refeed as RRTS) came into effect in December 1997. According to Article 13 of RRTS, the municipality is responsible for regulating the total number of vehicle plates to be issued, and the yearly total number issued is submitted by the planning department, transportation management and other related departments and then approved by the Shanghai municipality. This provision is one important legal basis for the VQS in Shanghai. In addition, the White Paper of Shanghai Transportation (Shanghai Jiaotong Baipishu) issued by the Shanghai Municipality on April 30th, 2002 was regarded as another legal basis of the VQS.[470]

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[467] *Ang/Tan,* Nature Resources Forum 25(2001), p.138.

[468] *Yang,* X.., The Legal Problems of Constraining and auctioning the Private Vehicle Quota In Shanghai(Shanghai Xiangzhi he Paimai Shiche Edu Falü Wengti), Available at: www.chinalegaltheory.com

[469] *Zheng,* Two Challenges Facing the Chinese Legal System at the End of Twenty Centry, in: *Krawietz/Pattaro, /Erh-Soon Tay(*eds), Rule of Law: Political and Legal Systems in Transition,pp.369-379.

[470] This is the viewpoint of the legal expert of the Shanghai Municipal. See *Yang*, The Legal Problems of Constraining and auctioning the Private Vehicle Quota In Shanghai(Shanghai Xiangzhi he Paimai Shiche Edu Falü Wengti), available at: www.chinalegaltheory.com

Before 2000, certificates of vehicle entitlement were auctioned at a basic price. A person had one chance to submit a computer bid. Since the number of available certificates of vehicle entitlement and the lowest winning price were predetermined, it was important to arrive early to place a bid before the numbers ran out.[471] In 2000, the certificate of vehicle entitlement for domestically made vehicles were auctioned without a basic price, and after October 2002, licenses for both domestic and imported vehicles were auctioned without a basic price. The auction procedure is similar to that of Singapore. All buyers of the COE (Certificate of Entitlement) submit their bids through the computer. The COE premium in each monthly auction is then determined by the price of the lowest successful bid, and all successful bidders pay the same premium as the price of the lowest successful bid.

There are two important distinctions between the VQS in Shanghai and the one in Singapore. Firstly, in Singapore, the quota licences are divided into many subcategories. The prospective owners for different types of motor vehicles are bidding for different types of quota licences.[472] But, the quotas in Shanghai are applicable to all types of vehicles. The prospective owners of cheap vehicles and expensive vehicles may bid for the same vehicle plate, which means the final levy on them for one vehicle plate will be the same. Secondly, in Singapore, the COE (Certificate of Entitlement) is valid for 10 years, and the quota license holder may renew the license for a further 5 or 10 years by paying what is called the 'prevailing quota price'. If a vehicle is sold within the country before the expiry date, the quota license will be transferred to the buyer together with the vehicle; the seller will have to bid for a new quota license if he wishes to purchase a new vehicle. In Shanghai the quota licence is valid until the vehicle is scrapped.

b) The Legality of Shanghai's VQS

As stated above, since 1986 Shanghai has adopted its VQS to regulate the licensed vehicles in its urban district. But before 1997, there was no national and local congress legislation which empower the Shanghai municipality to make this regulation. At that time, there were few Chinese legal scholars to challenge Shanghai's VQS. As a country without the tradition

[471] *Notar,* China Environmental Series, Issue 8(2006), p.93.
[472] *Ang/Tan,* Nature Resources Forum 25(2001),p.135. The concrete data contrast see: *International Energy Agency(IEA),*Energy Balances of OECD Countries, 2000.

of the "rule of law"[473] and in a period of transition from a planned economy to a market economy, government efficiency and social stability was given priority over the individual rights. Although some commentators argue that the 1982 constitution already incorporated the basic principles of "rule of law" —that all must abide by the law and no one is above the law[474]— it was not directly written into the *Constitution of China* until the third amendment in 1999.[475] Some local governments were often permitted by the central government to carry out experimental policies which may not have been consistent with the national law.[476] Such inconsistency of local enforcement of national law was not uncommon in the 1980s and 1990s, and even today, this phenomenon can be observed.

Nevertheless, in the mid-90s the principle of "rule of law" was officially endorsed by the Chinese communist party with the concept of *yifa zhiguo, jianshe shehuizhui fazhiguo–"*rule the country in accordance with law, establish a socialist rule-of-law state". This official endorsement of "rule of law" by the CCP is counted as the greatest event in the evolution of "rule of law" in China.[477] Then in 1999, the principle of "rule of law" was written into the third amendment of *Constitution of China*. The consistency of the whole legal system has gained more and more attention. The Law on Legislation(2003) is one important act to deal with the problem of inconsistency between the national and local legal systems and regulations.

Different from the courts in most other countries, up to now the courts in China have not had the authority to invalidate any type of legislation on grounds of unconstitutionality or even to overturn lower-level legislation that is inconsistent with superior legislation.[478] In

[473]The legal systems during the Imperial dynastic period and during the Mao era shared a number of feasures antithetical to any form of rule of law, even the formal rule of law. *Peerenboom*, China's Long March toward Rule of Law, p.47.

[474] *Chang* , What Does the Rule of Law mean in China? China Law and Practice 13(6): 33-35. August, 1999.

[475]Article 5 of 1982 Constitution stipulates, "No law or administrative or local rules and regulations shall contravene the constitution. All state organs, the armed forces, all political parties and public organizations and all enterprises and undertakings must abide by the Constitution and the law. All acts in violation of the Constitution and the law must be investigated. No organization or individual may enjoy the privilege of being above the Constitution and the law". In 1999 Amendments, one section is added to Article Five of the Constitution as the first section: "The People's Republic of China practices ruling the country in accordance with the law and building a socialist country of law.

[476] *Zheng,* Two Challenges Facing the Chinese Legal System at the End of Twenty Centry, in: *Krawietz/Pattaro/ Tay(eds)*, Rule of Law: Political and Legal Systems in Transition, p.369-379.

[477]*Li Buyun and Zhang Zhiming*, 1997. "Kuashiji de Mubiao: Yifa Zhiguo, Jianshe Shehuizhuyi Fazhi Guojia" ("The Cross-Century Target: Ruling the Country According to Law, Establishing a Socialist Rule-of-Law State"). *Zhongguo Faxue* 6:18.

[478]The court need not follow the lower-level regulation in the specific case if the judge find that the lower level regulation is not consistent with the superior law, ALL, Article 2,53.

China, it is the NPC(National People's Congress) and the NPCSC(Standing Committee of National People's Congress) which are responsible for reviewing the consistency of lower-level legislation with the constitution and other NPC & NPCSC Laws. However, before the enactment of the Law on Legislation, there was no concrete procedure and institution within the NPC or the NPCSC for reviewing the consistency of lower-level legislation. The Law on Legislation provides individuals with the possibility to challenge any inconsistency of lower-level legislation with the superior law or constitution. According to Articles 90 and 91 of the Law on Legislation, individuals, social groups, enterprises, or government entities can petition the NPCSC for review of lower-level legislation if they believe that it is not consistent with the constitution or laws. The NPCSC's specialized subcommittees are responsible for reviewing the legislation for consistency.[479]

Another important contribution of the Law on Legislation is placing restraints on the authority of the NPC to delegate power to the State Council and executive agencies by prohibiting the delegation of matters concerning criminal law and issues that affect the basic rights of citizens. Moreover, it is required that the delegating act must indicate the scope and purpose of delegation, and that the authorized entity must act in accordance with the purpose and scope of the delegation, and not subdelegate the matter to another entity.[480]

In this context of the further evolution of "rule of law" in China, the issue of Legality of Shanghai's VQS is challenged by legal scholars and potential vehicle consumers as well as vehicle enterprises.[481] With the development of the Chinese automobile industry and the rapid increase of citizens' earnings in Shanghai, private motor vehicles have become affordable for more and more Shanghai's citizens. But the quantitative limits of the quota of private motor vehicle plates presents an obstruction for the ownership of private motor vehicles. Some argue that Shanghai's VQS infringes upon the rights of owners and potential owners of private vehicles, and that Shanghai's VQS has constrained market competition, thus violating national law.[482]

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[479]The procedure of reviewing by the NPCSC's specialized subcommittees is as follows: " if a subcommittee believes

[480]Law on Legislation, Article 8 and Article 9.

[481]*Yang*, The Legal Problems of Constraining and Auctioning the Private Vehicle Quota In Shanghai(Shanghai Xiangzhi he Paimai Shiche Edu Falü Wengti), see: www.chinalegaltheory.com.
Xu Ganglin, Is the Auction of Vehicle Plate Ilegal?(Chepai Paimai Shifou Weifa?)in: Legal System Daily(Fazhi Ribao), 2004.5.19.

[482]*Yang,* The Legal Problems of Constraining and auctioning the Private Vehicle Quota In Shanghai, available at: : www.chinalegaltheory.com;

The issue of the legality of Shanghai's VQS can be traced back to the beginning of this system in 1986.[483] As mentioned above, before 1997, this VQS had no legal basis in the local and national legislations. Given the transformational character of the Chinese legal system, the legality of Shanghai's VQS in history will be omitted in this thesis. Rather, my discussion will concentrate on the legality of Shanghai's VQS under the present legal system of China. The "White Paper of Shanghai Transportation" ("Shanghai Jiaotong Baipishu") is an informative document, but it cannot be taken as the legal foundation of Shanghai's VQS. The formal legal basis of Shanghai's VQS is Article 13 of RRTS(the Regulation of Road Transportation in Shanghai*)*. Thus, discussion of the legality of Shanghai's VQS in the following will focus on Article 13 of RRTS. The consistency of Article 13 of RRTS with the Constitution will be presented, followed by the consistency Article 13 of RRTS with other superior national laws.

aa) The Constitutionality of Article 13 of the Regulation of Road Transportation in Shanghai(RRTS)

(1) The Legislative Competence

The formal consistency of Article 13 of RRTS with the constitution hangs on two legal questions: the legislative competence and the legislative procedure. Article 13 of RRTS is formally consistent with the constitution, only if the Shanghai Congress has the constitutional competency to enact this legislation and if this legislation is consistent with the procedure which is established in the Constitution. Because there are few disputes by the legislation procedures of RRTS, this issue will be omitted in this thesis.

(a) The Legislative Competence of Local Congresses and Their Standing Committees

Article 3 of CC provides the basic principle for the distribution of competency between the central state organ and the local state organs. According to Article 3 of CC, "the division of functions and powers between the central and local state organs is guided by the principle of giving full play to the initiative and enthusiasm of the local authorities under the unified leadership of the central authorities". This so-called principle of "democratic centralism"("Minzhu Jizhongzhi") is the basic principle of the division of competence

[483]For example, *Yang* Xiaoxin has discussed the legality issue of VQS in diferent phase.

between the central and the local state organs, including the administrative, legislative and the judicial branches.

In terms of legislative competence, Articles 58, 62(1)(3), and 64(1)(2)(3)(4) of CC stipulate the legislative competency of the National People's Congress and its Standing Committees. Article 100 provides the legislative competencies which belong to the local congresses and their standing committees. According to Article 100 of CC, "The people's congresses of provinces and municipalities directly under the Central government, and their standing committees, may adopt local regulations, which must not contravene the Constitution, the statutes and the administrative rules and regulations, and they shall report such local regulations to the Standing Committee of the National People's Congress for the record". This provision grants the local congresses of provinces and municipalities directly under the Central government legislative competence and makes substantial requirements for the excise of legislative competence by local People's Congresses : a) the local legislation must be consistent with the Constitution, the national statutes, and the administrative rules and regulations of the central government; b)the local legislation must be reported to the Standing Committee of National People's Congress for the record. As a centralized country with a long history, the authority of the central state organ is ensured in the constitution through the superiority of the national statutes over local regulations. Even the administrative rules and regulations of the central government are superior to the legislation of local congresses and their standing committees. The idea of centralisation is fully manifested through such substantial limitations on the local legislation.

After all, the Constitution has given the local state organs flexibility to a great extent to encourage the initiative of these local state organs. Sharing Tax System Reforms in 1994 granted the local government independent fiscal competency. As far as the legislative competency is concerned, Article 100 of CC has provided a general legislative competency for the people's congresses of provinces and municipalities directly under the central government as well as their standing committees. These legislation competencies are further specified in Articles 63 and Article 64 of the Law on Legislation which was enacted in 2000. According to 63, "(t)he People's Congress of a province, autonomous region, or municipality directly under the Central Government and the Standing Committee thereof may, according to the specific circumstances and actual needs of the jurisdiction, enact local regulations provided that such enactment does not contravene any provision of the Constitution, laws or

administrative regulation". Article 64 presents the specific scope of the legislation competency of local congresses and their standing committees: (i) matters for which enactment of a local regulation is required in light of actual circumstances of the jurisdiction for the purpose of implementing a law or administrative regulation; (ii) matters of local concerns for which enactment of a local regulation is required; (iii) those matters for which no national laws or regulations have been enacted, apart from those mentioned in Article 8 of the Law on Legislation, but such local legislation is confined to the local congresses and their standing committees of province, autonomous region, or municipality directly under the Central Government, and, after a corresponding national law or administrative regulation is enacted, the content that contravenes the national law or administrative regulation shall be invalid, and the enacting body shall amend or repeal such provisions in a timely fashion.

In conclusion, the Constitution has granted the local congresses and their standing committee comprehensive legislative competence. In comparison with other lower level congresses, the local congresses and their standing committees of a province, autonomous region,or municipality directly under the Central Government are granted more legislative competency according to Article 100 of CC. The concrete scope of the legislative competency of local congresses and its standing committees of a province, autonomous region, or municipality directly under the Central Government is stipulated in Article 64 of Law on Legislation.

(b)The Legislative Competence of the Shanghai Congress and its Standing Committee in the Case of Shanghai's VQS

Article 13 of RRTS is consistent with the provisions concerning legislative competency in the Constitution, if matters in Article 13 of RRTS are in the scope of legislative competency of the Shanghai Congress and its Standing Committee.

As the congress of a municipality directly under the Central Government,[484]Shanghai's Congress is delegated more legislative competency than the congress of a lower level. As above addressed, the scope of the legislative competency of Shanghai's Congress includes: (i) matters for which enactment of a local regulation is required in light of the actual circumstances of the jurisdiction for the purpose of implementing a law or administrative

[484] In China, there are four municipalities directly under the Central Government, they are Beijing, Shanghai, Tianjin, Chongqing.

regulation; (ii) matters of local concerns for which enactment of a local regulation is required; (iii) those matters for which no national laws or regulations have been enacted, apart from those mentioned in Article 8 of the Law on Legislation.

The Vehicle Quota System is designed to deal with local problems such as traffic congestion, local air pollution and so on, and therefore belongs to "matters of local concerns for which enactment of a local regulation is required". As a city with high population density and a very rapid increase in earnings, Shanghai is confronted with a special transportation challenge that is different from other cities. Shanghai has the legislative competency to establish its own transportation management system, including the VQS, to solve the problems and challenges that it is faced with. Moreover, Article 13 of RRTS does not belong to the matters that are mentioned in Article 8 of Law on Legislation.

(2) Has the VQS Infringed on Property Rights?

(a) Protection of Property Right in the Constitution

There are two significant improvements in the Fourth Amendment of CC in 2004 (the newest Amendment): one is the enshrinement of the protection of human rights in the Constitution;[485] another is the strengthening of protection of private property rights through the amendment of ArticleS 10 and 13 of CC. Article 13 in the original text states: "The State protects the right of citizens to own lawfully earned income, savings, houses and other lawful property." and "The State protects according to law the right of citizens to inherit private property." In the Fourth Amendment in 2004 this Article is revised to: "Citizens' lawful private property is inviolable" and "The State, in accordance with law, protects the rights of citizens to private property and to its inheritance" and "The state may, in the public interest and in accordance with law, expropriate or requisition private property for its use and shall make compensation for the private property expropriated or requisitioned." The revision of Article 10 has added one requirement for the expropriation or requisition of land for public interest: to "make compensation for the land expropriated or requisitioned".

In contrast to the old text before the Fourth Amendments, the new text shows a stronger political will to protect private property rights. Firstly, that "citizens' lawful private property

[485] In the Fourth Amendments, Article 33 has a third paragraph added: "The State respects and preserves human rights."

is inviolable" has been written into the Text. Secondly, defining property rights which are protected by the Constitution through enumeration has been given up. A general concept of "lawful private property" is introduced. In this way, the scope of property rights which are protected by the constitution has been extended. Thirdly, owners of property rights can require compensation by expropriation or requisition, which means that the protection of private property rights against the power of the state is not just a slogan as before.

The enshrinement of the protection of human rights in the Constitution and the strengthening of the protection of property rights in the Fourth Amendment are seen as important improvements in light of the substantial rule of law.[486] In countries which have put the "rule of law" principle into practice, the protection of property rights is a common value and they have established the corresponding legal mechanisms to protect private property rights in the Constitution, in spite of the different expressions of the property rights in their constitutions.[487] Property ownership is assumed as a guarantor of individual liberty and it is acknowledged that the protection of property is among the central aims of the government,[488] since for a person without private property, all other rights are difficult to realize.

(b) Has Shanghai's VQS Restricted or Expropriated the Property Rights of Motor Vehicle Owners/Potential Owners in Shanghai?

In Shanghai's VQS case, the private ownership of motor vehicles has not been changed by the requirement for buying a plate quota through auction for the application for a vehicle plate. Therefore, the VQS is not an expropriation. Because the use of a motor vehicle concerns public interests such as public safety, environmental protection, and transportation management, the motor vehicle is required to be registered before being used on public roads according to Article 9 of LRTS(the Law Road Traffic Safety of People's Republic of China on Road Traffic Safety). Such registration is an administrative license, since only motor vehicles which meet the corresponding technology and other requirements may be registered. In the case of Shanghai's VQS, to buy a vehicle quota is an additional requirement for registration, as compared with the requirements in other cities in China. This requirement

[486] *Xie Weiyan*, The Protection of Private Property Right in Constitution and the Spirit of Consitution ("Sichang Ruxian yu Xianzheng Jingsheng). Available at: http://www.chinapublaw.com/emphases/200443234654.htm.
[487] *Lin Laifan*: The Constitutional Protection of Private Property Right(Lun Siren Caichang Quan de Xianfa Baozhan), *Faxue*1999(3): 20-28.
[488] *Adler*, NYU Journal of Law & Liberty, 2005, p.988.

for a vehicle license for the use of public roads is a legal restriction on the property rights of motor vehicle owners.

(c) Is the Restriction on the Property Rights in Shanghai's VQS Case Justifiable?

The protection of property rights is not absolute, although they do play a most important role in the market economy and the personal freedom of the citizens. Environmental protection is an important reason to restrict the property rights.[489] There are many environmental thinkers who view the legal protection of private property as an obstacle to environmental sustainability.[490]Meanwhile, some conservative property right protectors argue that increasing restriction on property rights in the name of environmental protection imperils the property rights.[491]

With regards to Shanghai's VQS, the opponents of VQS maintain that it has totally deprived a motor vehicle's owner of the right to use his/her motor vehicle, since the vehicle owner cannot get vehicle registration and drive his/her car on public roads provided that he/she has not bought a vehicle quota. However, the opponents of VQS only focus on the rights of the vehicle owner, rather than on the property and health rights of non-private vehicle owners, the "victims" of pollution. With China' present motor vehicle technology, the emissions given out by motor vehicles do harm to people's health and property as well as increase GHGs. Such external damages should be borne by the motor vehicle owners, since property rights are confined within a three dimensional construct of the property boundaries.[492] As George Carlin has said, "you should keep your stuff in your space."[493] Motor vehicle owners cannot legitimize their action of giving out emissions that are harmful to people's health or property in the name of property rights.

As above mentioned, the external negative effects of motor vehicles concern not only emissions that are harmful to the local, regional and global environments, but also other problems such as traffic congestion and the decrease of arable land. These external negative

[489] *Adler*, NYU Journal of Law & Liberty,2005, p.990-992.
[490] *Adler*, NYU Journal of Law & Liberty,2005, p.990-992.
[491] *Lee,* The Relationship between Environmental Protection and Human Rights ("Lun Huangjing Baohu yu Renquan Baozhang zhi Guangxie"), *Soochow Law Review (Dongwu Faxue Pinglun*) 12(2): 31-32.
[492] *Cutting/Cahoon*, Pace Environmental Law Review, Spring 2005, p.55.
[493] *Carlin/Droppings*, page 36 Hyperion, "Stuff" New York, 1997.

costs should be shouldered by motor vehicle owners, rather than by the emissions' receivers or by society, as property rights do not include the right to do harm to others.

Another distinct characteristic of a motor vehicle as a property is that the use of this property must rely on public roads. As a property, a motor vehicle is different from land or other industry equipment, since although the use of land or industry equipment can engender negative external impacts, the use of them does not directly involve public property. In contrast to land and industry equipment, howver, a motor vehicle as a property cannot be utilized without the accompaniment of public roads. The property of an automobile involves not only the ownership of the product, but also the public service and use of public property. Thus, the owner of a motor vehicle should gain the right of using public roads before he/she may make use of his/her motor vehicle.

To sum up, the utilization of an automobile will bring about external negative effects to other people. In addition, the provision of public road is crucial to use an automobile.

In the Constitution, Article 51 stipulates the boundary of the excise of freedoms and rights, including property rights. It states that"the exercise by citizens of the People's Republic of China of their freedoms and rights may not infringe upon the interests of the state, of society and of the collective, or upon the lawful freedoms and rights of other citizens." This implies that in order to protect the interests of the state, society, the collective, and the lawful freedoms and rights of other citizens, the freedom and rights of citizens can be restricted.

VQS's restriction on the property right of a motor vehicle owner in Shanghai can be justified on account of protecting the rights of other citizens. As stated above, the ownership of an automobile will bring about external effects to others and involve the use of public roads. From the perspective of a non-motorist in Shanghai, their right to health should not be sacrificed for the right of an automobile owner. Therefore, the total number of automobiles should be regulated according to the environmental capacity. Since, on the one hand, the automobile has not achieved the goal of zero emissions, and on the other hand, Shanghai is a city with an extraordinarily high population density, the environmental capacity for harmful emissions from automobiles has a limitation as far as health of citizens is concerned. To impose limits on the total number of automobiles is a appropriate measure to guarantee that the living rights and other interests of citizens will not be sacrificed.

VQS's restriction on the ownership of automobiles can also be justified on account of the interests of society and the collective. Due to the limits of public road provisions, the total number of automobiles permitted to run in the roads should also be controlled, or the public interest of Shanghai will be infringed on. For one thing, the expansion of road space in Shanghai is restricted by its established city structure and its high population density, and for another, the high level of earnings makes private automobiles affordable for many citizens in Shanghai and then will be affordable for even more citizens in the future. To avoid transportation problems such as traffic congestion and to ensure the basic mobility of citizens, the restriction on of the total number of automobiles is a good choice for Shanghai (public transportation vehicles are exempt from VQS).

bb) The Consistency of Article 13 of the RRTS with the National Statutes and the Administrative Rules and Regulations of the Central Government?

(1) The Consistency of Article 13 of the RRTS with the Law of the People's Republic of China on Road Traffic Safety (LRTS)

Some argue that Article 13 of the RRTS has contravened Article 9 of the LRTS (Law on Road Traffic Safety), because Article 13 of the RRTS has changed the requirements for application for the registration of a motor vehicle which are stipulated in Article 9 of the LRTS.[494] According to article 9 of the LRTS , in an application for the registration of a motor vehicle the following certificates and vouchers shall be submitted: (1) a certificate of identification of the owner of the vehicle; (2) a certificate of the manner in which the vehicle is obtained;(3) a certificate of outgoing quality for the whole vehicle or a certificate of import license for the vehicle imported; (4) a payment receipt of vehicle purchase tax or duty free certificate; and(5) other certificates or vouchers to be submitted as required by the provisions of laws and administrative regulations for the registration of motor vehicles.[495] If these certificates and vouchers have been submitted, the traffic control department of public security organ shall issue the registration certificate, number plate and licence for the vehicle.[496] According to the Article 13 of RRTS, Shanghai takes control over the total number of vehicle plates issued and the Shanghai municipality is authorized to make decisions on the yearly total quotas of vehicle plates to be issued and the method of issuing

[494] *Yang* , The Legal Problems of Constraining and Auctioning the Private Vehicle Quota In Shanghai(Shanghai Xiangzhi he Paimai Shiche Edu Falü Wengti), see: www.chinalegaltheory.com
[495] Aticle 9 Sentence 1 *LRTS.*
[496] Aticle 9 Sentence 2 *LRTS.*

these vehicle plate quotas.In Shanghai, in the application for the registration of a motor vehicle one is required to submit: (1)a personal certificate of identification of the owner of the vehicle; (2) a certificate of the manner in which the vehicle is obtained;(3) a certificate of outgoing quality for the whole vehicle or a certificate of import license for the vehicle imported;(4) a payment receipt of vehicle purchase tax or a duty free certificate.[497] All these are consistent with Article 9 of the LRTS. However, only the applicant who holds a vehicle plate quota ("Jidongche Paizhao E'du") is qualified to make an application.[498] That suggests that there is an additional requirement: a certificate for vehicle plate quota that is issued by auction. Therefore, the de facto addition to the requirements for application for the registration of a motor vehicle that results from the enforcement of VQS in light of Article 13 of the RRTS could be considered to contravene Article 9 of the LRTS.

Article 9 LRTS mentions five kinds of certificates or vouchers, but the certificate of vehicle plate quota does not belong to the certificates or vouchers named in Article 9(1)(2)(3)(4) of the LRTS. The remaining question is whether it belongs to the "certificates or vouchers" in Article 9*(5)* of the LRTS, namely*"* other certificates or vouchers to be submitted as required by the provisions of laws and administrative regulations for registration of motor vehicles". If the RRTS does belong to the "laws(Falü) and administrative regulations (Xingzhenfagui)" in Article 9(5) of LRTS or if there is a law or administrative regulation that provides that owning a vehicle plate quota is a prerequisite for the registration of a vehicle, then Article 13 of RRTS is consistent with LRTS. If not, Article 13 of RRTS is inconsistent with LRTS. There are however no law or administrative regulation stipulating that a vehicle plate quota is a precondition for the registration of a vehicle. And, RRTS is a local regulation (Difangfagui), passed in the local congress or their standing committee, which is neither a law(Falü) nor an administrative regulation(Xingzhengfagui). In China, a law(Falü) is passed in the national congress or its standing committee and an administrative regulation refers to one enacted by the State Council.

Therefore, Article 13 of RRTS is inconsistent with Article 9 of the LRTS.

(2) The Consistency of VQS with Administrative License Law of the People's Republic of China(ALLC)

In China, to issue a motor vehicle plate means: a) a certificate that the motor vehicle has been registered by the administrative organ; b) a certificate that the motor vehicle can be used

[497] *Procedures of Motor Vehicle Registration(Banli Jidongche Zhuche Dengji Shouxu),* Issued by Shanghai Municipal Public Security Bureau.
[498] *Procedures of Motor Vehicle Registration(Banli Jidongche Zhuche Dengji Shouxu),* Issued by Shanghai Municipal Public Security Bureau.

on the public roads. Therefore, issuing a motor vehicle plate has not only the function of property registration, but also involves an administrative licence. As far as the requirements of this licence are concerned, Article 9 of the LRTS has provided the conditions for application for a motor vehicle plate. The legal issue is whether or not the local legislation of Shanghai can require that a motor vehicle plate applicant submit a vehicle plate quota in his/her application.

After a national law has established an administrative licence for one issue and provided the conditions of such a licence, what the local regulations can do is as stipulated in Article 16(2) of the ALLC (Administrative Licence Law of China): "a local regulation may, within the scope of the matters of administrative license established by the laws and administrative regulations, make specific requirements for the implementation of the administrative license". This provision has granted the local congress the power to make specific requirements for the implementation of the administrative license set by the national law. However, the excise of this legislative competency is restricted by 16(4) of the ALLC. 16(4) of the ALLC states: "the regulations and rules shall not make specific requirements for the implementation of the administrative license set down by the upper law, shall not increase administrative license; for the specific conditions of administrative license, they shall not establish any other condition in violation of the upper law". In VQS in Shanghai, only the applicant who holds a vehicle plate quota (Jidongche Paizhao E'du) is qualified to make an application for a motor vehicle plate.[499] In fact, for an application for the registration of a motor vehicle in Shanghai there is an additional requirement: a certificate for a vehicle plate quota that has been issued by auction. The additional requirement is inconsistent with Article 9 of the LRTS, as has already been shown.

Thus, the VQS in Shanghai is inconsistent with Article 16(2),(4) of the Administrative License Law of the People's Republic of China(ALLC).

All in all, VQS is a successful system to help Shanghai avoid being locked into a city with a high level of private car dependence. Its restriction on the property rights can be justified. However, the national laws have not give Shanghai the discretion to add a requirement for automobile registration. This become a legal barrier for the VQS in Shanghai and the introduction of this system in other huge cities in China.

[499] *Procedures of Motor Vehicle Registration(Banli Jidongche Zhuche Dengji Shouxu),* Issued by Shanghai Municipal Public Security Bureau.

III. Regulations on the Usage of Motor Vehicles

Apart from regulations on ownership, another important way is to regulate usage of automobiles. In OECD countries, the fuel tax plays an important role to internalize the social cost of the use of private vehicles. There are also different kinds of fees related to motorized transportation in some countries which regulate the use of private vehicles, such as congestion fees, highway tolls etc.. Compared with most of the OECD countries which have established a basic legal framework to internalize the external environmental costs and raise funds for the building and maintenance of transportation infrastructure, China lacks a legal framework to internalized the environmental costs of automobile usage. China has been collecting an annual road maintenance fee from vehicle owners since the 1960s to repair and build roads. In addition, there are other kinds fees placed on the use of automobiles. However, neither the road maintenance fee nor other kinds of fees are designed to internalize the environmetal cost of the use of automobiles. To deal with rapid motorization, China needs to reform the present legal framework concerning the regulation of automobile usage. Such reforms mainly involve two dimensions: the introduction of a fuel tax and the reform of fees related to motorized transportation.

1. The Context of Fuel Tax Reform in China

a) Road Maintenance Fees

Under the present regulation framework, automobile owners are required to pay road maintenance fees and other management fees[500] to the local transportation departments as the prerequisite for using the roads.[501] Road maintenance fees are collected by local administrations under the Ministry of Communications. They have been raised from vehicle owners since the 1960s to repair and build roads. The amount of fees varies by location. Another feature of road maintenance fees is that automobile owners pay a yearly fixed amount depending on the type and weight of automobiles, which has nothing to do with the extent of road usage and the amount of fuel consumption.

[500] The management fees is differs between different provinces.
[501] *Na Yingjian*, Taxation Research Journal(Shuiwu Yuanjiu) 2006 (2):43-46.

b) The Legality of Road Maintenance Fees

The legal basis of present road maintenance fees is the Ordinance of Road Maintenance Fee Collection and Manangement(Yanglufei Zhengshou Guangli Tiaoli)，which was issued by the Department of Communication and the National Planning Committee[502]on 15th Oct. 1991 according to the Regulation of Highway Management of the People's Republic of China (Zhonghua Renmin Gongheguo Gonglu Guangli Tiaoli), enacted by the State Council on 13th October 1987 and effective since 1st June 1988. In light of Article 18 of the Regulation of Highway Management of the PRC, the owner of an automobile is obliged to pay the road maintenance fees to the deparment which is responsible for road maintance. Article 19 of this regulation stipulates the special use purpose of these road maintence fees. Based on this Regulation, the Department of Transportation and the National Planning Committee issued the Ordinance of Road Maintenance Fee Collection and Manangement, which stipulates the specific procedures and the methods of levying road maintenance fees. It also authorized the provincial governments to issue detailed provisions concerning road maintenance fees. In light of this authorization, many provincial governments have issued their detailed regulations concerning road maintenance fees.

However, on 1st June 1998, the Highway Law of the People's Republic of China (Hereinafter referred to as "HLC") came into effect. The HLC was revised for the first time in 1999 and then again in 2004. The revised HLC states explicitly that road maintenance fees should be abandoned.[503] Article 36(1) of HLC states that funds for highway maintenance should be acquired through the collection of a tax and that the State Council is obliged to set specific procedures and steps for this.[504] In accordance with the hierarchy of the Chinese legal system, a law (Falü) issued by the National Cogress is superior to a regulation (Xingzheng Fagui) issued by the State Council. Thus, the collection of road maintenance fees according to the Regulation of Highway Management of the PRC is illegal because it is against the Article 36(1) of the revised HLC.[505]

Pursuant to Article 36(1) of HLC, the State Council is authorized to set specific procedures and steps to introduce a new tax that replaces the road maintenance fees, but there

[502]After 2004, the National Planning Committee is restructured as the National Development and Reform
[503] *Zhou Ze*, Road Maintenance Fees: Ilegal Collection in Six Years (Yanglufei: Zuijin Liunian Dushi Weifa Zhengshou), Procuratorial Daily(Jiancha Ribao). 23th, August, 2006.
[504]*Ibid.*
[505]*Ibid.*

is no specific provision for the time of introduction of such a new tax. In reality, the introduction of a fuel tax was postponed several times because of opposition from interest groups. The State Council has the freedom of judgment of deciding when to enact the fuel tax, but in postponing it so many times it has clearly disobeyed its obligation to issue specific regulation concerning a fuel tax. To implement the principle of "rule of law", the State Council should introduce a fuel tax to replace road maintenance fees as soon as possible.

2. Justifications for the Introduction of a Fuel Tax

a) The Introduction of a Fuel Tax and Environmental Justice

As above states, the "equal entitlement to GHG emissions" should be the basic principle in distributing GHG emission allowances as well as obligations of GHG control. This "equal entitlement to GHG emissions" should be taken as not only the main principle in distributing obligations of GHG controlling among the countries, but also as an important principle for the corresponding domestic legal systems.

Under the present legal framework, the fuel prices in China are among the cheapest in the world.[506] Driving in China is relatively cheap; the gasoline prices are subsidized because China has chosen to stimulate its economic growth by keeping prices as low as possible.[507] However, such low fuel prices have resulted in a shockingly wasteful economy, and a looming environmental nightmare, which is not consistent with the environmental justice principle advocated by developing countries(including China). Car users have produced more emissions than non-car-users, and therefore they should pay for their luxury emissions, which have surpassed the average amount per capita. But up to now they have not paid any money for their luxury emissions. On the contrary, the present system has in fact provided subsidies for the car users. The road maintenance fee has taken only road maintenance costs into account and omitted other social costs such as road construction costs, environmental costs(

[506] *York*, Chinese subsidize nascent gridlock on the road to environmental ruin, the Globe and Mail(Canada), March 31, 2006 Friday.
[507] *Ibid.*

including climate change and other environmental damage), health costs etc. It does not deal with the injustice between the car user and the non-car-user.

In addition, the road maintenance fee has led to an injustice between different car users. A car owner gains permission to use his/her vehicle by paying a fixed amount of road maintenance fees yearly, no matter how often the car is used. Moreover, the different GHG and other emissions of big and small cars have not been considered in road maintenance fees.

The introduction of a fuel tax can promote environmental justice not only between car users and non-car-users, but also between "big car users" and "small car users". As White stated, "First, higher taxes should be applied to goods that produce greater negative externalities (such as motor vehicle emissions), in order to reduce their consumption and the resultant social harm. Second, higher taxes should be applied to goods that are consumed more by higher-income households—resulting essentially in a progressive tax with respect to those goods."[508] The introduction of a fuel tax would be able to reverse a situation in which car users as high-income citizens are subsided by the public fund. It would internalize the external environmental costs by making car users pay for their emissions, in a manner consistent with the principle of environmental justice.

b) The Introduction of a Fuel Tax and the GHG Reduction as well as Environmental Protection

Environmental taxes can change the people's behavior by internalizing the costs of polluting activities; thereby "promot[ing] the most cost-effective sources of emissions reduction andencourag[ing] innovative approaches to environmental improvements".[509] Tax levied on motor fuels is the most important environmentally related tax. It is a "green" tax because:

(1) a fuel tax could be used as a disincentive for vehicle ownership and use or as an incentive to switch to cleaner vehicles, working as a rise of tax rates on more polluting fuels or more polluting vehicles, and/or (2) revenue from a fuel tax could be used to support more sustainable modes of transport.[510]

[508] *White,* Journal of Environmental Law (2007) Vol. 19 No. 1,p.43
[509] *Loper*, 12 Pace Environmental Law Review (1994),p.64.
[510] *OECD,* The Political Economy of Environmentally Related Taxes,p.31.

According to a report of the OECD, a very significant share of all revenue from environmentally related taxes comes from motor fuels.[511] Taxes on motor fuels have been introduced in all member countries of the OECD.[512] The experience of the OECD indicates that taxes on motor fuel can not only raise revenue, but also have important environmental impacts[513]. "In the context of environmental concerns, environmetally related taxes introduce a price signal that helps ensure that polluters take into account the costs of pollution on the environment when they make production and consumption decisions."[514] Taxes on motor fuel can make the big car owner pay more than the small car owner and thus promote the popularity of small, environment-friendly cars, providing incentives for technological innovation and further reductions in emissions.[515]

The level of tax rates is an important factor influencing the fuel economy of automobiles in a country. For example, even when taking into account taxes levied at state or provincial levels in Canada and the USA, the taxes on petrol and diesel in these countries are only a fraction of those levied in most European countries.[516] This is an important factor leading to the low fuel economy of the automobile in Canada and the USA when compared with that of Europe. As the OECD report states, the comparatively low fuel tax in the USA has contributed to much higher use of petrol and diesel per unit of GDP than in other countries.[517] The high fuel tax in Europe and Japan, however, has made small and environment-friendly automobiles more popular than in the USA.[518]

In facing great environmental challenges, China needs to promote the production and usage of small, environment-friendly automobiles rather than big high-emission automobiles. However, under the present road maintenance system, there is no significant difference in costs between small, environment-friendly automobiles and big high-emission automobiles in the period of usage[519], which has promoted the production and consumption of big high-emission automobiles rather than the small, environment-friendly automobiles.[520] To deal with the challenge of environmental protection as well as climate protection, a fuel tax must be introduced. If not, the irrational consumption mode of automobiles will change, and the

[511] *Ibid.*, p.31.
[512] *Ibid.*, p.31.
[513] *Ibid.*, p.31.
[514] *OECD*, Environmentally Related Taxes in OECD Countries: Issues and Strategies,p.9.
[515] *Ibid.*, p.9.
[516] *OECD*, The Political Economy of Environmentally Related Taxes, Paris, 2006, p.32.
[517] *OECD*, The Political Economy of Environmentally Related Taxes, Paris, 2006, p.58.
[518] *Yang/ Liu*, Study of Automobile Industry(Qiche Gongye Yanjiu), 2005(8):27.
[519] *Ibid.*
[520] *Ibid.*

development of the Chinese automobile industry will bring a catastrophe to local, regional and global environments.

3. Legal Problems Concerning a Fuel Tax Reform

a) The Introduction of a Fuel Tax and its Distributional Effects

A fuel tax is generally considered as fair and equitable, because it conforms to the principle of "polluters pay", aiming at internalizing the external social costs. It is more progressive in developing countries like China, since those households in China which can afford automobiles are higher income households. Thus, the fuel tax would have a progressive impact across households. Furthermore, a fuel tax would provide funds for government services, such as road maintenance and even health services for the poor.[521] However, the data from the OECD countries suggests that the direct effects of environmentally related taxes, especially energy taxes, can have a regressive impact on the income distribution of households,[522] especially when there are no corresponding measures to deal with the distributional effects of energy taxes. This is because poor households spend a higher share of income on energy taxes than the rich ones do. In the case of a fuel tax reform, higher fuel prices (especially diesel) will probably affect the costs of public transportation, an important transportation means for low-income groups, and bring about negative influences on farmers who rely on agricultural mechanics.

There are two types of corrective measures to reduce the negative distributional impacts of fuel tax: mitigation and compensation.[523] "Mitigation is an *ex ante* measure to reduce the rates of environmentally related taxes and therefore alleviate the tax burden (both in general and) for specific groups."[524] "Compensation measures are basically *ex post* and outside the realm of taxes as such,i.e. they do not affect the rate or structure of the given environmentally related tax."[525] If "mitigation measures" are adopted, the tax rates would be lower than the optimal level which would reflect the marginal social cost of externalities.[526] Hence,

[521] *White*, Journal of Environmental Law (2007) Vol. 19 No. 1, p.60.
[522] *OECD*, The Political Economy of Environmentally Related Taxes, p.20.
[523] *Ibid.*, p.20.
[524] *Ibid.*, p.136.
[525] *Ibid.* , p.136.
[526] *Ibid.*, p.136.

mitigation measures can reduce the environmental effectiveness of the fuel taxes.[527] In contrast to mitigation measures, the compensation measures provide more direct subsidies for the low-income households through the social security system, which can maintain the price signal of the tax while reducing the negative impact of the tax on low-income households.[528] Chinese fuel tax reform should show more concern over the disadvantaged groups, or there will be little for political acceptance. In dealing with the distributional effects of fuel tax reform, it is more preferable to take compensation measures rather than mitigation measures.

b) Distribution of Fuel Tax Revenue between the Central and Local Governments

Under the present "road maintenance fees" system, local governments are granted the authority to collect the road maintenance fees and to administrate them. After the introduction of the fuel tax, the distribution between the local and central government of revenue from the fuel taxes between the local and central government is another issue crucial to the success of fuel tax reform in China.

The "Tax Sharing System"("Fengshuizhi") reform in 1994 provides the framework for the distribution of fiscal revenues between the central and local government. Chinese local governments have enjoyed a certain degree of administrative and fiscal autonomy ever since the market-oriented reform. However, China has not adopted a formal decentralization policy.[529] The basic principle of the "Tax Sharing System" of 1994 is the sharing of tax revenues between the central and local governments according to their respective responsibilities. The central government is responsible mainly for expenditures relating to national defence, foreign affairs, the operation of central goverment agencies, economic restructure, coordination of development among regions and macroeconomic adjustment. The local governments are mainly responsible for expenses relating to the operation of government agencies under their respective jurisdictions, and economic and social development in their regions.[530] Accordingly, taxes are divided into central government taxes, local government taxes and taxes shared between two.[531]

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[527] *Ibid.*, p.12.
[528] *Ibid.*, p.12.
[529] *Smoke*, The Rules of the Intergovernmental Games in East Asia: Decentralization Frameworks and Process, in: *The World Bank*, East Asia Decentralizes :Making Local Government Work, 2005, p.26
[530]The website of Ministry Of Finance People's Republic Of China. At:http://www.mof.gov.cn/english/english.htm
[531] *Ibid.*

The distribution of fiscal revenues lacks of a formal basis in China. Although a number of reforms and legislative changes have clarified the fiscal responsibilities of different levels of government somewhat since 1994,[532] intergovernmental fiscal relationships have no constitutional or dedicated legal framework.[533] Intergovernmental fiscal relations are decided largely by a complex system of bargaining between higher-level and lower-level authorities.[534] The distribution of responsibility between the central and local governments according to the "Tax Sharing System" reform in 1994 appears too general, lacking formal, accountable criteria.

As far as the distribution of fuel tax revenue between the central and local governments is concerned, it is important to make a clear definition between the respective responsibilities of the central and local governments. The road maintenance fee levied by the local government has provided funds not only for road maintenance and management, but also for investment in transportation infrastructure by the local government. In terms of transportation infrastructure delivery, China has adopted a principal-agent approach. Although the central government, as principal, has retained and even strengthened its role in setting investment priorities across and within sectors and has reinforced this role by setting highly specific targets and timetables for infrastructure coverage in different classes of cities,[535] local governments have full responsibility for actually executing these investments and providing services.[536] Moreover, local governments have significant latitude in deciding how to mobilize funds to pay for capital investment, which they now must finance entirely without central grant support.[537] Because the local government has the main responsibility for delivering the transportation infrastructure, they should gain a greater share in the distribution of revenue from fuel taxes.

However, as above stated, allocating tax revenue to the development of sustainable transportation is critical to making the fuel tax green. If all the revenues from the fuel tax are used for the expansion and maintenance of roads, its contributions to environmental protection and GHG reduction will be greatly compromised. The introduction of the fuel tax is a good chance to redefine the role of the national government in the sphere of urban

[532] *Smoke*, The Rules of the Intergovernmental Games in East Asia: Decentralization Frameworks and Process, in: *The World Bank*, East Asia Decentralizes :Making Local Government Work, 2005, p.31.
[533] *Ibid.*, p.31.
[534] *Ibid.*, p.31.
[535] *Peterson/ Muzzini*, Decentralizing Basic Infrastructure Service, in: *The World Bank*, East Asia Decentralizes :Making Local Government Work,p.211.
[81] *Ibid.*, p.211-213.
[537] *Ibid.*, p.211-213.

transport. While urban transport should remain the primary responsibility of the local government, the national government should get a signficant share in the allocation of fuel tax revenues so that it can support, encourage and reward best practices at the local level. Local governments tend to only consider the negative spill-over effects of urban transport at local levels. The spill-over effects of urban transport at national and even global levels, such as the acrid rain, energy security, the protection of arable land, climate change etc., may be underestimated in local decision-making and law enforcement. Therefore, it is essential to re-align the incentives of municipal governments so that long-term national and global interests are appropriately considered in the local decision-making process.[538]

Under the present mechanism, the responsibilities of the national government are confined to setting policy guidance and technical standards, reviewing and approving of urban master plans and large urban transport investment projects (including mass rail transit), promoting knowledge exchange, and facilitating capacity building.[539] However, its effectiveness of in carrying out these responsibilities is seriously compromised by the limited national budget available for urban transport.[540] Local governments lack the incentive to follow policy guidance set by the national government at present. In particular, central monitoring and supervision are not effective at the local level where planning and policy implementation is carried out. To solve this problem, in addition to strengthening the enforcement of national law and policy, it is necessary to give the national government more fiscal power to re-align the incentives of municipal governments by making the national fiscal support for local urban tranport projects conditional on the enforcement of national law & policy guidance and by encouraging best practices at local levels.

c) The Introduction of Fuel Tax and Road-Pricing Fees

Due to insufficiency of funds for the rapid expansion of roads, China has encouraged various investors to make investments in highway construction by giving the investors the right to gather road tolls since the 1980s.[541] At present, there are about 15 thousand kilomitres

[538] *World Bank,* China: Building Insitution for Sustainable Urban Transport, In: Emerging Urban Transport Chanllenge: A Perspective, p.17.
[539] *Ibid.*, p.17.
[540] *Ibid.*, p.17.
[541] *Wu/Shu/Li*, Macroeconomy Study(Hongguan Jinji Yuanjiu)2006(1):58.

of toll roads in China.[542] Moreover, due to the severity of traffic congestion in many cities, congestion fees for specific areas of some cities are being discussed by some local decision makers. However, after a fuel tax is introduced, motorists will pay road tolls and/or congestion fees on top of the fuel taxes. Is this a double-taxation? Can it be justified?

Whether or not the co-existence of a fuel tax and other road-pricing fees is in fact a double-taxation depends on the fuel tax rate. If it is so high that the revenue is sufficient to cover the costs of road construction and maintenance as well as all other external costs, the co-existence of the fuel tax and other road-pricing fees is actually a double-taxation. If not, it can not be claimed unfair for motorists. In fact, the general fuel tax rate is unlikely to be so high as to be able to cover the costs of road construction and maintenance in China. In addition, if there are other alternative transportation means or alternative roads available, the existence of toll roads and introduction of congestion fees can be justified on account of a higher quality of transportation service and the promotion of sustainable transportation. Supposing that there will be no road tolls in China after the introduction of a fuel tax, the incentive of private investment in road construction would be discouraged and the motorist would not drive on the same quality of roads or would only be able to use them at a later time. A congestion fee is a direct tool to both solve the congestion problem and provide an efficient transportation service for those who pay for it.

The fuel tax reform can help China implement the principle of "rule of law" in the transportation sector and promote the development of a sustainable transportation system through transforming the road maintenance fees into fuel taxes and ruling out all the illegal fees levied by the local governements. However, it is impractical to rule out all road tolls and the introduction of a new road pricing systems such as congestion fees in some cities. The fuel tax can co-exist with toll roads as well as congestion fees, as long as toll roads and congestion fees have a legal basis.

IV. Conclusion

Technology-based regulations on automobiles play an important role in reducing the GHG emissions from road transportation. One approach of technology-based regulations is to reduce the GHG emissions per kilometer through the technology standard. Another is to

[542] *Wu/Shu/Li*, Macroeconomy Study(Hongguan Jinji Yuanjiu)2006(1):58.

promote the development of automobiles fuelled by alternative energy. However, overreliance on technology-based regulations will result in social and environmental risks in China due to their limitations. Technology-based regulations can be successful in reducing GHG emissions on the condition that the development of cost-effective green technology can keep pace with the growth of transportation activity. This is impossible if a transportation system with a high level of private automobile dependency cannot be avoided and the external costs of automobiles use cannot be internalized.

Non-technology-based regulations on automobiles can influence the behaviour of the citizens to avoid private automobile dependency. They can be classified into regulations on automobiles ownership and regulations on automobile usage. Regulations on ownership focus on behaviours relating to acquisition and possession of automobiles; whereas regulations on utilization focus on the actual use of automobiles.

The most direct and perhaps the most effective approach to avoid private automobile dependency is to control the level of automobile ownership, i.e. to regulate the per capita motor vehicle ownership level and keep it under a certain level. The VQS in Shanghai is an attempt to directly regulate the level of motor vehicle ownership by requiring a licensed quota for registration of an automobile. Hong Kong has chosen another approach through extraordinarily high registration fees that are beyond affordability for most citizens. However, direct regulation of automobile ownership through VQS or extraordinarily high registration fees may face problems of legality.

Firstly, to directly regulate the automobile ownership level through the VQS or extraordinarily high registration fees, the local government needs the corresponding discretion to take such measures. Hong Kong, as a special administrative area, can use its independent legislative competency to levy extraordinarily high registration fees on automobiles. However, the case study of Shanghai VQS has shown that constitution and the national law does not give the state organ of Shanghai the discretion to add a precondition for automobile registration. To solve this legality problem, it is necessary to revise Article 9 of LRTS to authorize local states to add new requirements for the registration of new motor vehicles through local legislation. Such legal reforms can also help to surmount legal obstacles blocking the introduction of VQS in other cities.

Furthermore, the regulation of automobile ownership level through VQS or extraordinarily high registration fees may go against the principle of proportionality, if there exists other approaches which can achieve the same regulation aim but impose weaker influences on the property rights of citizens. We should accept the fact that direct regulation of automobile ownership level must impose strong restrictions on the property rights of citizens and the economic freedom of enterprises. However, such an approach has proved most effective in controlling the negative effects of automobiles and it is appropriate in huge cities with an extraordinarily high population density such as Hong Kong and Shanghai. Other approaches cannot guarantee that excessive automobile use can be avoided and the citizens' health rights will not be infringed.

A more moderate approach to regulate automobile ownership is to regulate ownership structure rather than the total number of automobiles. In China, promoting the vehicles with low emissions and vehicles fuelled by the new energy should be established as a national policy. The reform of the automobile consumption tax is a successful step to steer the automobile ownership structure. Using economic instruments to steer the structure of automobile ownership is confronted by no legal problems and should be further strengthened.

Regulations on automobile utilization is thought to be a better choice to deal with the negative effects of excessive automobile dependency in contrast to regulations on the automobile ownership. If many of the costs (including the external negative effects) are fixed or only marginally linked to vehicle miles travelled, once an individual has purchased a car, he/she typically chooses to drive the car exclusively to other models. Under such situations, the advantages of a low level of automobile ownership can be offset by the excessive utilization of a purchased automobile. Thus, "encourage ownership, but restrict its utilization" is advocated as a good form of regulation to deal with the negative effects of automobiles, since the external negative effects of automobiles mainly come from their actual use rather than the static ownership of them. If owners can reduce the frequency of automobile usage, the per capita motor vehicle mileage will also be reduced. In addition, the automobile ownership structure can be altered through measures regulating the usage of automobiles such as the fuel tax, congestion fees, and parking fees. Considering the higher costs of utilizing automobiles with high energy consumption and high emissions, a consumer may be in favor of purchasing an automobile with low energy consumption and low emissions.

"Encourage ownership, but restrict its use" looks like a good choice to regulate the external negative effects of automobiles, since the external negative effects of automobiles come from their actual use. Nevertheless, if a city or a country has developed into a community with a high automobile ownership level, it is difficult to implement an effective regulation on the use of automobiles that would ensure that rights of other citizens(for example, health and basic movement right of non-motorists) can not be infringed on and all the external costs can be internalized, because motorists and auto-industry can exert a strong influence on public decision making. Moreover, it is very apparent that a person with his/her own auto will use automobiles more often than a person without his/her own automobile. Although the fuel tax can have a positive effect on automobile ownership structure, the promotion of automobiles with low energy costs and low emissions levels as well as those fuelled wholly or partly by renewable energy require regulations on purchase of automobile and its registration. Without such regulations, the automobiles with low energy costs and low emission level as well as those fuelled whole or partly with renewable energy would not be able to compete with non-environemnt-friendly automobiles.

In conclusion, in order to effectively address the GHG emissions and other external negative effects of automobiles, China should adopt both technology-based regulations and non-technology-based regulations. Some regulations can be justified on the national level, such as the fuel tax, the automobile consumption tax, and the fuel economy standard. But some regulations can only be justified in consideration of the local special situation of a city, such as the VQS, congestion fees, etc. To implement integrated regulations, on the one hand, national legal criteria should be established for the regulations of automobile; on the other hand, the local governments should be given the discretion to carry out active policies that are suited to their specific conditions.

G. Promotion of Climate-Friendly Transportation Modes

I. Regulations on Bicycles

1. Bicycles in China and Implications for the Environment and Climate Protection

China is a kingdom of bicycles. Because of the small investment, the high efficiency of movement as well as their extreme maneuverability in constrained urban situations,[543] bicycles have played an important role in the urban transportation system in China. There is a well-developed, convenient transportation infrastructure for bicycles in the existing transportation system. Even though the number of car-owners is on the rise with the rapid increase of income, many people, especially citizens with low income, still depend on bicycles as their major means of transportation.

In recent years, China has been experiencing a rapid transition from human-powered bicycles to electric bikes.[544] "Electric bikes are a category of vehicles in China that includes two-wheel bikes propelled by human pedalling supplemented by electrical power from a storage battery, and low-speed scooters propelled almost solely by electricity."[545] In the process of urbanization, electrical bicycles are more convenient than human-powered bicycles. Moreover, they are affordable for most citizens with normal or low incomes. Therefore, e-bikes are becoming attractive alternatives to public transit, traditional bicycles or private cars.[546] The Chinese electric bike industry has developed rapidly in recent years and China has become the country with the biggest e-bikes production and consumption. Annual electric bike sales in China grew from 40, 000 in 1998 to 10 million in 2005.[547]

No matter what kind of bicycles, man-powered or electric, their use has a series of advantages:[548] direct access, low energy consumption, low or absence of pollution, healthful exercise, space conservation, low public investment, low private expense, etc.. However,

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[543] *Grava,* Urban Transportation Systems: Choices for Communities, pp.73-76.
[544] *Weinert/Ma/Cherry*, the Transition to Electric Bikes in China: History and Key Reasons for Rapid Growth, Transportation (2007)34:301.
[545] *Ibid.,* p.302.
[546] *Ibid.,* p.302.
[547] *Ibid.,* p. 301.
[548] *Grava,* Urban Transportation Systems: Choices for Communities, p.73-76.

there are disadvantages to using bicycles: their low speed makes them unattractive for long distance travel;[549] their use is restricted to some extent by the natural environment. Nevetheless, for a country like China with a large number of inhabitants and heavy population density in urban areas, the bicycle is an indispensible means of transportation that cannot be substituted by public transit and private cars. For one thing, they can fulfil door-to-door transportation needs at a low personal and social costs. Furthermore, bicycles are easily integrated into the public transit system through the intermodel facilities and regulations.[550]

One prominent advantage of bicycle use is that it can benefit the local environment and promote global climate protection at the same time. Compared with automobiles, bicycles can provide mobility with a low level of GHG emissions and other pollutants (in the case of electric bicycle) or zero emissions(man-powered bicycles). Cherry(2006) holds a cautious viewpoint on the environment-friendliness of electric bikes in China.[551] Although electric bikes provide zero tail-pipe emissions, they do emit GHG and other pollutants from power plants, which in China are 75% coal-fired.[552] Moreover, emissions from the battery production and recycling practices have serious health implications in China due to absence of strict regulations on e-bike battery production and recycling.[553] Electric bikes are also not the most efficient transportation means in terms of land use. Although they can move more people per lane than private cars, buses move more people per lane than e-bikes.[554]

Notwithstanding the disadvantages of electric bicycles, they are more environment-friendly than private cars. In a strict sense, environment-friendliness is a relative concept. Even public transit produces emissions. But no one can deny the fact that public transit is an environment-friendly means of transportation and should be encouraged. Electric bikes can provide door-to-door transportation with lower emissions compared with private cars. They are environment-friendly and cannot be totally substituted with public transit. Hence, they should also be encouraged.

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[549] there is general consensus that very few people would ride more than 16 km on a regular basis each day, see *Grava,* Urban Transportation Systems: Choices for Communities, p.74.

[550] For example, it is a good policy choice to require building the facilities for parking bicycles on the station of public transit. See *Wang Jixian*, Strategy and Management (Zhanlü Yu Guanli), 1997(3):17-20.

[551] *Cherry,* Implications of Electric Bicycle Use in China: Analysis of Costs and Benefits. Paper Presented at the UC Berkeley Center for Future Urban Transport-Volvo Summer Workshop, Berkeley CA, 24 July 2006.

[552] *Ibid.*

[553] *Weinert/Ma/Cherry*, the Transition to Electric Bikes in China: History and Key Reasons for Rapid Growth, Transportation (2007)34:304.

[554] *Cherry/Cervero*, Use Characteristics and Mode Choice Behavior of Electric Bikes in China, Institute of Transportation Studies, University of California Berkeley(2006).

2. The Legal Regulations on Bicycles

a) The Legal Regulations on Bicycles: an Overview

Generally speaking, a bicycle belongs to the category of "non-motor vehicles". It can be used on public roads if its size, quality, brake, handle-bar bell and night reflectors meet the required safety and technical standards.[555] Moreover, it should be registered, if there is registration requirement in the local legislation . According to Article 8 (2) LRTS(the Law of the People's Republic of China on Road Traffic Safety), "the types of non-motor vehicles required for registration according to law shall be specified by the people's governments of provinces, autonomous regions, and municipalities directly under the Central Government in light of the actual local conditions". Therefore, whether a "non-motor vehicle" needs registration or not is decided by the local laws of provinces, autonomous regions, and municipalities directly under the Central Government. If there is no local registration requirement, it can be driven on roads when the technological conditions meet the standards.

There are no disputes about the regulations on the traditional man-powered bicycles in China. Some local legislation require registration for their use though most have not. The right of owners of man-powered bicycles to use public roads is guaranteed in all provinces, autonomous regions, and municipalities. However, the expansion of motor ways and new public roads without corresponding bicycle lanes is becoming a de facto restriction on their use.

Today the usage of electric bicycles is still in dispute. In recent years, electric bicycles have made significant development in China. Although the LRTS classifies electric bicycles as non-motorized vehicles and has endowed owners of electric bicycles with the right to ride on the public roads, the local legislation on electric bicycles differs from city to city.[556] Some cities such as Shanghai and Chengdu adopt pro electric policy which encourages their ownership and use.[557] By contrast, some cities like Beijing, Fuzhou, Wengzhou, Guangzhou,Wuhan, Haikou, Zhuhai have adopted an anti-e-bikes policy, and have banned the use of electric bicycles. This policy has sparked debates about the legal status of electic

[555]Article 8 (3) of *Law of the People's Republic of China on Road Traffic Safety*.
[556]*Weinert/Ma/Cherry*, the Transition to Electric Bikes in China: History and Key Reasons for Rapid Growth, Transportation (2007)34:312.
[557]*Weinert/Ma/Cherry*, the Transition to Electric Bikes in China: History and Key Reasons for Rapid Growth, Transportation (2007)34: 313.

bicycles and local regulation on electric bicyles. This thesis chooses Zhuhai electric bicycle legislation as a case study.

b) Zhuhai Case

On Mai 27, 2005, the Standing Committee of the People's Congress of Zhuhai Special Economic Zone voted in favour of *the Road Traffic Safety Regulation of Zhuhai Special Economic Zone ("Zhuhai Jinji Tequ Daolu Jiaotong Anquan Guanli Tiaoli",* hereinafter refered as "the Regulation of Zhuhai"), which came into effect on July 1, 2005. Article 7 of this regulation states: " The non-motored vehicles listed below are not permitted to be registered and forbidden to run on the road: (1) electric bicycles; (2) man-powered tricycles. The electric bicycle registered outside of the special economic zone can not ride inside the special economic zone". According to Article 33 of the regulation of Zhuhai , the police can detain the non-motored vehicle and impose a fine of 500 Yuan if the rider has violated the provision of Article 7 of the regulation of Zhuhai. If the rider does not pay the fine within the required deadline or does not go to the transportation management department within 30 days, the non-motored vehicle will be expropriated and be destroyed.

On August 3, 2005, the Dongfang Public Interest and Legal Aid Law Firm submitted a written proposal to the Standing Committee of the National People's Congress, asking to review the legality of articles 7 and 33 of the Regulation of Zhuhai which forbid the use of electrical bicycles in Zhuhai. The Dongfang Public Interest and Legal Aid Law Firm claimed that the Regulation violated the LRTS, the Legislation Law, and the Administrative Licence Law. So far, there is no official response from the Standing Committee of the NPC. But the Beijing municipal government has changed its previous harsh policy on the use of electrical bicycles, and decided that the electrical bicycles would be allowed to be registered and put into use from Jan. 1, 2006 in Beijing.

aa) The Legislative Competence of the Standing Committee of the People's Congress of Zhuhai Special Economic Zone concerning the Regulation of Electric Bicycles

According to Article 63 (2) (4) of the Law on Legislation, the SCPC(Standing Committee of the People's Congress) of Zhuhai has the authority to make local legislation. However, if the national statutes and the administrative rules and regulations of central government has provisions on the same subject, the local congresses and their standing committees are not allowed to enact contradictory provisions which conflict with the national statutes and the administrative rules and regulations of the central government , except that there is a special delegation of National Congress and its Standing Committee.

The LRTS makes a distinction between motorized vehicles and non-motored vehicles, with the regulations being differiated. Motored vehicles must be registered to run on public roads. As for no-motored vehicles, Article 8 of LRTS stipulates:

"Non-motor vehicles required for registration according to law shall run on roads only after they are registered with the traffic control departments of the public security organs.

The types of non-motor vehicles required for registration according to law shall be specified by the people's governments of provinces, autonomous regions, and municipalities directly under the Central Government in light of the actual local conditions."

As shown in the text above , the governments of provinces, autonomous regions, and municipalities directly under the Central Government are granted the legislative competence to stipulate which types of non-motored vehicles need registration.

To discuss the legislative competence of local governments concerning electric bicycles, it is necessary to clarify which vehicle group electric bicycles belong to. According to Article 119 (4) of LRTS, "'Non-motor vehicles' mean such means of transport as are driven or drawn by man or animal on roads, and the motor wheelchairs for the disabled and electrically operated bicycles which are installed with power sets but the designed maximum speed per hour, the light quality and the external size of which are in conformity with the relevant standards of the State". Hence electric bicycles in conformity with the relevant standards of the State belong to the non-motor vehicles. Therefore, for the electric bicycles in conformity with the relevant standards of the State, the standing committees of the local congress of provinces, autonomous regions, and municipalities directly under the central government have the legislative competence to decide whether they need registration before riding on the road. However, the local legislative competence concerning the registration of non-motor vehicle according to Article 8 of LRTS is confined by two conditions: a) only the people's governments of provinces, autonomous regions, and municipalities directly under the Central Government have such competence; b) these powers consists only of deciding which type of non-motor vehicle needs registration before riding on the road. The Zhuhai government does not belong to the governments of provinces, autonomous regions, and municipalities directly under the Central Government. Moreover, Article 8 of LRTS only authorizes local governments to decide which types of non-motor vehicles need registration, rather than allowing them to forbid the usage of any type of non-motor vehicle already in conformity with the relevant standards.

Thus, SCPC of Zhuhai does not have the appropriate legislative competence to enact Articles 7 and 33 of the Regulation of Zhuhai.

bb)The Regulation Instrument

Articles 7 and 33 of the Regulation of Zhuhai have, in fact, restricted the property rights of electric bike owners by banning their using on the road. This disallows the most important function of electric bicycles as a transportation means. This restriction on the property rights of the electric bike owners can only can be justified, if the following requirements are fulfilled: a)it is in the form of law; b) it follows lawful aims; c) it is in conformity with the proportionality principle.

(1) The Aim to Ban Electric Bikes

A primary reason for the ban on electric bicycles in Articles 7 and 33 of the Zhuhai Regulation cited by the SCPC of Zhuhai is that electric bicycles have brought about serious public safety problems,[558] and, banning them will improve public safety.[559] The national electric bicycle standard was set in 1999 to establish performance limits for electric bicycles with respect to speed, weight and power. In light of this national standard, as long as an e-bike has functional pedals, it could be classified as an e-bike.[560] In reality, two types of electric bicycles have been developed, bicycle-style electric bikes and scooter-style electric bikes, both of which can be classified as electric bikes in accordance with the 1999 national standard. Bicycle-style electric bikes typically employ 36V batteries and 180-250 W motors, while scooter-style electric bike usually have larger 48 V batteries and higher-powered motors of 350-500 W.[561] According to the national e-bikes standard, the maximum speed of electric bicycles is 20 km/h, with the weight no more than 40 kilogram and width no more than 220 millimeters. However, many electric bicycles, especially scooter-style electric bikes, can travel at a speed beyond 20 km/h, with weight and widths exceeding the legal limits. These scooter-style electric bikes that do not conform to the national standard are also run on the non-motor lane, which is likely to cause more traffic accidents. It is a headache to deal with

[558] *Beijing Dongfang Public Interest and Legal Aid Law Firm*, China Bicycle, 2005(8)5-10.
[559] *Ibid.*
[560] *Weinert/Ma/Cherry*, the Transition to Electric Bikes in China: History and Key Reasons for Rapid Growth, Transportation (2007)34: 312.
[561] *Weinert/Ma/Cherry*, the Transition to Electric Bikes in China: History and Key Reasons for Rapid Growth, Transportation (2007)34: 312.

the compensation when traffic accidents involving electric bicycles happen, because electric bike owners are not obliged to buy insurance.

Another aim of banning electric bicycles as mentioned by the Zhuhai SCPC is to promote environmental protection.[562] There may exist environmental pollution in the process of production of batteries and the disposal of the old batteries of electric bikes.[563] Moreover, banning electric bicycles is assumed to be a way to improve traffic. [564]

(2) Is the Regulation Instrument Appropriate?

The next step is to examine the proportionality of the regulation instrument which the legislator has chosen for the regulation aim. Even if the regulation aim is legal, if the chosen regulation instrument is not appropriate for its aims, the restriction on the property right can not be justified.

To examine the appropriateness of the instrument, the first step is to examine whether the regulation instrument can serve its stated regulatary aim. In the case of Zhuhai, the aims of the regulation are to promote public safety, protect the environment and improve traffic. However, can the banning of electric bicycles really be helpful to these three aims? Firstly, the ban on electric bicycles will not necessarily promote public safety. It will push electric bike owners to use private cars, public transit or man-powered bicycles. Whether such a change of transportation means can reduce traffic accidents or not lacks factual or theoretical support. Secondly, the ban is not beneficial to environment. Although there are environmental problems in the production and disposal of the batteries for a e-bicycles, the ban may lead electric cyclists to using motorized transportation public transit, which will bring about even more serious environmental problems. Thirdly, there is no certainty that the ban will promote traffic order and traffic efficiency.

Additionally, to examine the appropriateness of the regulation instrument, one needs to see if there are other instruments, which can help achieve the same regulatory aims with less restriction on the rights of citizens. In the case of Zhuhai, the regulatory aims can be reached

[562] *Beijing Dongfang Public Interest and Legal Aid Law Firm*, China Bicycle, 2005(8)5-10.
[563] *Ibid.*
[564] *Ibid.*

through ways which cause less restriction on the property rights of electric bike owners. To deal with the public safety problem mainly caused by scooter-style electric bikes that do not reach electric bicycle standard, it is better to require that scooter-style electric bikes should be registered as motor vehicles and ridden on the motor lane, or only to ban these electric bicycles, rather than to ban electric bicycles of all kinds. To solve environmental problems caused by the batteries, it is more appropriate to strengthen regulation on the production and disposal of batteries, rather than simply to ban e-bikes of all kinds. In terms of the promotion of traffic order and traffic efficiency, only after other attempts fail, can the ban on electric bicycles be taken into consideration. In the case of Zhuhai, the legislators have many other policy choices that can promote the traffic order and traffic efficiency than a ban on e-bikes.

3. Legal Reforms to Encourage the Use of Bicycles

a) Safeguarding the Rights of Bicyclists to Use Public Roads

Until now, China still claims the title of " kingdom of bicycles". However, the dominion of bicycles is becoming smaller and smaller with the rapid development of the automobile industry,. The flourishing e-bicycle is a active response of the bicycle industry to this challenge. Nevertheless, the automobile industry and automobile owners are able to exercise a strong influence on public decision-making and law enforcement. In reality, the "automobile hegemony" is becoming a strong power that threatens both the rights of bicyclists and pedestrians. The right to use public roads, the most important right of cyclists, is threatened by biased public policy. Safeguarding the right of cyclists to use public roads is vital in promoting bicycles as a viable transportation means.

aa) Justification for the Right of Cyclists to Use the Public Road

The right of cyclists to the use of public roads can be justified on the legal basis of Article 33 (2)(the right to equality) of CC along with Articles 42 (the right to work), 43 (the right to rest), 46 of CC(the right of education). Although there are no direct provisions for the right to basic mobility in the Constitution, it is a prerequisite for exercising the right to work, the right to rest and the right of education. There is a debate on if the state is obliged to ensure the right to work, the right to rest and the right of education, yet it goes without saying that no one should be deprived of equal opportunities to work, rest and education by the state.

Similarly, equal access to basic mobility should not be deprived by state. If equal access to basic mobility were not ensured, equal opportunities to work, rest and to education would be difficult to realize.

As a valuable public resource, the road should be open to all individuals, except where there exist convincing arguments. A ban on a particular mode of transportation means could be considered as inequitable as excluding a particular group from using public parks or public restrooms.[565] Similarly, it is unfair to deprive cyclists of the right to use the road, or to ignore cyclists' needs in transportation facility design and management.[566] The ban on electric bicycles has totally deprived e-bicyclists of the right to use public roads. Such deprivation can only be justified with the convincing arguments. Some people think that cyclists do not pay road maintenance fees, and therefore have no right to ride on the public roads. This viewpoint is moot, because the road maintenance fee comprises only a small portion of road costs. The roads are mainly funded through general taxes that all residents pay regardless of how they travel. As general tax payers cyclists have an equal right to use the roads.

bb) Strategies to Safeguard the Right of Bicyclists to the Use of Public Roads

LRTS, enacted in 2003 affirms the right of bicyclists to use the road(Articles 18, 57, 58, and 59 of the LRTS). Even electric bicyclists' right to ride on the bicycle lane is clearly ensured in Article 58 of the LRTS, which states: "when motor wheelchairs for the disabled and battery-powered bicycles run in the bicycle lane, their maximum speed per hour shall not exceed 15 kilometres". It is evident that as long as an electrical bicycle does not exceed this limit, it may be used in the bicycle lane. However, the right to use the road, clearly provided in the national law, has been deprived in reality by local legislation(in Zhuhai) or by illegal law enforcement of the local governments(in Beijing, Fuzhou, Wengzhou, Guangzhou,Wuhan, Haikou). Litigation against this illegal law enforcement and the submission of written proposals to the Standing Committee of the National People's Congress by the Dongfang Public Interest and Legal Aid Law Firm have not yet achieved positive results .

[565] *Litman*(Victoria Transport Policy Institute), Whose Roads? Defining Bicyclists' and Pedestrians' Right to Use Public Roadways, 30 November, 2004, p.10.
[566] *Ibid.*

The deprivation of electric bicyclists' right in some cities is a epitome of the legal system in China. Although national law has already established relevant legal criteria, such criteria are easily breached by local legislation or illegal law enforcement. To better deal with such legal challenges, it is necessary to push judicial reform that will make the court independent and establish institutions to review the lawfulness and constitutionality of local legislation in the long run. At present, protecting the rights of bicyclists needs the strong political will of the central government. Under the present legal and political structure, illegal law enforcement and unconstitutional local legislation can be quickly repealed through political pressure from the central government.

The deprivation of the bicyclists' road use right can be taken in other forms. For the sake of so-called transportation efficiency and public security, non-motorized traffic lanes have not been taken into account in many newly designed and built roads and many separate bicycle lanes were even dismantled to be used for motorized roads. If such an automobile-oriented road development trend can not be deterred, the bicyclists' right will be vain talk.. Introducing public participation and monitoring in the planning process is essential to protect bicyclists' right to use the road. As a report from the World Bank states, "while professional technical competence is needed for the planning practice, it is not sufficient. Effective and meaningful public participation and monitoring is an essential element to protect the long term interest of the city and the interests of disadvantaged groups."[567] In addition, bicycle lanes should be taken into consideration during planning if the natural geographical condition is suitable for the riding of bicycles. Such requirements should be written in the planning laws.

b) Creating an n Legal Structure for Equal Competition between Non-motorized Transportation and Motorized Transportation

Non-motor transportation, i.e. walking and bicycling, is regarded as an inefficient means of transportation by many transportation planners and regulators.[568] However, automobile-oriented planning and regulation is itself far from the principle of efficiency, because the principle of efficiency requires that different kinds of transportation means compete under

[567] *World Bank,* China:Building Institution for Sustainable Urban Transport. Easter Working Paper No.4. Transport Sector Unit, Infrastructure Department, East Asia and Pacific Region, p.11.
[568] *Litman(Victoria Transport Policy Institute),* Whose Roads? Defining Bicyclists' and Pedestrians' Right to Use Public Roadways, 30 November, 2004, p.10.

equal conditions. This implies that, unless a subsidy is specially justified, the consumers should bear their share of costs for the goods and service they use.[569] Under present regulation, the competition between motorized and non-motorized transportation is under unequal conditions. To promote equal competition, these unequal conditions should be eradicated. Firstly, subsidies supporting basic mobility should be based on the person's trips rather than person's miles to avoid that higher-speed modes are subsidized at the expense of lower-speed modes. Secondly, the external costs of motorized transportation are currently shouldered unequally by the public, particularly bicyclists or pedestrians.[570] These groups face more serious safety risks than the motorists in the case of a motor-vehicle accident, and emissions from automobiles are directly breathed by bicyclists or pedestrians. A series of measures should be adopted that will reduce and internalize these external costs. The reluctance of legislators to introduce green fuel taxes to internalize the external costs and stricter emissions standards to reduce them has put non-motorized transportation at a disadvantage.

II. Promotion of Public Transportation

1. Introduction: Public Transportation and GHG Mitigation

Public transportation refers to "all transport systems in which the passengers do not travel in their own vehicles".[571] It is "generally taken to include rail and bus services, wider definitions might include scheduled airline services, ferries, taxicab services etc. — any system that transports members of the general public".[572] Public transportation plays a significant role in reducing energy consumption and GHG emissions. The average energy consumption per passenger per hundred kilometres by bus is only 8.4% of that done by car; similarly, riding by trolley-bus uses 4% of that by car, by tram 3.4% of that by car, and by subway train 5% of that by car.[573] Based on the current gasoline savings produced by public transit and the potential for even greater savings if transit ridership is increased, a significant reduction in GHG can be achieved.[574] More importantly, when communities invest in public

[569] *Ibid.*
[570] *Litman,* Transportation Cost and Benefit Analysis Guidebook, available at: www.vtpi.org. 2004. Also see "Transportation Costs" in the VTPI Online TDM Encyclopedia (www.vtpi.org).
[571] Available at: http://en.wikipedia.org/wiki/Public_transport
[572] Available at: http://en.wikipedia.org/wiki/Public_transport ; Transportation system, p.133.
[573] *Wang Fengwu*, Modern Urban Transit (Xiandai Chengshi Guidao Jiaotong), 2005(6):1.
[574] *Wang Fengwu*, Modern Urban Transit (Xiandai Chengshi Guidao Jiaotong), 2005(6): 2-3.

transportation to improve and expand transit service, they create permanent energy and GHG savings.

2. Public Transportation as a Priority

a) Other Justifications for Prioritising Public Transportation in addition to GHG Reduction

GHG reduction is not the only justification for giving priority to the development of public transportation. There are many other reasons for prioritising public transportation.

The most important reason of these is the high population density in China. The experience of industrialized countries suggests that the population density of a country is an important factor in determining the transportation model of a country. In the United States, cars have been the norm since the 1960s and public transport is almost non-existent in many places.[575] Almost 80% of commuters drive to work alone.[576] There are only a few cities where public transport is in good condition, such as New York City. The car-orientated transportation model remains popular because the USA is not a densely populated country in comparison with most countries in Europe and Asia. Nevertheless, widespread car usage has caused serious problems such as oil-depenency, environmental pollution and urban sprawl. These have aroused critical reviews on public policies which have ignored the development of public transportation.[577] In Europe, however, dense population structure has forced countries to utilize public transportation. A tradition of public transport culture remains even today, even while living standards have escalated.

In China the population density is so high that the development of public transport should play a more significant role than that in the USA or Europe. It is unlikely that China can develop an efficient transportation system in the USA or European model due to its urban population density. In order to develop an efficient transportation system, the primary task is to develop efficient public transportation.

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575 *Mann, F. R.*, Virginia Tax Review, Winter 2005, Vol.24, p 587.

576 *Ibid.*

577 *Mann, F. R.*, Virginia Tax Review, Winter 2005, Vol.24, pp.613-616.

Secondly, giving priority to public transportation is a good way to fulfil basic mobility needs for all citizens in China. Due to its large population, a good public transport system is the most efficient way to provide China with sufficient capacity for large quantities of people to move around. Although public transportation cannot satisfy the needs of privacy, comfort, and flexibility like a private car can, it has significant advantages in fulfiling basic mobility needs with the same cost in comparison to private cars. In China, the most important task for the state is to fulfil the basic mobility needs for the majority of the population rather than to satisfy the luxurious needs of the minority.

Finally, the opponents of the prioritisation of public transportation hold that public transportation usually requires subsidies from the government, because the earning from fares can only support a portion of the investment and operation costs. Such large subsidies would be against the principle of economic efficiency and a heavy burden on public finance. Public transportation subsidies can be justified on the basis that they will help provide basic mobility for the majority of the population, a prerequisite in achieving human rights like the rights to work , to rest and to be educated. More importantly, subsidies will result in positive external economic benefits. The development of public transportation will promote energy saving, reduce congestion, and improve environment. Furthermore, the development of public transportation will maximize the economic and environmental benefits of public transit investments by encouraging a greater density of development within walking distance of stations and therefore increasing real estate values. If all external benefits are taken into account, subsidising public transportation is more convincing.

b) Defining the Priority of Public Transportation

Public transportation is given priority by the central government. In October 2005, the General Office of the State Council released the *Notice of Giving Priority to the Development of Urban Public Transport* by the Ministry of Construction and other five ministries (*Guobanfa No.46[2005]*). *Guobanfa No.46[2005]* belongs to Minstry Rules(Bumen Guizhan) which has no external legal effects. It is the first official document to give priority to public transportation. The State Council is drafting a Regulation on the Public Transportation to promote the development of public transportation.

Do all forms of public transportation deserve to enjoy this development priority? It is evident that not all the public transportation in the general sense could and that the concept of

"public transportation" needs further restrictions. Environment-friendliness should be considered critical criteia in determining which kinds of public transportation can enjoy the priority. Scheduled airline services have never been viewed as an environment-friendly form of transportation and thus should be excluded from the types of "public transportation" that would have priority. Although the taxicab can reduce private car ownership and usage to some extent, it has no significant environmental advantage over private cars, since it cannot convey more passengers than a private car. Thus, taxicabs do not belong to the prioritised public transportation that can be given all priorities, either, it can be given part of the priorities.

The priorities of public transportation involve: priority in planning, priority in the investment of public funds and tax policy, and priority in the road use.[578]

aa) Giving Priority to Public Transportation in Planning

Priority for public transportation should be implemented first in planning. This would require the planner to give public transportation priority in the comprehensive transportation planning by allocating more resources such as road space, money and parking spaces to public transportation.

According to *Guobanfa No.46[2005]*, city governments are required to set up a public-transportation-oriented model of urban development & land use by drawing up and implementing comprehensive transportation plans, special plans for public transportation and special plans for trajectory transportation. According to *Guobanfa No.46[2005],* a comprehensive transportation plan is an indispensable part of urban planning. It should put emphasis on public transportation, including public traffic structure, the distribution of lines and networks, the layout of stations, land use, construction plans, etc. Moreover, city governments are required to strongly support the drawing up and implementation of special plans for public transportation, to include funding for these plans in the yearly budget, to take measures to avoid and correct the behaviour that would infringe on the plans by encroaching on public transportation infrastructure or land used for public transportation.

[578] *Shao Zu-feng*, Sci-Technology and Management (Keji he Guangli) Nol.32，2005(4):39-40.

bb) Giving Priority to Public Transportation in Public Funding

Prioritizing public transportation in the city's comprehensive transportation plans is the first important step in promoting the development of public transportation. But this alone cannot effectively promote the development of public transportation to the extent needed. Development also needs long-term, sustained funding support from public finance. Conventional funding practices tend to favour investments in transportation by private cars, with the public investment devoted to the construction of highways, expanding roads, subways, and other such facilities. However, such investments are likely to result in a surge of private car use and lock a city into a high level of automobile-dependency. In order to promote further development of public transportation, funding for public transportation plans should be considered over transportation plans that mainly favour the private car owners.

In *Guobanfa No.46[2005]*, local city governments are required to give necessary funding support to the development of public transportation. The use of special public funds such as the Infrastructure Fund should lean more towards the public transportation. Local city governments are also required to provide subsidies to public transportation companies to make up the deficits. These requirements on local governments are also written into the Draft Regulation on Public Transportation.

As a public utility, the public transportation sector is a non-profit sector. This has been written in Article 3 of the Draft Regulation on Public Transportation. The public transportation sector has the obligation to provide universal transportation services for all citizens. This universal obligation involves not only the offer of particular public transport routes, which in a free market would not attract sufficient revenue to be viable, but also special mobility services for certain social groups, such as the elderly, people with disabilities, students and so on. Moreover, the universal obligation also refers to the affordability of public transportation. To accomplish the universal obligation, the public transportation sector needs public investment and subsidies from the public finance. However, these subsidies for the public transportation are always criticized as being inefficient and a heavy long-term burden on public finance. One way of dealing with this challenge of financing is to introduce competition in the operation of public transportation. Furthermore, to ensure a long-term, stable, and abundant capital for public transportation, it is necessary to conduct a tax and public finance reform. The following measures should be considered and acted upon collaboratively by the central and local government:

a) Require the expenditure on public transportation in the budgets of central and local governments to be not less than that on car transportation.

b) Introduce a fuel tax , as well as a pollution tax , and give the revenue to public transit in both central and local governments.

c) Transfer sales taxes for automobiles that are fuel-inefficient to public transportation as well as to consumers who purchase high-efficiency cars (gasoline/electric hybrid).

d) Allow local governments to increase registration fees for passenger vehicles & trucks or introduce a VQS and transfer the revenues to public transit .

e) Introduce congestion fees in some cities and transfer revenues to public transit.

In the end, the most active measures to provide long-term, abundant and stable financial support for public transportation is to internalize its external positive effects. This initiative has been successful in Hong Kong and can be put into effect in some other cities in China. In densely-populated cities, the development of public transportation projects usually increases the price of real estate surrounding the public transportation station. Hongkong seizes and reassigns development rights within a certain distance surrounding stations to public transportation operators. In this way, the Hong Kong public transportation system has seen economic profits.

cc) Giving Priority to Public Transportation in Road Usage

Another important method to promote the development of public transportation is giving the transit vehicles priority in road usage. Due to limited funding and environmental concerns related to constructing new facilities, priority of public transportation in road usage is an efficient way to promote development of public transportation, especially in developing countries where railway transit is too expensive for most cities. There are different strategies to giving public transit priority. Choosing which strategy to employ depends on the local transportation situation of a city. Thus it is at the discretion of the local government.

The strategies for implementing priority include those based on facility design and those relying on traffic control. The facility design strategy normally consists of exclusive lanes for transit on arterial or "bus only" streets, as well as street designs that facilitate safe expeditious loading, and reduce conflicts with transit vehicles entering and leaving the traffic stream.[579] A good example of this kind of strategy is the BRT system, in which an allocated bus-lane is

[579] *Skabardonis*, Control Strategies For Transit Priority, Research Report Issued by Institute of Transportation Studies(University of California, Berkeley), 1998, available at: http://repositories.cdlib.org/its/path/reports/UCB-ITS-PRR-98-2, p.2.

separate from all other traffic modes.[580] Traffic control measures range from changes to fixed-time traffic signal settings that will make transit signal pre-emption at specific intersections possible, and to system-wide priority based on integrated automatic transit vehicle location/monitoring systems and real-time traffic control systems,[581] which include Traffic Signal Pre-Emption, Transit Priority Traffic Signals, Passive Traffic Signal Priority, Exemptions from Prohibited Turns, etc.[582]

The priority of public transportation in road usage is stipulated in the *Guobanfa No.46[2005]*. In part VI, the local governments are encouraged to take different kinds of measures, including those relying on facility designs and traffic control, to give public transportation priority in road usage, the development of public transportation.Which specific measures to use depends on the local government.

dd) The Relativity of Priority of Public Transportation

Public transportation only has a priority over the transportation based on private cars. It should not enjoy any priority over emergency vehicles, walking or cycling. Emergency vehicles have absolute priority in transportation, while walking and cycling are even more environment-friendly transportation means than public transportation. Some cities such as Zhuhai restrict the transportation means of cycling in the name of public transportation, however, this is not consistent with the goals to give public transportation priority.

[580] *Zhou Yi*, Urban Vehicles(Chengshi Chelian)，2005(4):25.
[581] *Skabardonis*, Control Strategies For Transit Priority, Research Report Issued by Institute of Transportation Studies(University of California, Berkeley), 1998, available at: http://repositories.cdlib.org/its/path/reports/UCB-ITS-PRR-98-2, p.2.

[582] *Ibid.,* p.2.

H. Conclusion

I. The Commitment Model of Developing Countries in the International Climate Protection Treaties

The effective participation of developing countries, in particular the rapidly industrializing countries such as China and India, plays a significant role in climate protection. The non-binding, action-based commitments of developing countries in the UNFCCC and the Kyoto Protocol nevertheless have their limitations in promoting the effective participation of developing countries in climate protection.

From the perspective of developing countries, "equity" is the most important criterion in the discussion of commitments in future international climate protection treaties. There are two important fields of international climate treaties: adaptation and mitigation. As far as adaptation is concerned, "historical contribution" should be the main equity-based principle dealing with the issue of obligations. In this case, "retributive justice" means that those who cause the damage have the responsibility to make amends for it and to shoulder the costs for reducing the damage and risk. On the other hand, in"distributive justice", the distribution of GHG mitigation obligation is directly related to the right to use the "limited assimilative capacity" of the earth's atmosphere. "The equal per capita entitlement" should be the main criterion to used to determine the emission rights and corresponding mitigation obligation, because the equal development rights of all human beings on the planet should not be deprived.

The GHG emissions per capita of most developing countries are lower than the world average level. Therefore, more concern should be given to the commitments of a developing country in future international climate treaties before its emissions per capita reach the world average level. It is justifiable to involve a developing country in a commitment regime. According to the text of UNFCCC, developing countries cannot be shielded from any effective mitigation commitments, notwithstanding that they are able to rely on "the principle of common and differentiated obligations" to make their commitments contingent upon the fulfillment of financial and technology transfer obligations as well as the leadership of developed countries.

The commitment model of developing countries is a key issue for the participation of developing countries. Legally-binding commitments mean that if a developing country cannot fulfill its commitments, it must bear corresponding legal consequences. But the capacity of punitive legal consequences to deter non-compliance and to induce a party to return to compliance is limited in the area of climate protection, as the non-compliant party may choose to back out of the climate treaties. Non-binding commitments can promote the effective participation of developing countries in the GHG mitigation, if the "capacity building" can be strengthened and the achievement of commitments can be encouraged through the transfer of funds and technologies from developed countries. Not all target-based commitments are more climate-effective than action-based commitments. A loose target-based commitment may be less climate-effective than an action-based commitment, in particular, if an action-based commitment is defined as specific and measurable.

There are four possible mitigation commitment models for developing countries the future climate treaties: legally binding target-based commitments, non-binding target-based commitments, legally binding action-based commitments, and non-binding action-based commitments. Legally binding target-based commitments are perceived more climate-effective than the other three models. However, it is unfair to require a developing country to assume this type of commitments and punish it under non-compliance before its emissions per capita reach the world average level, because it is inconsistent with the criterion of "the equal per capita entitlement" to GHG emissions. Non-binding target-based commitments and legally binding action-based commitments can both play an important role in the promotion of effective participation of developing countries, if "capacity building" can be strengthened and the achievement of commitments can be encouraged through the transfer of funds and technologies from developed countries, and if action-based commitments are defined specifically and measurably. In addition, these two types of commitments are consistent with the criterion of "the equal per capita entitlement" to GHG emissions.

II. Climate Protection within the Legal Framework of China

The state has the duty to protect climate. First and foremost, the state is obliged to implement its commitments as stated in the international climate treaties. The state's duty to protect climate can also be directly inferred from Article 26(1) CC. According to Article 26(1) CC, the state has the duty to take measures to protect climate, and the measures adopted

by the state should be effective enough so that the public hazards due to climate change can be kept under control or be prevented.

However, it is difficult to define the "effectiveness" of climate protection from the perspective of national legal system. In China, the state has other more urgent duties to acomplish, such as to fulfill the people's basic needs, to ensure energy security, and to address environmental problems directly related to the people's health. These duties are usually used as arguments for the insufficiency in climate protection. The investigation of the relationship between climate protection, provision for the people's basic needs, energy security and environmental problems directly related to the people's health illustrates that there are two requirements necessary for the "effectiveness" of climate protection. One is to restrict luxurious emissions by making the luxurious emitters pay for the external costs or by other regulation instruments. Another is to give policy priority to synergistic, comprehensive policy rather than a policy which promotes one policy aim while sacrificing other policy aims.

China is taking significant action to reduce its GHG emissions. Important political programmes and legislations include CNCCP, REL and ECL. However, there is no law directly internalizing the external costs of GHG emissions. In future legislation, economic instruments should be introduced to internalize the external costs of GHG emissions, especially luxurious GHG emissions. The legal and political structure is an important factor that should be taken into account in the choice of regulation instruments. Under the present legal and political structure, a carbon/energy tax would be a more appropriate instrument to control the GHG emissions in China than an emissions trading system.

III. The Regulation of Road Transportation

1. The Regulation of Road Transportation and Climate Protection

Road transportation plays an increasingly important role in climate protection, especially for a country like China that is in the process of rapid motorization. GHG control and other national and local policy aim are not always consistent with each other. Nevertheless, as far as the long-term development of Chinese transportation, GHG control and other national/local issues can be addressed with an integrated strategy. One important dimension of this integrated strategy is to avoid being locked into a transportation model with a high level of car dependency, while developing a balanced multi-model transportation system. Another is to

promote automobiles with less GHG emissions and the automobile fuelled by renewable energy.

2. Regulations on Automobiles

Technology-based Regulations

Technology-based regulations on automobiles are crucial in reducing the amount of GHG emissions from road transportation. One approach of technology-based regulations is to reduce GHG emissions per kilometer through the technology standard. Although China has not adopted a mandatory technology standard to directly regulate the GHG emissions of automobiles, the mandatory fuel economy standards can contribute to the reduction of GHG emissions. Another approach of technology-based regulations is to promote the development of automobiles fuelled by alternative energy.

The local, national, and international environmental problems cannot be solved without the development and utilization of new, green automobile technology. However, over-reliance on technology-based regulations will bring about social and environmental risks in China due to their limitations. Technology-based regulations can be successful in reducing GHG emissions only on the condition that the development of cost-effective green technology can keep pace with the growth of transportation activity. This is impossible if a transportation system with high level car dependency cannot be avoided and the external costs of automobiles use cannot be internalized.

Regulations on Automobile Ownership and Usage

Non-technology-based regulations aiming at influencing the behavior of citizens can play a significant part in the control of GHG emissions and other negative effects of rapid motorization. These non-technology-based regulations can be classified according to focus into regulations on automobile ownership and regulations on automobile usage.

The most direct and perhaps the most effective method to reduce the car dependency level is regulating the total number of automobiles in a city, which can be carried out by levying extraordinarily high registration fees or adoption of VQS. However, the research has shown that this direct regulation on automobile ownership may face a problem of legality. It imposes a strong restriction on the property rights and economic freedoms of enterprises. However,

such restriction has proved to be the most effective to control the negative effects of automobiles. It can be justified in huge cities with an extraordinarily high population density such as Hong Kong and Shanghai, because other approaches cannot ensure that excessive automobile use can be avoided and that the rights of non-motorists will not be infringed opon.

A more moderate approach to regulate automobile ownership is to regulate the ownership structure rather than the total number of automobiles. In China, promotion of vehicles with low emissions and vehicles fuelled by renewable energy should be adopted as a national policy. The reform of the automobile consumption tax is a successful step to steer automobile ownership structure. Using economic instruments in this way confronts no legal obstacles and should be further strengthened. In particular, the combination of economic instruments and technology-based regulation can effectively promote the development of vehicles with low emissions or vehicles fuelled by alternative energy, as well as discourage ownership of automobiles with high emissions.

A fuel tax has been introduced in all member countries of the OECD. It plays an important role in internalizing the social costs of automobile use. The fuel tax reform is the most important step to regulate the external negative effects of automobile use, and thus should be carried out in China as quickly as possible. Moreover, congestion fees should be considered in some cities to regulate the usage of automobiles.

In conclusion, in order to effectively address the GHG emissions and other external negative effects of automobiles, both technology-based regulations and non-technology-based regulations should be adopted in China. Some regulations can be justified on the national level, such as the fuel tax, the automobile consumption tax and the fuel economy standards. But some regulations can only be introduced in a certain city in consideration of its special local conditions, such as the VQS, congestion fees etc. To better implement the integrated regulations, national legal criteria should be established for the regulations of automobile. On the other hand, the local states organ should also be given the discretion to adopt active policies that match their specific conditions.

3. Promotion of Climate-Friendly Means of Transportation

Bicycles and public transportation are the first two important means of transportation for most of the citizens in China up to now. Both are climate-friendly and have much less negative external effects, and thus should be promoted. But these two transportation means are threatened by unfair regulation influenced by the "automobile hegemony". To promote the use of bicycles, the bicyclists' right to use the public road should be ensured in regulations of road transportation and in the planning process of public roads. Due to its positive external effects, public transportation should be given priority in the planning of transportation systems, in public funding and in road use.

IV. Outlook

Negotiations on the international climate treaties after 2012 has not made a significant breakthrough up to now. If the USA could assume legally-binding target-based mitigation commitments in the future, then the involvement of developing countries in the commitment regime would be the pivotal for the success of global climate law . As far as the participation of developing countries is concerned, "graduation" is a good concept that defines a pathway for developing countries first to participate in the commitment regime and then to assume progressively more stringent commitments. Legally binding action-based commitments and non-binding target-based commitment are appropriate types for developing countries to take in the next step. They can make an effective contribution to the GHG control in developing countries, especially for developing countries with low level per capita GHG emissions like China and India. The important issue is how to establish an effective compliance mechanism to stimulate the participation of developing countries in GHG mitigation.

Even without legally binding mitigation commitments, China has taken actions to protect the climate. Although the state has many urgent duties to fulfill, climate protection should not be underestimated or neglected in public decision-making, especially when synergistic policies are available. There is still a long way to go for the "effective climate protection" in China. Energy/carbon tax reform is the next important step, followed by emissions trading system. Nevertheless, what kind of measures are appropriate should be determined from case to case. The case study on road transportation regulations shows that many legal and political obstacles exist for the integration of climate protection concern in the national and local legal systems. Legal and political obstacles also exist in other sectors, which need further studies.

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