Transition toward Green Economy with Green Industry Policy: The Case of Chinese Practice

Wu Shifang[1,a,*], Su Yuxuan[2,b]

[1]*Department of Economics and Management, Hubei University of Arts and Science, Xiangyang City, China*
[2]*Faculty of Science, University of New South Wales, Sydney, Australia*
a. wsf22555@126.com
b. yuxuan.su@student.unsw.edu.au
**corresponding author*

Keywords: green economy, green transition, green industry policy

Abstract: Green economy is the direction of human progress. There are urgent needs to transition from high consumption, high emissions and environmental damage toward resource efficiency, environment protection, common prosperity with clean energy, cleaner production, which will be a revolutionary change in the development mode. Green Economy transformation cannot be accomplished in a single step. It needs a whole set industry policy to phase out outdated industry and phase in green sunrise industries. This paper introduces policy and practice of Chinese green industry and discusses the challenges of China's green transformation. In order to successfully realize green economy transition, some system constructions are proposed.

1. Introduction

Nowadays mankind face severe ecology environment challenge such as global warming, resource scarcity, environment degradation etc. Development model transition toward green economy is urgent for international social. The United Nations Environment Programme (UNEP) defines the green economy as one that improved social equity and human well-being, on the mean time significantly reducing environmental risk, resource consumption and ecological scarcities. According to UNEP (2011), the protection of environment, the reduction of poverty, the creation of employment opportunities, and the enhancement of livelihoods are the four essential growth trajectories for green economy in developing countries. The central ideas of green economy contains resource and production efficiency, reducing consumption and decoupling economic growth from environmental exploitation (Okereke,2015). Three objectives are described for green economy, the first is improving resource-use efficiency which means lesser inputs of energy, water, and other material. The second is ensuring ecosystem resilience which means protects ecosystems, ecosystem flows and the natural environment. The third is promoting human well-being and enhancing social equity which means a fair burden sharing across societies. (R.C.Brears, 2018)

Green Economy would become a new engine to get rid of poverty and backwardness increasing social wealth and equity other than a drag on growth which some people are worried about. (UNEP 2011:2). The concept of Green Economy implies a paradigm shift, "with deep, structural and systemic" changes. (Stevis and Felli2015). Growing literatures suggest adopting adaptive sustainable environment policy to trigger economy dynamics and carry forword economy evolutionary (Francesco Crespi,2016). Transition to green economy needs incentive methods for motivating investment and innovation. Providing adequate and appropriate policy approach and tools for the government is necessary.

Green economy transition means development mode change from relying on high consumption, high emissions and environmental damage toward coordinate promoting each other among economic growth, resource conservation, emission reduction and environmental improvement. Green Economy transformation cannot be accomplished in a single step. It needs the breakup of entrenched development paths and the balance of interest group. To propel testing, development, , deployment and upscale of sustainable technologies is the key task. It is important to phase out undesirable sector so as to create the ground within new green sectors can be fostered. Longer timespans, well-designed cooperation mechanism among stakeholders should be considered. The framework of industry policies to promote economic development and employment growth should be designed. The green transformation is not a patch on the traditional industrialization model, but a revolutionary change in the development model. The green economy transition needs a whole set of green industrial policy to practice in order to restrain backward production capacity and foster advanced low-carbon industries.

Green Industrial policy is defined as the government measure which aimed to improve the structural transformation towards a resource-efficient low-carbon economy in ways that also enable productivity efficiency advance. (Altenburg and Rodrik,2017). Green economy might be triggered by green industries such as: renewable electricity-generating equipment, electric vehicles, energy-efficient appliance, droughts and salt-resistant plant varieties, low-GHG emission waste management operation, water-saving technologies and energy conservation in buildings and organic agriculture, waste water treatment etc. More than 20 years ago Michael Porter suggested that it is win-win between reducing pollution and improving productivity. According to Porter Hypothesis, proper environmental regulation can trigger innovation and stimulate economy that may partially or more than fully offset the costs of complying with them, resulting in win-win situation. Green industry policy act as "pathway subverting": disrupting of key polluting sectors of the economy to break new ground for the growth of green industries.

2. Green Industry Policy Options and Cases

There are four options for phase out outdated industry and phase in green sunrise industries. The first option of the green industry policy is to impose environmental taxes, charges, levies, fees on the high pollution and high waste firms, decreasing their competitiveness relative to green firms. The second option is elimination of incentives. Some energy-and material-intensive sectors might enjoy incentives such as cash grants, reduction and exemption, low-interest loans, price support, tax advantages, low-cost land and so on for history reasons. Eliminating these incentives can favour greener, high-value added firms and restructuring the economy. The third option is adopt mandated measure to phase backward production capacity out of the targeted sector or firms. The forth option is the hardest disruptive green industrial policy that one hand phasing backward industry out of target sectors, one the other hand vigorously cultivating of substitute desired sectors, for example, using

either taxation for polluting products or subsidies for green products. Fostering management would coverage whole iterative processes from a nurturing phase to mature period.

For example, fossil fuel subsidies are to be proved inefficiency. On the one hand, consumer subsidies artificially lower the supply price of fossil fuels, consequently, lead to over-consumption, on the other hand, preferential tax treatment or other such measures reduce energy production or distribution costs, enhance profit and cause further interest lock in the fossil fuel power sector. Since 2009 G20, the international social has launched fossil fuel subsidy reform agenda. In 2010 china cancelled export value added tax (VAT) refunds aiming at a list of 406 energy-intensive products. Since 2013, Morocco has begun fossil fuel subsidy reform, at the same time, accelerated to develop renewable energy. Morocco has built the world largest concentrated solar power plant. Ontario, Canada phase out coal-fired electricity generation resulting the percentage of coal in the energy mix drop from 25 percent in 2003 to Zero in 2014, and carry out the long-term energy plan that a target of 10,700MW of wind, solar and bio-energy capacity to be added by 2021.

3. Specific Measures of China's Green Industry Policy

The objective of current Chinese green industrial policy is to limit pollution and promote the use of renewable energy (YÜlek,2018), maximizing economic and social benefits with minimum economic cost, and internalize environmental externality costs. In practice, the green industry policy tools operated in China can be divided into three categories: command-to-control policy tools, market-oriented policy tools and voluntary consultative policy tools. Command-to-control policy tools mainly regularize the behaviour boundary of social participants with mandatory administrative management, including laws, regulations and standard policies etc. The market-oriented policy tool aims to control pollution by behaviours stimulation with fiscal subsidies, tax incentives, feed-in tariff subsidies and emission trading system etc. The voluntary consultative policy instrument is dominated by corporate self-restraint of environment behaviour, reflecting the fulfilment of corporate social responsibility.

3.1 Command-and-Control Policies

Command-and-control policies include law, regulations and standards, in specific forms with energy efficiency standard, total emission control, task decomposition and secret inspection etc.

3.1.1. Legislative Control

Since 1979, China has enacted "Environmental Protection Law(trial)", "Marine Environmental Protection Law", "The Law on Water and Soil Conservation", "Energy Conservation Law" etc. Since 2000, China has successively promulgated a series of laws and regulations related to environmental protection, such as "Air Pollution Prevention and Control Law", "Renewable Energy Law", "Environmental Impact Assessment Law" etc. At present, China has formed a relatively complete environmental and resource protection legal system which has great significance for environment governance.

3.1.2. Energy Conservation and Emission Reduction Policy

Since 2005，China implement strategy with the core of energy conservation, setting up the target responsibility system and assessment system, and linking the energy-saving target with local leadership responsibility appraisal. Government carries out some action plan such as "Thousands

Enterprises Action Programme", "Ten Thousands Enterprises Energy-saving Low-carbon Action Scheme" and the11th, 12th,13th five-year Plan etc. The state council issue "Prevention and Control of Air Pollution Act plan", "Country Ten Item for Air" etc. Government try to "force" industrial upgrading with stricter standards.

3.2. The Market-Oriented Policy

3.2.1. Environment Tax and Fee System

Sound management system of environment tax and fee is an important institutional basis for resource conservation and environment protection. The current tax and fee system in China mainly include resource tax, fuel tax and sewage charge. However, due to weak implement strength, the income from tax and fee is not enough to cover the cost of resource consumption and pollution control.

3.2.2. Carbon Emission Trading System

It was not until 2017 that the emissions trading system was officially launched nationally. However, the progress of voluntary emission reduction trade market is slow, and there is obstacle presence to coordination between policies

3.2.3. Fiscal and Tax Policy

Financial subsidies play an important role in promoting technological innovation and new energy exploitation, which can be divide into producer subsidies, consumer subsidies and investment subsidies. Tax preference is also a common subsidy used by government to ease the burden of enterprises. At present, the support strength of fiscal and tax is relatively strong.

3.2.4 Green Finance

In practice, the construction of green finance is flexible and diversified. Environmental credit assessment, green financial infrastructure, green financial instruments, risk analysis, social insurance and other policy measures are gradually introduced into the environmental governance system. Green finance policy contributes to establish a comprehensive management system in which environment trustworthy enterprises are encouraged and environment dishonest enterprises are punished.

3.3 The Voluntary Consultative Policy

Voluntary consultative policy mainly refers to that government influences enterprises through non-mandatory means such as information public opinion, consultation exhortation, moral preaching and citizen participation, so that the regulated enterprises can voluntarily adopt an environment-friendly development model. The specific forms of voluntary consultative policies mainly include environmental labelling, environmental certification, information disclosure, environmental hearing, environmental publicity and education, unilateral agreements, negotiated agreements, public resource agreements etc.

4. China's Transformation Process toward Green Economy

Along with economy development, Chinese industry structure has been optimizing. Since 2012, service industry in China becomes the largest industry of national economy and the biggest engine of economic growth. The structure of tertiary industries in China was adjusted from 27.7:47.7:24.6 in

1978 to 7.2:40.7:52.2 in 2018. Inside the industrial sector, behindhand overcapacity in coal, steel, cement, plate glass, electrolytic aluminium and other industries gradually have been eliminated. On the meantime, strategic emerging industries such as energy conservation and environmental protection, new energy, next-generation information technology, biology, and new-energy vehicles have been vigorously fostered. China try to build green industries system by developing green service and promoting contracted energy management and contracted water-saving management and other measures. In recent years, China has actively promoted the development of smart manufacturing. "Internet plus" manufacturing model has been widely used in the oil, petrochemical, steel, household appliances, clothing, machinery, energy and other industries, providing a strong driving force for the green transformation of manufacturing. The use of clean energy has increased significantly. Hydropower, wind power and solar power generation capacity rank the first in the world, and the share of non-fossil energy consumption has increased to 14.3 percent. China has become a global leader in the use of non-fossil fuels.

Green science and technology innovation is the power source for green development. From 1990 to 2014, number of environmentally related patents increased by 60 times. At the same time, efforts have been made to reduce the cost of green technology transfer and drive green technology demonstration and promotion. The development and diffusion of green technologies have provided strategic support for China's green transformation.

5. The Challenges Facing China's Green Transformation

While China has become the "factory of the world", she has also discharged a large number of pollutants, greenhouse gases and wastes. This not only brings great pressure to the ecological environment, but also results in huge governance cost. China's energy resource endowment makes it difficult to change the status of coal as a major energy source in a short period. At the same time, there is still a large gap of energy and resource utilization efficiency between China and the world's advanced level. According to OECD calculations, China generates an economic value of ＄2,150per tonne of CO_2 emitted, compared with nearly twice that of OECD countries at ＄4,240.

Environmental pressures remain high. According to statistics, for every one percent increase in China's urbanization level, sanitary sewage will increase 1.15billion tons, domestic garbage will increase 12million tons, construction land will enlarge 1000 square kilometres, domestic water will increase 1.2billion tons, and energy consumption will increase 80million tons of standard coal.

6. Conclusions

Green economy transformation is social revolution process that requires system construction. It is indispensable to build green industry development system by promoting whole industry chain coordination among relevant parties in technical cooperation, connecting between production and use, and supporting services. Development of green science and technology innovation system can be achieved by strengthening intellectual property rights protection of green technology and promoting green technology and business model innovation. By promoting the "3R" production method of reduction, reuse and resource recovery, the system of resource conservation and recycling can be improved. Through the implementation of the main functional zoning strategy, a unified system of territorial space planning and management can be accelerated, and a land development protection system can be established.

Market service system for green development can be achieved by actively exploring green financial instruments such as green loans, green bonds, green insurance, green funds and green

certificates etc. To save energy and reduce emissions, it is necessary to promote green consumption system for living by advocating a simple, moderate, low-carbon lifestyle and green travel, encouraging the use of green products. In order to promote the ecological environment governance system and create beautiful world, government will play a leading role in the joint effort of enterprises, social organizations and public participate.

References

[1] Chukwumerije Okereke, Timonthy G.Ehresman, Int Environ Agreements (2015)15:5-11.International environmental justice and the quest for a green global economy: introduction to special issue.

[2] J.M.Koh,Green Infrastructure Financing(2018):11-69.Green Infrastructure to pursue Two Visions.

[3] Humayun I.Azad. Industrial Policy and Sustainable Growth (2018):189-212.Renewable Energy and Green Industrial Policy: Opportunities for Developing Countries.

[4] H.O.Genc, K.A.Akkemik. Industrial Policy and Sustainable Growth (2018).:285-310. Developmental State, Industrial Policy, and Green Growth in China.

[5] Ulrich Brand. Fudan J. Hum. Soc. Sci(2016)9:107-121.Beyond Green Capitalism: Social-ecological Transformation and Perspectives of a Global Green-Left.

[6] Wang Yinming. China Economy Report (2019.6):18-25.China's Green Transformation: Process and Prospects.

[7] Li Xiaoping, Zhang Yijun，JiangFeitao. Journal of Finance and Economics (2019.8):4-24.Green Industrial Policy: Theory Evolution and Chinese Practice.

[8] UN ENVIRONMENT,2017:1-221.Green Industry Policy: Concept, Policies, Country Experiences.

[9] Sanya Carley, Elizabeth Baldwin, Lauren M.Maclean, Jennifer N.Brass. Envion Resource Econ (2017)68:397-440.Global Expansion of Renewable Energy Generation: An Analysis of Policy Instruments.