

On Regulating Chinese Consumer Environmental Behaviour to Reduce Global Warming: Some Reflections

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Abstract. Low-carbon consumption is inevitable for international societies to respond to reduce global warming because it restricts the generation of carbon emissions from the consumer's side. The consumption behaviours of Chinese consumers are identified as having high level of waste, excessive energy demand, lack of awareness and unreasonable consumption. These high-carbon consumption behaviours should be subject to effective regulatory measures imposed by the Chinese government. This article explores the current policies and practices of China in promoting low-carbon consumption and suggests the Chinese government make clearer rules and standards for the labelling and public procurement of low-carbon products and service expand low-carbon development pilot programs in China and strengthen the education of Chinese consumers.

Keywords: Low-carbon consumption, global warming, consumer policy in China, carbon emission, carbon labelling, public procurement, pilot programs

1. Introduction

Climate change has become a pressing global challenge confronting the international community. The recent Synthesis Report from the Intergovernmental Panel on Climate Change highlights that the existing degree of global warming has resulted in more frequent and perilous weather disruptions for both humanity and the Earth, and the achievement of the 1.5°C commitment established by the Paris Agreement demands imperative efforts from all sectors and individuals at all levels.¹ It is therefore recommended that all States adopt 'rapid and far-reaching transitions across all sectors and systems' to attain significant and permanent reductions in Greenhouse Gas (GHG) emissions and ensure a viable and enduring future for everyone.² Among a wide range of mitigation and adaptation options, the change of consumer behaviour is an effective way to reduce GHG emissions and

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1 IPCC, *Climate Change 2023: Synthesis Report – Summary for Policymaker* (Report, 2023) 4-7.

2 *Ibid.*, 28.

build a low-carbon society.³ It has been estimated that household consumption contributes around two-thirds of the GHG emissions.⁴ It follows that consumers have a significant role to play in the achievement of ‘responsible consumption and production’.⁵ Low-carbon consumption (LCC) behaviour should therefore be promoted to mitigate GHG emissions.

China is rated as the largest contemporary carbon emitter in the world.⁶ In 2020, carbon emissions in China hit around 9.9 billion tons, making it the only major State that maintained a positive carbon-emission increase rate.⁷ To fulfil the 1.5°C international commitment, China has set its carbon peak target by 2030 and carbon neutrality target by 2060 (Dual Constraint Targets)⁸ and aims to achieve a low-carbon economy (LCE).⁹ In this context, plenty of literature has provided suggestions on how to transit the Chinese economy to an LCE.¹⁰ For instance, many scholars investigated and found the implementation of Chinese low-carbon pilot programs (LCPPs) have significantly helped in reducing environmental pollution and carbon emissions.¹¹ Some studies further examined the impacts of LCPPs on the carbon emissions in certain industrial sectors.¹² Some researchers collected data to assess on the impacts of LCPPs on the overall economy in China.¹³ Furthermore, some Chinese scholars started to research into the low-carbon practices of residents and corporations in China. For instance, Wang and Zhang examined the behaviour of residents in relation to electricity consumption, transportation, purchase of low-carbon products, and E-waste recycling.¹⁴ Sun and Wang conducted an empirical study of the impacts of China’s LCPPs on the low-carbon lifestyle of Chinese families with a special focus on household carbon emissions.¹⁵ Yang et al. also conducted an empirical study of China’s green consumption policies made from 1989 to 2019.¹⁶ They found that the focuses of green consumption policies in China had evolved from pollution control and clean production to circular economy and ecological environmental protection, and that Chinese scholarship had also started to research into green labelling, energy ecological cycle, LCE and social participation.¹⁷

Nonetheless, these studies focus on the implementation effects of enacting green consumption policies in China, rather than delving into the underlying motives driving the formulation of these policies by the Chinese government. In addition, the Chinese government has set new goals as reflected in recently published Chinese LCC policy documents. Because the promotion of LCC among consumers through the proper exercise of regulatory power is a delicate task, this study attempts to provide recommendations to the Chinese government for the making of informed policies and decisions to promote LCC behaviour. Accordingly, the second section below delineates

- 3 Fagang Hu, et al., ‘Analysis of Consumers’ Green Consumption Behaviour against the Background of “Carbon Peak, Carbon Neutrality”—Based on Survey Data from Anhui Province’ (2023) 15 *Sustainability*.
- 4 United Nations Environment Programme, *Emissions Gap Report 2020* (Report, 9 December 2020) 62.
- 5 In 2015, the United Nations adopted 17 Sustainable Development Goals. Three of these goals aims at dealing with the negative impacts of global warming, including affordable and clean energy, responsible consumption and production, and climate action. See United Nations, *The Sustainable Development Goals Report* (Report, 2016).
- 6 Wang Min, ‘Putting a Limit on Energy Demand due to Carbon Peaking and Carbon Neutrality Goals is not Necessary’, *Think China*, (2 November 2021) <http://www.china.com.cn/opinion/think/2021-11/02/content_77846305.htm>.
- 7 ‘Analysis of the Total Amount and Structure of Global Carbon Emissions, The World is Having Emission Reduction except the Increase in One Country’, *OFweek*, (14 July 2021) <<https://ecep.ofweek.com/2021-07/ART-93010-8420-30509566.html>>.
- 8 *Long-term Low Greenhouse Gas Emission Development Strategies* (Report, 28 October 2021) 8.
- 9 Notice of The State Council of the People’s Republic of China on Issuing the ‘14th Five-Year Plan’ Comprehensive Work Plan for Energy Saving and Emission Reduction (People’s Republic of China) State Council, Order No 33, 28 December 2021.
- 10 Xuetao Sun and Zhenhua Wang, ‘Can Chinese Families Achieve a Low-Carbon Lifestyle? An Empirical Test of China’s Low-Carbon Pilot Policy’ (2021) 9 *Frontiers in Energy Research* <<https://www.frontiersin.org/articles/10.3389/fenrg.2021.655733/full>>.
- 11 Botao Jiang, et al., ‘China’s Low-Carbon Cities Pilot Promotes Sustainable Carbon Emission Reduction: Evidence from Quasi-Natural Experiments’ (2022) 14 *Sustainability*; Jinhua Cheng, et al., ‘Can low-carbon city construction facilitate green growth? Evidence from China’s pilot low-carbon city initiative’ (2019) 231 *Journal of Cleaner Production* 1158–1170.
- 12 Xiaoling Ouyang and Boqiang Lin, ‘An analysis of the driving forces of energy-related carbon dioxide emissions in China’s industrial sector’ (2015) 45 *Renewable and Sustainable Energy Reviews* 838–849.
- 13 See above n 10.
- 14 Zhaohua Wang and Bin Zhang, *Low-Carbon Consumption in China: Residential Behavior, Corporate Practices and Policy Implication*, Science Press and Springer Nature Singapore Pte Ltd, 2020.
- 15 See above n 10.
- 16 Menghua Yang, Hong Chen, Ruyin Long, et al, ‘Overview, Evolution and Thematic Analysis of China’s Green Consumption Policies: A Quantitative Analysis Based on Policy Texts’ (2020) 12 (20) *Sustainability*.
- 17 *Ibid*.

the detrimental impacts of Chinese consumers' consumption behaviour on the high level of GHG emissions in China. Following that, the third section expounds on the rationale behind China's need to implement regulations to guide consumer behaviour in terms of LCC. The fourth section outlines the evolution and challenges of China's regulatory practices concerning LCC. Lastly, the fifth section proposes actionable steps for the Chinese government to consider for promoting LCC behaviour among Chinese consumers.

2. The Impacts of Consumer Behaviour on GHG Emissions

In China, the negative impacts of consumer behaviour on the high level of GHG emissions result from unreasonable consumption, enormous waste, misconception about packaging, and misconnection between 'green' and 'environmentally friendly' products. Generally, unreasonable consumption behaviour occurs when consumers consume excessively and disregard consumption waste. Chinese consumers display reluctance in recycling and reusing, preference over one-off products, high frequency of apparel purchase, food waste, and excessive food demand.¹⁸ The high level of consumption waste not only stimulates excessive production, but also exacerbates carbon emissions during the waste disposing process.¹⁹ One example of unreasonable consumption can be found in the automobile industry of China. In 2008, the Chinese government started a tail rego number line restriction system to alleviate serious traffic jams during peak hours and to reduce its impact on air condition.²⁰ However, the system ended up with consumers purchasing more cars with different tail rego numbers and a massive increase in vehicle transactions.²¹ The purchase of multiple petrol cars with different rego numbers was the result of non-awareness or ignorance of the regulative intent. As a follow-up measure, the Chinese government started subsidising new energy vehicles rather than expecting fewer vehicle purchases.²² However, significant subsidies led to much lower car prices, resulting in further increase in vehicle transactions.²³ Although new energy vehicles emit substantially less carbon compared with the amount emitted by petrol vehicles, the excessive demand of new energy vehicle will also result in high carbon emissions, let alone the carbon emitted during the production process.²⁴ According to a report issued by Deloitte in 2022, the major reasons for Chinese consumers to purchase new energy cars are the lower costs and less traffic restrictions, rather than the awareness of impact on the environment.²⁵

In addition to unreasonable consumption, enormous waste has a detrimental impact on GHG emissions. For example, live streaming has become one of the major business models in China,²⁶ and Internet influencers' promotion of 'environmentally friendly lifestyle' has caused Chinese consumers to produce more waste. That is, Internet influencers often introduce products they believe to be environmentally friendly and encourage viewers to buy them. However, when consumers buy those products, they usually throw away the ones that are currently in use, resulting in high level of waste. Moreover, Chinese consumers tend to demand 'green' products more than they need, presuming that there will be no harm to the environment as long as the products are marked 'green'.²⁷

18 Li Xiang, *Research on Low-Carbon Consumption Legislation*, (People's Publishing House, 2017), 9-10; Xu Wei, *Research on Administrative Law and Regulation of Low-Carbon Consumption*. (People's Publishing House, 2015), 37-8.

19 Lian Hongping, Wang Dechuan and Li Hui, 'Waste sorting and its effects on carbon emission reduction: Evidence from China' (2020) 18 *Chinese Journal of Population, Resources and Environment* 26.

20 On odd-numbered dates, only private cars with an odd number at the end of the vehicle rego number can go on the road, and on even-numbered dates, only private cars with an even number at the end of the vehicle rego number can go on the road. The system aims to encourage residents to take public transportation.

21 Cao Jing, Wang Xin and Zhong Xiaohan, 'Has the travel restriction police improved Beijing's air quality?' (2014) 13 (3) *China Economic Quarterly* 1092.

22 Zhao Wenbo, 'Review of New Energy Vehicle Subsidy History' (CCiD, 19 January 2022) <<https://www.ccidgroup.com/info/1105/34179.htm>>.

23 Ibid.

24 Yu Cong, 'New energy vehicles reduce carbon emissions by 15 million tons per year, but reduce fuel consumption of fuel vehicles is equally important' (Caixin Global, 21 January 2022) <<https://www.caixin.com/2022-01-21/101833293.html>>.

25 Deloitte, *2022 Global Automotive Consumer Study* (Report, 2022).

26 Liu Linrong and Wang Lan, 'A Study on the Influence of Consumer Purchase Decisions from the Perspective of Live Streaming Business' (Modern Business Magazine, 28 October 2021) <<https://www.xdsyzzs.com/shangyeliutong/7111.html>>.

27 Li (n18), 69.

Therefore, if new ‘green’ products are trended online, Chinese consumers will buy them and throw away the old ones, which further increases the amount of waste.²⁸ The huge amount of waste, in turn, will cause more GHG emissions.

Furthermore, the misconception of consumers about packaging has a harmful impact on GHG emissions. Chinese consumers usually look for good bargains and opt to purchase what they believe is useful and necessary. A recent report reveals that Chinese consumers plan their consumptions more carefully due to income decrease since the COVID-19 pandemic.²⁹ Nonetheless, there is the trend that Chinese consumers want to pursue quality life and are willing to pay a premium for high quality products.³⁰ Their desire for good bargains and their willingness to pay more for a quality life has led producers to develop products prestigious in look but convenient in use. For example, when consumers purchase products packed in nice boxes or individual packaged product, they can experience apparent ‘improvement’ in life. However, in terms of carbon emission control, packaging of such sorts is considered excessive and will result in unnecessary carbon emissions.

On top of these, Chinese consumers’ confusion about ‘green’ and ‘environmentally friendly’ products has not improved the situation of GHG emissions in China. A survey conducted in 2017 revealed that some Chinese consumers believed that they had chosen to live in an environmentally friendly way because they purchased only products that are beneficial to their health, such as foods labelled with organic or green products.³¹ This belief is under the wrong perception that ‘green products’ which are good for health are the same as products that have less negative impact on the environment. In a recent report issued by Deloitte, ‘food and beverage’ was the only sector where more than 50% of Chinese consumers cited ‘environmental friendliness’ as a top consideration in making purchases,³² indicating a misconnection between the concepts of ‘green’ and ‘environmentally friendly’. This misconnection will not lessen the emissions of GHG emissions in China.

In a nutshell, Chinese consumers’ consumption habits tend to lead to high GHG emissions. In *Mapping the Low-Carbon Development in China 2020–2050*, the lack of knowledge about the relationship between environmental impact and consumption behaviour is identified among Chinese consumers.³³ As of now, China has paid most of its attention to the production side of an LCE, such as facilitating energy transition, encouraging technology innovation and increasing energy efficiency.³⁴ If Chinese consumers do not change their behaviour voluntarily due to unreasonable consumption, enormous waste, misconceptions about product packaging, and misconnection between ‘green’ and ‘environmentally friendly’ products, the government should consider whether it should intervene by enacting legislation to promote LCC.

3. The Necessity of Regulating Consumer Behaviour

It is widely recognised that consumer behaviour should be changed to reduce the GHG emissions.³⁵ For instance, Habib et al maintained that the change of consumer behaviour should focus on change of lifestyle, reduction of luxury consumption, and waste control.³⁶ As such, the facilitating role of consumers in reducing GHG emissions is increasingly clear. For China to become an LCE, it is necessary to regulate consumer

28 Wang Guan, ‘Network to Promote Consumerism? Encouraging Consumption should not become Encouraging Wasting’ (People’s Daily, 24 April 2015) <<http://media.people.com.cn/n/2015/0424/c40606-26896988.html>>.

29 Deloitte, 《2023 中国消费者洞察与市场展望白皮书》[‘2023 Insights on Chinese Consumers and Market Vista White Paper’] (report, 2023), 6-7. (Insights and Vista). Iresearch, 《2023 年中国消费者洞察白皮书》[‘2023 Insights on Chinese Consumer White Paper’] (report, 2023) 12. (Insights)

30 *Insights*, n 29, 16.

31 ‘Chinese consumers’ consumption concept of green products’ (Hong Kong Trade Development Council, 21 December 2017) <<https://research.hktdc.com/sc/article/NDkwMTUxNTI3>>.

32 *Insights and Vista*, n 29, 23.

33 *Mapping the Low-Carbon Development in China 2020-2050*, (Blue Paper, 2021) 392.

34 *Medium to Long-Term Development Plan for Renewable Energy*, (Report, 2007).

35 Rishad Habib, et al., ‘Shifting consumer behaviour to address climate change’ (2021) 42 *Current opinion in psychology* 108-13; Victoria K. Wells, Cerys A. Ponting and Ken Peattie, ‘Behaviour and climate change: Consumer perceptions of responsibility’ (2011) 21 (7-8) *Journal of Marketing Management* 808-833

36 Habib (n35) 108-113.

behaviour because Chinese consumers should share environmental responsibility, the government should execute its regulatory role, and it is advisable to avoid a possible tragedy of commons.

1. Sharing the Environmental Responsibility

In China, manufacturers and service providers are required to offer low-carbon products and services. For instance, *the Law on the Protection of the Rights and Interests of Consumers* imposes legal duties and liabilities on business operators to provide safe products that will not jeopardize the lives of consumers.³⁷ However, consumers should not be spared their share of responsibility in the reduction of GHG emissions. Where there is a conflict between private interests and public interests, consumers should be expected to ‘think bigger’ and actively participate in the formation of an LCE. Therefore, Chinese consumers should have the legal obligations to ‘raise their awareness of environmental protection’ and to ‘adopt low-carbon and economical lifestyles’.³⁸ These obligations can be imposed based on the Constitution and statutory provisions.

According to the Chinese *Constitution*, the State ‘saves and opposes waste’,³⁹ which provides a constitutional basis for developing legislative activities regarding environmental protection and resource preservation. Regarding environmental protection, article 6 of the *Environmental Protection Law* (EPL) provides that all entities and citizens have the obligation to protect the environment.⁴⁰ Consumers are accountable for any environmental damages caused by their actions under the ‘polluter pays principle’ (PPP): Those who have caused pollution have the responsibility to prevent damage to human health or the environment.⁴¹ Moreover, article 7 of the *Atmospheric Pollution Prevention and Control Law* requires citizens to ‘increase their awareness of protecting the atmospheric environment, take on low-carbon and economical lifestyles and to voluntarily fulfill their obligation of protecting the atmospheric environment’.⁴² Therefore, consumers should be responsible for bearing the environmental costs arising from their consumption of products that contribute to GHG emissions. In addition, consumers should fulfill their obligation to protect the environment by actively taking actions to help reducing direct or indirect GHG emissions.

As for resource preservation, article 10 of the *Circular Economy Promotion Law* (CEPL) stipulates that ‘citizens shall consume resources in a reasonable way’.⁴³ Article 9 of the *Energy Conservation Law* states that ‘all the entities and individuals shall fulfill the obligation of energy conservation and have the right to report the acts of wasting energy resources’.⁴⁴ The recently issued *Anti-Food Waste Law* also requires individuals to ‘pursue socially responsible, healthy, rational and green consumption’.⁴⁵ These statutory provisions impose an obligation on consumers to avoid unnecessary consumption that exceeds their reasonable needs.

To facilitate the transition into an LCE, a balanced approach combining the consumption and production sides should be taken. Therefore, Chinese consumers’ behaviour should be regulated to reduce GHG emissions because consumers should share environmental responsibility in the face of climate change, and the Chinese government should intervene by playing its regulatory role.

37 Consumer Rights Protection Law of the People’s Republic of China (People’s Republic of China) Standing Committee of the National People’s Congress, Order No 7, 25 October 2013, ch 2-4.

38 Energy Conservation Law of the People’s Republic of China, (People’s Republic of China) Standing Committee of the National People’s Congress, Order No 77, 28 October 2007, art 6.

39 Constitution of the People’s Republic of China 1949, art 14.

40 Environmental Protection Law of the People’s Republic of China (People’s Republic of China) Standing Committee of the Seventh National People’s Congress, 26 December 1989, art 6.

41 Jose Felix Pinto-Bazurco, ‘How to Enforce the Polluter-Pays Principle’ (2022) *International Institute for Sustainable Development*.

42 Atmospheric Pollution Prevention and Control Law of The People’s Republic of China (People’s Republic of China) Standing Committee of the National People’s Congress, Order No 32, 1 September 2000, art 7.

43 Circular Economy Promotion Law of the People’s Republic of China, (People’s Republic of China) Standing Committee of the National People’s Congress, Order No 4, 29 August 2008, art 10.

44 Energy Conservation Law of the People’s Republic of China, (People’s Republic of China) Standing Committee of the National People’s Congress, Order No 77, 28 October 2007, art 9.

45 Anti-food Waste Law of the People’s Republic of China (People’s Republic of China) Standing Committee of the National People’s Congress, Order No 78, 29 April 2021, art 14.

2. Executing the Regulatory Role

In China, the government plays a leading role in economic development and social governance.⁴⁶ LCE is listed on the policy agenda of the Chinese government as a response to climate change. Environmental consumerism, which refers to consumers' purchasing behaviour in favour of the environment, has been accepted as an effective and timely governance philosophy in response to the environmental externals.⁴⁷ Although the concept of sustainable consumption is embedded in the minds of many Chinese people,⁴⁸ and many Chinese consumers may voluntarily adopt a LCC lifestyle, most consumers are not capable of determining what kinds of behaviour should be changed without clear behavioural standards. Therefore, to reduce GHG emission, it is necessary for the government to intervene through regulation to influence the patterns and levels of consumer consumption.⁴⁹ The most effective interventions of consumers' consumption patterns should focus on the directions, such as reflecting carbon footprint in the product prices, promoting climate-friendly products and carbon labelling.⁵⁰

3. Avoiding a Possible Tragedy of Commons

By regulating the behaviour of consumers, the Chinese government will prevent the country from experiencing a tragedy of commons, which refers to an undesirable situation where every individual has incentives to consume common resources at the expense of others, leading to an overconsumption of shared resources.⁵¹ For illustration purposes, a tragedy of commons has occurred in the prevention and management of air pollution in China. Air is considered a commonly held, open-access resource that no individuals would like to have their use of air restricted. Although China has adopted campaign-style governance to prevent air pollution, the long-term mitigation effects of this approach are not significant, because local governments and industries in local jurisdictions have no incentives to establish a long-term mechanism to adhere to this approach.⁵² China's fragmented jurisdictional governance for air pollution has led to inadequate regulation and free-rider problems, and therefore, caused the tragedy of the commons.⁵³

In the case of GHG emissions, a tragedy of commons occurs when there is a limit as to how much can be emitted before catastrophic environmental problems arise.⁵⁴ The amount of GHG emissions emitted by one individual consumer will reduce the potential GHG emissions of others, imposing a negative effect on the environment and adversely impacting other consumers.⁵⁵ At the end, the whole country will be unable to reduce, or even increase, GHG emissions. If the current patterns and levels of consumer consumption do not change, it is likely that China's carbon peak and carbon neutrality targets will not be achieved as planned. Therefore, the Chinese government should act proactively to avoid a possible tragedy of commons in the case of GHG emissions.

As a result, it is time for the Chinese government to pay attention to the consumption side of an LCE and provide behavioural standards for consumers so that they can bear their environmental responsibility. To determine what behavioural standards should be established to change consumer consumption, it is necessary

46 Guo Shuqing, 'The Government's Role in China's Market Economy' (1999), 32(5) *The Chinese Economy* 26-68.

47 Nina Panizzut, et al., 'Exploring relationship between environmentalism and consumerism in a market economy society: A structured systematic literature review' (2021) 2 *Cleaner Engineering and Technology*.

48 Sustainable consumption refers to 'a level of consumption which causes a level of environmental impact over time that does not degrade basic ecosystem services, such as the provision of fresh water, fertile soil, and a protective ozone layer'. See James Salzman, 'Sustainable Consumption and the Law' (1997) 27 (4) *Environmental Law* 1246.

49 Salzman built an analytical framework to examine the roles for government to play in regulating the patterns and levels of consumption. James Salzman, 'Sustainable Consumption and the Law' (1997) 27 (4) *Environmental Law* 1243-1293.

50 John Thøgersen, 'Consumer behavior and climate change: consumers need considerable assistance' (2021) 42 *Current opinion in behavioral sciences* 9-14.

51 Brett Frischmann, Alain Marciano and Giovanni Ramello, 'Retrospectives: Tragedy of the Commons After 50 Years' (2019) 33(4) *Journal of Economic Perspectives* 218-9.

52 Yanchao Feng, et al., 'Campaign-style governance of air pollution in China? A comprehensive analysis of the central environmental protection inspection' (2023) *Frontier in Public Health* 1-12.

53 Shihong Guo and Jiaqi Lu, 'Jurisdictional air pollution regulation in China: A tragedy of the regulatory anti-commons' (2019) 212 *Journal of Cleaner Production* 1054-1061.

54 Li (n18), 83, 110-114.

55 Ibid.

to examine what LCC measures have been undertaken and what challenges have arisen in the reduction of GHG emissions.

4. The Regulatory Developments of LCC and Implementation Challenges

China has started to take actions to promote LCC since 2015, when the *Opinions on Accelerating the Construction of Ecological Civilization* treated green and low-carbon lifestyle and consumption pattern as one of five principles of the construction of eco-civilisation in China.⁵⁶ In 2016, China issued a policy document to provide guidance for the promotion of green consumption, aiming to establish a basic system for LCC.⁵⁷ With the pronouncement of its Dual Constraint Targets, China formulated an Opinion and a Notice to achieve these targets, and the promotion of LCC is one of the directions that the Chinese government would take.⁵⁸ Following the Opinion and the Notice, China released a Plan in 2022 to promote LCC in all aspects of consumers' daily life and build a strong low-carbon awareness among Chinese consumers by 2025.⁵⁹ The Plan also introduced the potential measures that could be useful to promote LCC in the retail, tourist and public service sectors.⁶⁰ Among these measures, carbon labelling, low-carbon public procurement, LCPPs, and public education have been implemented by the Chinese government. Thus far, both progress and difficulty can be found in these four policy areas.

1. Carbon Labelling

Carbon labelling is regarded as a quantitative measure of carbon emissions of a product or service.⁶¹ Carbon labelling allows consumers to make environmentally friendly purchase decisions based on the level of carbon emissions shown in the labels, and the change of their consumption behaviour further encourages low-carbon production (LCP).⁶² China has a variety of environmental protection and energy-saving labelling systems, including the China Environmental Labelling, China Green Product, Energy-Saving Product, and Carbon Product. Enterprises can voluntarily apply for one or more labels for their products or services according to the relevant standards. In addition, China has established and implemented a mandatory energy labelling system by introducing the energy-efficiency information label since 2004.⁶³ In order to bestow on the energy labelling system a more active role in promoting energy-saving consumption, financial subsidies⁶⁴ and energy-efficiency 'top runner' programs⁶⁵ have also been introduced.

56 Opinions of the CPC Central Committee and the State Council on Accelerating the Ecological Civilization Construction, (People's Republic of China) State Council, 25 April 2015.

57 Guidance on the Promotion of Green Consumption, (People's Republic of China) The National Development and Reform Commission, 17 February 2016.

58 Opinions of the CPC Central Committee and State Council on Work regarding the Full and Faithful Implementation of the New Development Philosophy in Carbon Dioxide Peaking and Carbon Neutrality, (People's Republic of China) State Council, 22 September 2021, art 5. State Council's Notice on the Action Plan for Carbon Dioxide Peaking before 2030, (People's Republic of China) State Council, 24 October 2021, sect III, subsect 9.

59 Implementation Plan for Promoting Green Consumption, (People's Republic of China), The National Development and Reform Commission, 21 January 2022.

60 Ibid.

61 Rui Zhao, Dingye Wu and Junke Zhang, 'Policy Implications on Carbon Labelling Scheme Toward Carbon Neutrality in China' (2021) 9 *Frontiers in Environmental Science*.

62 Nan Chen, et al, 'Chinese consumer responses to carbon labelling: evidence from experimental auctions' (2018) 61(13) *Journal of Environmental Planning and Management* 2319.

63 Measures for the Administration of Energy Efficiency Labels, (People's Republic of China), National Development and Reform Commission and State Administration for Quality, Supervision, Inspection, and Quarantine (Order No 35), 2016.

64 'Projects Promoting Energy-saving Products Benefiting the People made outstanding achievements' (China Clean Development Mechanism Fund, 2015) <<https://www.cdmfund.org/11347.html>>.

65 'Energy Efficiency "Top Runner" Implementation Plan' (Energy Label Record, 2015) <<https://www.energylabelrecord.com/userfiles/2/files/cms/article/2017/04>>.

The energy labelling system has been proven effective in promoting both energy-efficient technology development and energy efficiency in the industrial production of China.⁶⁶ Compared with energy labelling, carbon labelling focuses on the disclosure of carbon emission information, which especially aims to reduce global warming while contributing to energy saving and environmental protection. Although carbon labelling seems to be a promising measure targeting reduction of carbon emissions, various problems occur in practice.

Firstly, carbon labelling was incorporated into a unified certification system of green products in 2016 with the purpose of bringing together the separate certification systems of energy-saving, environmental protection, and low-carbon products.⁶⁷ However, the unified system does not contain the necessary criteria and standards to specifically assess and evaluate carbon emissions of the identified green products. In addition, carbon emission information and the related evaluation processes are not treated equally with other elements in the system of green products. The lack of specific standards and processes applicable to low-carbon products shows that carbon labelling has still not been equally emphasised.

Secondly, the major low-carbon evaluation and certification activities are undertaken by the China Electronic Energy-Saving Technology Association (CEESTA), which is a non-governmental organisation (NGO) for the research and consultation of energy-saving technologies. In China, an NGO tends to have limited political space, professional capacity, financial independence, and social recognition.⁶⁸ Therefore, the general principles, evaluation rules and certification procedures made by the CEESTA do not have similar influences as those made by the National Development and Reform Commission (NDRC), the Accreditation Administration of China (CAAC), or the State Administration for Market Regulation (SAMR).

Moreover, the current carbon labelling certification conducted by the CEESTA is only used for some electronic products,⁶⁹ and most of the current carbon labels fail to show the carbon emissions generated throughout the whole production process. The limited scope of carbon labelling certification and the absence of full carbon emission information will result in inaccurate labelling, thereby misleading consumers. In addition, no policies or practices exist to link the price advantage with the purchase of carbon-labelled products. Not knowing the price advantage, consumers' choices rely heavily on low-carbon awareness, which is, as discussed below, quite limited in China, making the effectiveness of carbon labels in promoting LCC questionable.

2. Low-Carbon Public Procurement

The public sectors are regarded as one of the largest consumers due to their considerable purchasing power.⁷⁰ According to a report conducted by the World Economic Forum, governments are directly or indirectly responsible for 15% of global carbon emissions.⁷¹ A green public procurement (GPP) system can significantly reduce carbon emissions and promote LCC on a general basis, because it serves to reduce the public expenditure in high-carbon products and services and demonstrates the leadership of the public sectors in facilitating LCC. Apart from that, GPP is also able to contribute to an LCE since it guides LCP preference:⁷² producers need to supply goods or services that meet carbon emission standards prescribed by relevant GPP guidelines.

In China, the government has an obligation to purchase 'energy-saving, water-saving, material-saving and environmentally friendly products and recycled products'.⁷³ The EPL stipulates that a public institution shall 'take

66 Gongyi Zhang, Chang Zhang and Hongguang Nie, 'An Overview of China's Energy Labelling Policy Portfolio: China's Contribution to Addressing the Global Goal of Sustainable Development' (2021) SAGE Open.

67 Opinions of the General Office of the State Council on Developing a Unified Standard, Certification and Identification System of Green Product, (People's Republic of China), General Office of the State Council, (Order No 86), 2016.

68 Lei Liu, Pu Wang and Tong Wu, 'The role of nongovernmental organizations in China's climate change governance' (2017) 8 (6) *WIREs Climate Change*.

69 China Electronic Energy-Saving Technology Association, *China's Electrical and Electronic Products Carbon Footprint Assessment Standards 2018*; China Electronic Energy-Saving Technology Association, *Carbon Footprint Assessment (First Part): LED Road Lighting Products 2018*.

70 Qi Wang, et al, 'Green public procurement as a promoter for green consumption: From the perspective of individual's knowledge' (2021) 3 *Cleaner and Responsible Consumption*.

71 Joerg Hildebrandt, Børge Brende and Stephan Sicars, *Green Public Procurement: Catalysing the Net-Zero Economy* (White Paper, 2022).

72 Ibid.

73 Circular Economy Promotion Law of the People's Republic of China, (People's Republic of China) Standing Committee of the National People's Congress, Order No 4, 29 August 2008, art 47.

the lead in using energy-saving products and equipment' and purchase those products listed on the inventories of energy-saving products.⁷⁴ Under the GPP, government agencies are required to give priority to the products listed on the Energy Conservation Products (ECP) List and Environmental Labelling Products (ELP) List when they purchase goods or services. Although these two lists are different in terms of certifying procedures, management agencies and ministries-in-charge, they function similarly so far as public procurement activities are concerned: shortlisting products that meet GPP requirements and providing detailed information about these products.⁷⁵ Public authorities can then make purchase decisions based on the information provided on the lists. Currently, the volume of GPP has reached a historical height in China. For example, the governments at the national and regional levels spent RMB 81.35 billion on the products in the ELP list, accounting for 85.5% of the same type of products.⁷⁶

However, the potential of GPP in promoting LCC has not been fully achieved. In China, 80% of GPP comes from the products that are listed in the ECP or ELP lists.⁷⁷ The scopes of these two lists are yet limited without bringing into the selection criteria of low-carbon products and services. Although both lists are supposed to reflect LCC goals, the relevance of low-carbon product standards is not equally emphasised, resulting in insufficiency in promoting an LCE through GPP. Further, in terms of facilitating consumers' LCC through the low-carbon public procurement, there is still little evidence indicating how strong the relationship is between government consumption behaviour and individual purchase decisions.

3. Low-Carbon Pilot Programs

Although low-carbon measures that directly deal with consumers remain lacking until 2022, China has started its attempts to establish low-carbon cities⁷⁸ since 2010 through three LCPPs. The first project (started in 2010) engaged five provinces and eight cities, aiming to: (1) design low-carbon development plans; (2) develop supportive policies; (3) establish a low-carbon industrial system; (4) establish GHG monitoring systems; and (5) promote low-carbon lifestyles and consumption modes through education and public campaigns.⁷⁹ The second project (started in 2012) included 29 cities. Compared with the first LCPP, the second LCPP required identifying the principles of a low-carbon city and determining the corresponding approaches to coordinate different sectors. In addition, each pilot city was required to set its own GHG emission goals.⁸⁰ The recent LCPP started in 2017 and involved 45 cities. This time the focus was to utilise the experiences gained from previous LCPPs to enhance the current work towards a low-carbon city.⁸¹ Overall city management improvement was also expected.⁸²

China's three LCPPs are in an evolving process. They started from exploring every possibility and gradually tightened up with a focused direction. Regarding the project structure, China's low-carbon city initiative are not carried out in a 'one-applies-to-all' way. Rather, it bestows on each city the freedom to develop low-carbon policies in conformity with its development advantages and needs. As to the project tasks, the responsibilities of building a low-carbon city are distributed among three players: (1) the government who makes policies and plays a coordinating role between the other two players; (2) industries who produce, consume, and dispose

74 Energy Conservation Law of the People's Republic of China, (People's Republic of China) Standing Committee of the National People's Congress, Order No 77, 28 October 2007, arts 47 and 51.

75 Benjamin Denjean, et al., 'Green Public Procurement in China: Quantifying the Benefits' (2015) *International Institute for Sustainable Development*.

76 As of August 2023, approximately 81.35 billion Chinese Yuan (RMB) is equal to roughly 11.17 US dollars. See 'International Symposium on Green Public Procurement under Carbon Neutrality Vision & 15th Anniversary of Government Procurement on Environmental Labelling Products held in Beijing' (CEC News, 2021) <<http://en.mepcec.com/mobile/news/cecnews/2022/7722.shtml>>.

77 Mingming Sun and Ke Zhang, 'Enhancing China's green procurement of legal forest products' (2018) 30 (1) *Traffic Bulletin* 23.

78 A low-carbon city is a model of sustainability and is considered as a promoting factor towards low-carbon economy.

79 Notice of the National Development and Reform Commission on Launching Low-Carbon Province and Low-Carbon City Pilot Programs, (People's Republic of China), the National Development and Reform Commission (Order No 1587), 2010.

80 Notice on Launching the Second Batch of Low-Carbon Province and Low-Carbon City Pilot Programs, (People's Republic of China), the National Development and Reform Commission, (Order No 3760), 2012.

81 Notice of the National Development and Reform Commission on Launching the Third Batch of Low-Carbon City Pilot Programs, (People's Republic of China), the National Development and Reform Commission, (Order No 66), 2017.

82 Ibid.

according to the policies made by the government; and (3) individual residents who consume under LLC guidance facilitated by the government. It is worthy to note that in the third pilot project, the promotion of LCC is expressly stated in its guiding principles, but not included as a separated task. Such absence does not indicate that China underplays the negative impact of high-carbon consumption on the LCE. Rather, the tasks of promoting LCC are picked up by independent measures designed in each province. In this way, LCC will receive more concentrated and customised attention by separating the tasks of promoting LCC from the technologically focused LCPPs.

One example of such independent measures is the carbon generalized system of preferences (GSP). The GSP is an incentive mechanism for citizens to value and quantify their reduced carbon emissions, aiming to encourage LCC behaviour.⁸³ It was introduced in several cities as a pilot program.⁸⁴ A good illustration is the GSP platform launched by the Guangdong Province. By engaging in LCC behaviour, citizens earn carbon coins, which can then be used to purchase products on the platform or participate in some charitable activities through the platform.⁸⁵ The GSP, by its very nature, is an upgraded version of guiding measure used to enhance consumer awareness without legally binding force. Although the carbon credit system was formally introduced in July 2021 nationwide to enable carbon transactions between businesses,⁸⁶ it has not been popularised among individual consumers. The central idea behind the personal carbon credit system is that an individual will be given a carbon emission limit and be allowed to trade what is not used under the limit according to different needs. To date, the lingering questions are how to set up the limit for individuals and how to track the carbon emissions caused by individuals.⁸⁷

According to the *Green Book of Climate Change 2021*, the initiative to build low-carbon cities has been proven relatively successful after three LCPPs.⁸⁸ It is also recognised that LCPPs have changed the consumption habits of the residents and reduced the carbon intensity in the pilot cities.⁸⁹ Among all the pilot cities, Shenzhen reached the highest level of low-carbon emissions.⁹⁰ A plausible explanation can be found in its action plans: On the one hand, extensive efforts have been made around technology innovation, city management and industry low-carbon responsibilities.⁹¹ On the other hand, individual low-carbon consumption is also strongly promoted through the individual GSP platform, where many interesting games and rewards are available to encourage individuals to engage in LCC.⁹² The platform was paused in May 2020 for developing more interactive approaches that encourage LCC behaviour, and it is expected that the introduction of the Shenzhen Carbon Emission Trading Management Measures will accelerate the returning of the individual GSP platform.⁹³ Other studies also found that the LCPPs have shaped consumption behaviour of urban households in the country's eastern and central regions, but not in the other parts of the country.⁹⁴ This demonstrates that the implementation of the LCPPs has

83 Liu Hang, 'Carbon GSP: Theoretical Analysis, Experience Discussion and Structural Design' (2018) (5) *Studies on Socialism with Chinese Characteristics* 86, 88.

84 See, eg, Implementation Plan for the Carbon GSP Pilot Work in Hebei Province, (People's Republic of China), the National Development and Reform Commission of Hebei Province (Order 1290), 2018. Implementation Plan for the Carbon GSP Pilot Work in Guangdong Province, (People's Republic of China), the National Development and Reform Commission of Guangdong Province (Order 408), 2015. (*Guangdong GSP*)

85 *Guangdong GSP* n 84.

86 'Official Launch of the National Online Emission Trading System (ETS)' (People's Daily Online, 16 July 2021) <<http://cpc.people.com.cn/n1/2021/0717/c64094-32160646.html>>.

87 Li Boru, 'Longitudinal Analysis of the Development of Personal Carbon Accounts—Taking "Ant Forest" as an Example' (2020) 3(1) *Economics* 17-8.

88 Xie Fuzhan, et al, *Annual Report on Actions to Address Climate Change* (Report, 2021).

89 See above n 10.

90 Ibid.

91 National Centre for Climate Change Strategy and International Cooperation, *Research Report on Low-Carbon Pilot City and Climate Change Planning in Shenzhen* (Report, 2021).

92 Zhou Yajing, Pan Zhiming and Wang Yaling, *Case Studies on Projects Developed by Governments and Enterprises to Promote Individual Low-Carbon Consumption Behaviours in China* (Natural Resources Defense Council, April 2021) 11.

93 Administrative Measures for Carbon Emissions Trading in Shenzhen, (People's Republic of China), The Municipal Government of Shenzhen, 1 July 2022.

94 See above n 10; Shuang Zhou and Chaobo Zhou, 'Evaluation of China's low-carbon city pilot policy: Evidence from 210 prefecture-level cities' (2021) 16 (10) *PLoS ONE*.

regional differences between urban and rural regions, and the effectiveness of the LCPPs in promoting LCC is largely dependent upon the explicit policies made by individual cities.

4. Education to Guide Consumer Behaviour

Promoting consumers' awareness of LCC has become a legal obligation of the country in accordance with the EPL⁹⁵ and the CEPL.⁹⁶ Various policies also set targets to encourage consumers to buy energy-saving or low-carbon products and to adopt green lifestyles. For example, the *Code of Conduct for Environmental Protection (Trial)* provides 10 behavioural requirements for citizens, including eco-environment understanding, energy and resources saving, green consumption, low-carbon transportation, garbage sorting, pollution reduction, ecosystem protection, public engagement, supervision and building a beautiful China.⁹⁷ Although the Code is not legally binding, it still serves as a social norm to every citizen.

In addition, China has also established educational programs aiming to raise the LCC awareness of consumers. For example, National Energy Conservation Week, 5th of June Environment Day, Green Travel Awareness Month, and Public Transportation Awareness Week. China has also incorporated the idea of building an LCE into its school curriculum to raise the LCC awareness in younger populations. Furthermore, carbon-neutral technology forums and relevant science activities are carried out to enhance the concept of LCC in Chinese society and guide the public to consume in a low-carbon way.⁹⁸

However, China's consumer education on LCC has a rural-urban divide. China has predominantly directed its educational efforts toward consumers residing in the urban locales of the eastern and central regions. According to the study of Sun and Wang, China's LCPP yields more pronounced effects on carbon emissions within urban areas, attributed to disparate resource allocations by local governments.⁹⁹ Moreover, China's LCC education impacts the perceptions and insights of urban consumers; however, a disparity exists between their awareness of low-carbon practices and their practical adoption.¹⁰⁰ Certain consumers encounter challenges when attempting to modify their behaviour, often influenced passively by media and corporate promotion of low-carbon products. In view of this, it is suggested that elementary schools enhance the provision of low-carbon knowledge to students and foster the cultivation of early low-carbon consumption habits.¹⁰¹

5. Conclusion

China aspires to become an LCE to address the negative impacts of global warming. The two essential elements of an LCE are LCP and LCC, which necessitate the coordination of both the production and consumption sides of the economy. China has launched various initiatives to promote LCP, but the promotion of LCC has hitherto been indirect and instructional. This article, therefore, argues that a more effective regulatory framework targeting Chinese consumers should be established to address their lack of awareness or limited understanding of the impact of GHG emissions, unreasonable consumption, enormous waste, and confusion about environmentally friendly and green labels.

To raise the awareness of consumers, educational programs and public campaigns must be regularly run, especially with the aid of communication technologies and on social media platforms. Because the current educational programs and campaigns are concentrated in the urban areas, it is recommended that the government launch more educational programs and public campaigns in the remote and rural areas. In both urban and rural areas, it will be useful to seek the participation of resident committees and villager committees because they can play an important role in facilitating the achievement of LCC in their neighbourhood.

95 See n 40, art 9.

96 See n 43, art 10.

97 Code of Conduct for Environmental Protection (Trial), Ministry of Ecology and Environment of the People's Republic of China, 2018.

98 Ministry of Ecology and Environment of the People's Republic of China, China's Policies and Actions to Address Climate Change, 2022 Annual Report (Report, 2022) (*The 2022 Annual Report*).

99 See above n 10.

100 Yan Wu, Pim Martens and Thomas Krafft, 'Public Awareness, Lifestyle and Low-Carbon City Transformation in China: A Systematic Literature Review' (2022) 14 *Sustainability*.

101 Ibid.

To encourage LCC among consumers, it is recommended that the Chinese government strengthens carbon labelling by making specific standards and procedures applying to low-carbon products and enlarging the scope of the current carbon labelling certification conducted by the CEESTA, enabling consumers to make more accurate decisions based on the information provided. In addition, it is recommended that the Chinese government attach price incentives, through subsidies or tax reduction, to purchasing low-carbon products and services. Furthermore, the carbon credit and trading systems should be continued and further refined, while legal or monetary consequences for high-carbon consumption behaviour may be considered.

Regarding public procurement, it is necessary to incorporate the selection criteria of low-carbon products and services into the ECP and ELP lists to increase the proportion of low-carbon products in public procurement and the availability of low-carbon products in the market generally. As to the LCCPs, it is recommended that the Chinese government further expand the LCCPs in rural or remote areas by providing financial support and educational resources. Particularly, a customised focus on promoting LCC behaviour through LCCPs is recommended.

In exercising its regulatory power, the Chinese government must deal with a host of issues, whether they are administrative, economic, legal, or social. Given the diverse interests of various stakeholders, it is likely that the Chinese government will adopt a balanced approach in view of consumer rights, administrative capacity, environmental protection, availability of resources, and economic development. Nonetheless, China aims to achieve the Dual Constraint Targets and become an LCE. Because the two elements of an LCE are LCP and LCC and the change of consumer behaviour is an effective way to reduce GHG emissions, it is time for the Chinese government to take administrative and legal measures to increase Chinese consumers' environmental responsibility.