PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

环境保护部
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Policy Research Center for Environment and Economy,
Ministry of Environmental Protection, P. R. China

TRANSITION TO A GREEN ECONOMY IN CHINA'S JIANGSU PROVINCE

A STOCKTAKING REPORT

UNEP United Nations Environment Programme

International Labour Organization

UNDP Empowered lives. Resilient nations.

UNIDO United Nations Industrial Development Organization

unitar United Nations Institute for Training and Research

The report is published as part of the Partnership for Action on Green Economy (PAGE) – an initiative by the United Nations Environment Programme (UNEP), the International Labour Organization (ILO), the United Nations Development Programme, the United Nations Industrial Development Organization (UNIDO) and the United Nations Institute for Training and Research (UNITAR).

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2016

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FOREWORD

2016 is a milestone year for global sustainable development, with the 2030 Agenda for Sustainable Development and Paris Agreement on climate change coming into effect. The United Nations Conference on Sustainable Development (Rio +20) held in 2012 in Rio de Janeiro considered green economy in the context of sustainable development and poverty eradication to be "one of the important tools available for achieving sustainable development", which means the United Nations would encourage and support the various countries in the world to explore special models of green economy based on their national conditions. With such international support, green economy will become one of the important means and approaches for the countries to transition towards a low-carbon, green and sustainable future.

2016 is also an important year for China's ecological civilization approach to green development. China's 13th Five-Year Plan (2016-2020) clarifies the overall goals for building a balanced and prosperous society. The Plan highlights the idea of shared development that is innovative, coordinated, green, and open, and includes a series of policy reforms and measures that are intended to promote green development, ecological civilization, and environmental protection. Green economy can play an important role in helping national and local governments to explore new green development paths and innovative solutions to environmental problems that will help them to achieve the targets of 13th Five-Year period.

Jiangsu province is one of the most developed provinces in China, and actively explores green planning, regulations and policies. Jiangsu took the lead, for example, in drawing "ecological redlines" (for protecting ecological functions) that cover more than 20 percent of the province's territory, and it established a green development evaluation system for assessing the green performance of its 13 prefectures. Overall, the development of a green economy in Jiangsu has so far achieved positive outcomes and laid a good foundation for future work to address remaining challenges.

The Partnership for Action on Green Economy (PAGE) launched China's first local green economy promotion project in Jiangsu in November, 2015, and this report is the preliminary outcome of the project. The report summarizes and analyses the successes and good practices of Jiangsu, and aims to provide lessons for other provinces and countries on promoting green economy. The report also identifies the challenges and priorities for Jiangsu's future green economy work, which can provide reference and guidance for upcoming PAGE work in the province and in China as a whole.

On the basis of this report, we are looking forward to further cooperating with relevant governmental departments of Jiangsu on green economy policy design and helping Jiangsu to deal with related challenges. I hope these and other elements presented in this publication will not only help the international community better understand China's good practices on green economy, but also inspire global action on green economy initiatives, the 2030 Agenda and the Sustainable Development Goals.

Xia Guang
Policy Research Center for Environment and Economy
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LIST OF ACRONYMS

ASEAN	Association of Southeast Asian Nations
CAEP	Chinese Academy For Environmental Planning
CNY	Chinese Yuan
COD	Chemical Oxygen Demand
EMC	Energy Management Contract
FYP	Five-Year Plan
GDP	Gross Domestic Product
GGGI	Global Green Growth Institute
ILO	International Labour Organization
IPR	Intellectual Property Rights
KWh	Kilowatt Hour
MEP	Ministry of Environmental Protection
NBS	National Bureau of Statistics
NH_3-N	Ammonia Nitrogen
NO_X	Nitrous Oxide
PAGE	Partnership for Action on Green Economy
PM_{10}	Inhalable Particulate Matters
$PM_{2.5}$	Fine Particulate Matters
PRCEE	Policy Research Centre for Environment and Economy
SDGs	Sustainable Development Goals
SO_2	Sulphur Dioxide
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
US	United States
USD	United States Dollar
WWF	World Wildlife Fund

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1. Executive Summary

The concept of "Green Development" has been put forward explicitly in China's 13th Five-Year Plan, and green economy serves as an important approach to achieve it. Compared with other provinces of China, Jiangsu is already relatively advanced in integrating key elements of a green economy into development plans and policies. Investment in natural capital, clean technologies, and green skilled labor force, for example, has already begun. However, some problems are still exist, such as the overloading of environmental capacity and the reliance on the heavy industry. This report aims to summarize successes and good practices at the policy, business, and sub-provincial levels, identify major challenges of green economy policy implementation and offer targeted solutions that PAGE can support in the next phase.

Since 2011, Jiangsu has adopted a series of green economy policies related to industrial upgrading and greening, ecological and environmental protection, green consumption and trade, green employment and ecological services for poverty alleviation, among others. But various challenges still remain. The main challenges at the macroeconomic level include: 1) a reliance on heavy industry that intensifies the conflict between economic development and resources and environment; 2) slower economic growth that restricts the capacity of the green transition. 3) environmental risks resulting from rapid urbanization; 4) regional differences in green economy progress.

There are also a number of sector-specific challenges. The domestic energy supply, for example, is not sufficient to meet demand and energy intensity is still high. In the agricultural sector, challenges include inefficient water-use and agricultural pollution. In industry, though Jiangsu has a large and well developed manufacturing sector, it remains at the lower end of the international value chain and is would benefit from technical capacity building for the green transition. In particular capacity on core technologies and emerging industries research is lacking. The transition to green trade is challenged by irrational import and export structures, as exports are mostly goods with high resources consumption and environmental pollution. The transition towards sustainable consumption is still at the piloting stage, and household energy intensity and resource consumption remain high.

To scale up the green transition in Jiangsu at the macroeconomic level, the Provincial government should prioritize five areas: 1) cultivating green economy concepts proactively; 2) strengthening strategic management in key sectors to promote green investment and green industrial transition; 3) enhancing the development of green markets and building sustainable production and consumption systems; 4) strengthening basic capacity for green economy (integrated support from infrastructure, technological innovation and management capacity are needed); and 5) improving relevant policy systems and stimulating endogenous dynamics of green economy.

Priorities for the energy, agriculture, industrial, trade and consumption sectors include the following: 1) improving energy efficiency and controlling total energy consumption; 2) strengthening intensive water utilization in agriculture and improving the use-pattern of fertilizers, pesticides and agricultural film; 3) intensifying the control of excessive capacities, energy conservation and emission reduction in key industries, promoting industrial structural adjustment, and facilitating the greening and technological innovation in traditional manufacturing sectors; 4) improving resource and environment efficiency of key industries and accelerating the green adjustment of trade structures; 5) taking measures to encourage green consumption through green procurement, green transport, green buildings and green energy; and 6) exerting the guiding role of green policies to ensure green development to benefit all social groups.

Based on the analysis above, priorities of the next phase PAGE project in Jiangsu could focus on:

1) in cooperation with relevant government departments, carrying out training programmes, exchanges and discussions with relevant government departments, businesses, experts, researchers

© PRCEE – Participants in PAGE joint scoping mission in November 2015.

and social organizations so as to raise awareness and improve understanding of green economy;

2) in partnership with local research institutes, developing the theoretical framework and application of green economy indicators for the province, including at the macroeconomic and business levels;

3) establishing a network of green industrial parks for peers to share information, exchange experience and facilitate cooperation;

4) conducting green employment training, including training for trainers, entrepreneurs and policy makers to help local government and businesses avoid green transition led job losses, and at the same time, to explore new green opportunities;

5) taking energy restructuring as an entry point and the main line for future activities, and conducting studies on green industries, green employment and green trade relating to the construction of regional energy networks;

6) conducting studies for green trade, including trade in environmental goods and services (EGS), and trade and investment cooperation with developing countries on renewable energy products and clean technologies; and

7) conducting studies and capacity building on greening supply chains in the manufacturing sector, including the sharing of international good practices that are relevant to the industrial characteristics of Jiangsu Province.

2. Introduction and Background

This report is an initial result of the *Partnership for Action on Green Economy (PAGE) project in Jiangsu Province, China* (or "PAGE Project" for short). The report was drafted by the Policy Research Center for Environment and Economy (PRCEE), Ministry of Environmental Protection (MEP), P. R. China, with joint contributions from PAGE experts and local stakeholders. The report aims to outline strategies, plans and polices related to green economy in Jiangsu province; summarize success stories and best practices; identify critical challenges and future priorities and thereby provide reference and support to the implementation phase of the PAGE Project.

PAGE was officially launched by United Nations Environment Programme (UNEP), International Labour Organization (ILO), United Nations Industrial Development Organization (UNIDO) and United Nations Institute for Training and Research (UNITAR) at UNEP's Governing Council in 2013 as the United Nations' direct respond to the Rio+20 Conference call on the international community to provide assistance to countries interested in developing, adopting, and implementing inclusive green economy policies and strategies for achieving sustainable development and poverty eradication. UNDP joined in 2014, further increasing the partnership's capacity to fulfill its mandate.

PAGE aims to enable countries to transition towards greener and more inclusive economies in four strategic areas: 1) national economic and development planning (by assisting the formulation and adoption of national green economy planning and policies); 2) sectoral and thematic policy analysis and policy reform (by providing support for the design of specific policy options and mobilization of financing partners); 3) capacity development of individuals and institutions through national and global action (by providing global access to tools and tailored training programmes on green economy); and 4) knowledge creation for inclusive green economy action (by generating and sharing knowledge on green economy to support its implementation at the country-level).

2.1 PAGE support to Jiangsu Province

The MEP of China expressed interest in joining PAGE at the provincial level – due to the size of the country – in September 2014. Designated as the lead institution by MEP, PRCEE started working with PAGE under the guidance of the Chinese government and the MEP in December 2014 and officially launched the PAGE project in Nanjing in November, 2015.

The PAGE Project aims to achieve two main objectives that are consistent with the PAGE approach and adapted to China's particular circumstances. The first is to identify and exemplify successes and good practices at the policy, business, and sub-provincial levels to inspire other provinces and countries. Jiangsu is already relatively advanced in integrating key elements of a green economy into development plans and policies. Investing in natural capital, clean technologies, renewable energy, sustainable value chains and green skilled labor force, for example, has already begun. Analyzing and sharing these good practices nationally could inspire changes in other provinces.

The second objective is to identify and analyze the major challenges of green economy policy implementation. Although green economy strategies, policies, and plans are in place, and there are success stories in their implementation, the province at large still faces challenges in transforming its economy. Examples include: the impacts of the slower economic growth on the incentives to make green investments, the constraints on the province to practice green finance (as the financial sector is a tightly controlled by the central government and the discourse on green finance has yet to be translated to the provincial level), the historically large share of heavy industry in the province's economic structure, the need to move up along the value chain of environmental goods and explore global market, and the lack of a solid and authoritative set of indicators based on available data to support the measurement of progress, among others. Through engagement of local stakeholders, PAGE supports the government

to substantiate and prioritize such challenges so that the next phase of PAGE support can offer targeted solutions.

2.2 Target audience of the report

In view of the background and objectives of the project, the target audiences and stakeholders of this report include: 1) related government organs at the provincial level and below that will help to summarize the progress of policy implementation and document success stories, good practices as well as key challenges, and increase awareness of green economy in Jiangsu Province. At the same time, the findings of this report will help local government to improve their capacity to formulate and implement green economy policies; 2) local industrial associations, enterprises, exporters, foreign investors, Small and Medium Sized Enterprises (SMEs), and financial, research and training institutions all serve as important promoters of green economy, and they have provided inputs to this report that cover industrial development, green trade and investment, sustainable value chain management and knowledge sharing. Conversely, the conclusions on key challenges and opportunities will help them make greener business and investment decisions, as well as identify the direction of future research and training; 3) PAGE partners in China and around the world will disseminate and share success stories, good practices and green development models that can help facilitate the development of a worldwide green economic transition.

2.3 Outline of the report

This report gives an introduction and background information in this chapter and a definition of green economy based on China's particular circumstances in chapter 2. Chapter 3 presents an analysis of the basic information about economic and social development, resources and energy utilization and ecological and environmental quality of Jiangsu province as well as its achievements regarding green economy strategies, plans, policies and actions. Chapter 4 highlights the major problems and challenges Jiangsu province faces in developing green economy from overall and sectoral perspectives. Chapter 5 identifies priorities for the next stage of green economy. The final chapter provides suggestions for PAGE's following work in Jiangsu province.

© Robert Harding – A decorated tricycle riding through the old streets of Suzhou, Jiangsu Province.

3. The concept of a Green Economy in China

Green economy is gaining momentum globally as an effective approach to sustainable development. Developed countries and regions are developing and implementing strategies and policies aimed at increasing green investment and transitioning towards a resource-efficient, low-carbon and socially inclusive future. As an important part of the global economy, developing countries have also expressed great interest in and commitment to green economy. For example, Mongolia, Mozambique, Barbados, Cambodia, Indonesia and South Africa have formulated national strategies and plans for promoting green economy (PRCEE, 2015a). In China, "green development" was first featured in the 12th Five-Year Plan (2011-2015), and entire chapter of which was devoted to "building an energy-efficient and environment-friendly society". Building on this, China has included "green development" as one of the five development concepts[1] in the 13th Five-Year Plan (2016-2020).

Despite discrepancies in their definitions and understanding of green economy, international organizations, research institutions and scholars all attach great importance to the interdependence between economic growth, ecological environment and social inclusiveness. In China, the concept of green economy includes three aspects. The first is to ensure economic growth. The economy should maintain a certain growth rate that is within an appropriate range to ensure macro-economic stability (e.g. full employment, inflation control, and increasing per-capita income). The second relates to improved ecosystems and environmental quality – or at least reduced degradation. Green economy should realize environmental sustainability, including improved ecosystem services and air, water, and soil quality. The third criterion is inclusive and balanced growth. The benefit of green economy should be distributed reasonably, fairly and equitably among different regions, cities and rural areas, with all people, men and women (PRCEE. 2015b).

© Robert Harding – High angle view of women sewing baby booties, Zhouzhuang, Kunshan City, Jiangsu Province, China.

4. Green Economy Status in Jiangsu Province

4.1 Overview of Jiangsu Province

Jiangsu Province is located in the Yangtze River Delta in eastern China and covers a land area of 107,200 square kilometers, or 1.12% of China's territorial area. Jiangsu is one of the economically well-developed provinces in China and has 13 prefectures (Nanjing, Wuxi, Xuzhou, Changzhou, Suzhou, Nantong, Lianyungang, Huai'an, Yancheng, Yangzhou, Zhenjiang, Taizhou and Suqian), with Nanjing as the provincial capital.

FIGURE 1 LOCATION OF JIANGSU PROVINCE (YELLOW AREA) IN CHINA

4.1.1 Economic and social development

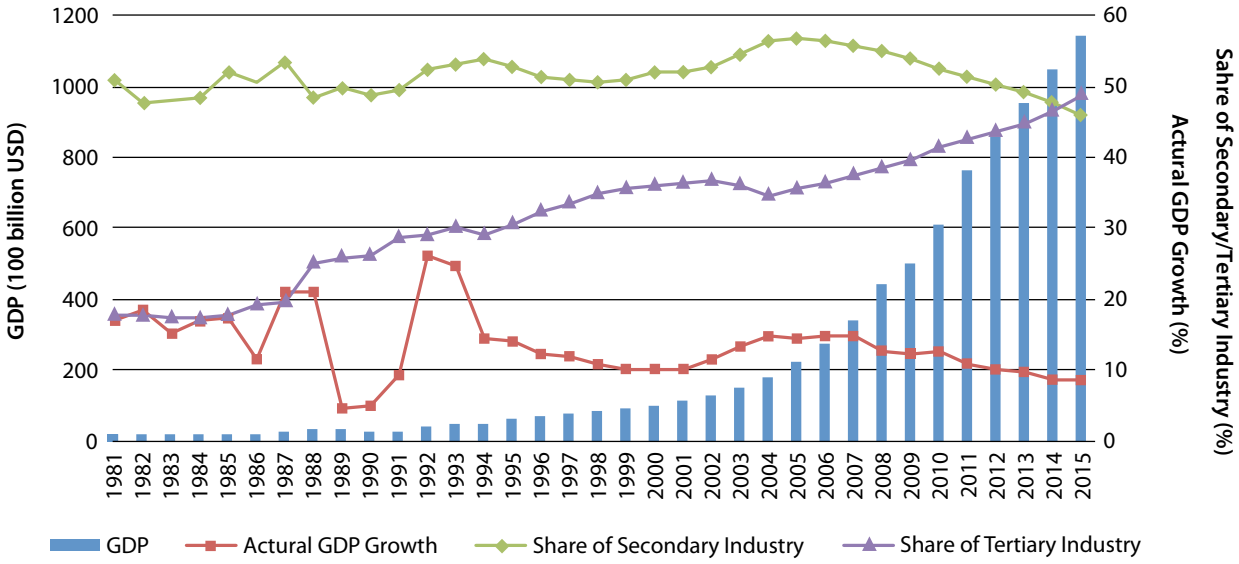
As one of China's fastest developing provinces over recent decades, living standards and overall well-being in Jiangsu have increased significantly. Progress has occurred in four key areas:

Sustained economic growth and industrial optimization. In 2015, the GDP of the province reached approximately 1,125.8 billion USD[2], 186 times higher

than the 1981 level, and the average annual real GDP growth rate is 13.7%. The share of secondary industry in GDP dropped from 50.9% in 1981 to 45.7% in 2015 and the share of tertiary industry rose from 17.9% to 48.6% in the same period (see Figure 2).

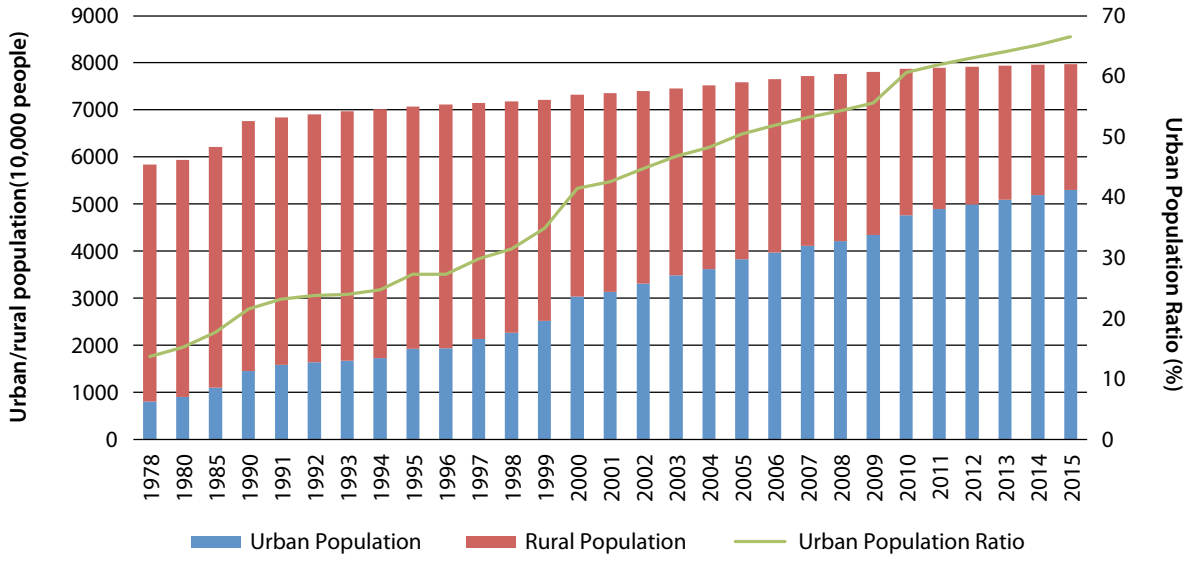
Foreign trade and investment. In 2015, total trade volume reached 545.61 billion USD, out of which export 338.67 billion USD and import 206.95 USD. The export volume of general trade of the province was 155.25 billion USD, while the export volume of processing trade was 147.96 billion USD. The export volume of mechanical and electrical products reached 224.75 billion USD and high-tech products reached 131.09 billion USD, account for 64.8% and 37.8% of the gross export, respectively. Export to developing countries registered a stable increase over the past years, yet the total share remained relatively low. In 2015,

FIGURE 2 GDP GROWTH AND INDUSTRIAL STRUCTURE OF JIANGSU (1981-2015)



Source: *Jiangsu Provincial Statistics Bureau, 2016a.*

FIGURE 3 URBAN AND RURAL POPULATION OF JIANGSU2015)



Source: *Jiangsu Provincial Statistics Bureau, 2016a.*

exports to Association of Southeast Asian Nations (ASEAN), Africa, Latin America accounted for 10.3%, 2.6% and 5.6% of Jiangsu's total exports respectively (Jiangsu Provincial Statistic Bureau, 2016b).

Improved living standards and wellbeing driven largely by a rapid urbanization process. By the end of 2015, total urban population of Jiangsu province reached 53.04 million, with an urbanization rate of 66.5%, which is much higher than the average rate of 56.1% of the country (see Figure 3). The per capita GDP reached 14,128 USD, the urban per capita disposable income reached 5,968 USD, and rural per capita disposable income reached 2,610 USD.

Urban employment in the manufacturing and construction sectors. As of 2015, the total employed population in Jiangsu was 47.59 million, and those employed in the primary, secondary and tertiary industry account for 18.4%, 43% and 38.6%, respectively. Of the total urban jobs, nearly 40% are in the manufacturing industry, 28% in the construction industry, 12% in the mining sector, 6% in education, 5% in wholesale, retail, hotels and catering industries, 3% in transport, storage and post industries and a few in other industries (see Figure 4).

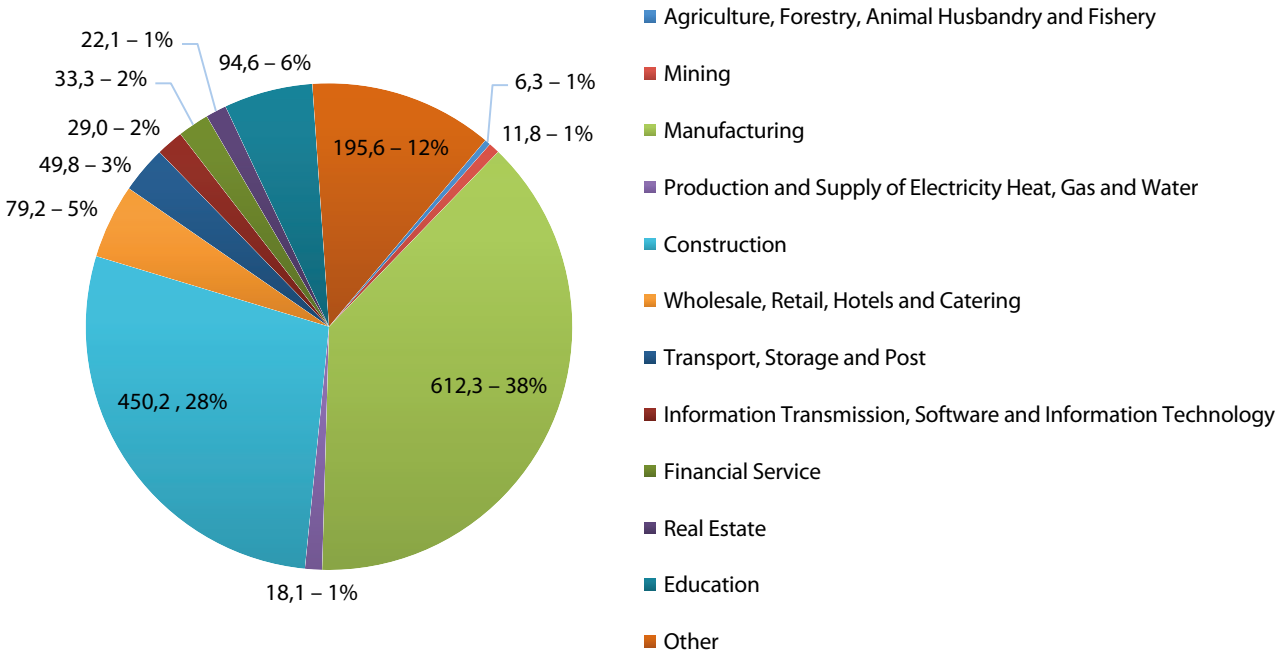
4.1.2 Resources efficiency and environmental quality

Total energy and resource consumption is still high, but efficiency is improving. The total energy consumption of Jiangsu increased from 88.81 million tons of standard coal in 2001 to 319 million tons of standard coal in 2014. In the meantime, energy consumption per 1,000 USD of GDP dropped from 0.78 ton of standard coal to 0.30 ton of standard coal, with a decrease of 62% (see Figure 5).

Total water consumption continues to grow, especially in domestic and industrial areas. In 2013, Jiangsu consumed 57.67 billion cubic meters of water. Industrial and domestic water increased by 20.8% and 26.7% respectively, compared to 2004, and account for 52.4% and 32.8% of the total water consumption. Water consumption per 1,000 USD of GDP dropped from 290 cubic meters in 2004 to 60.7 cubic meters in 2013, with a decrease of 72.5% (see Figure 6).

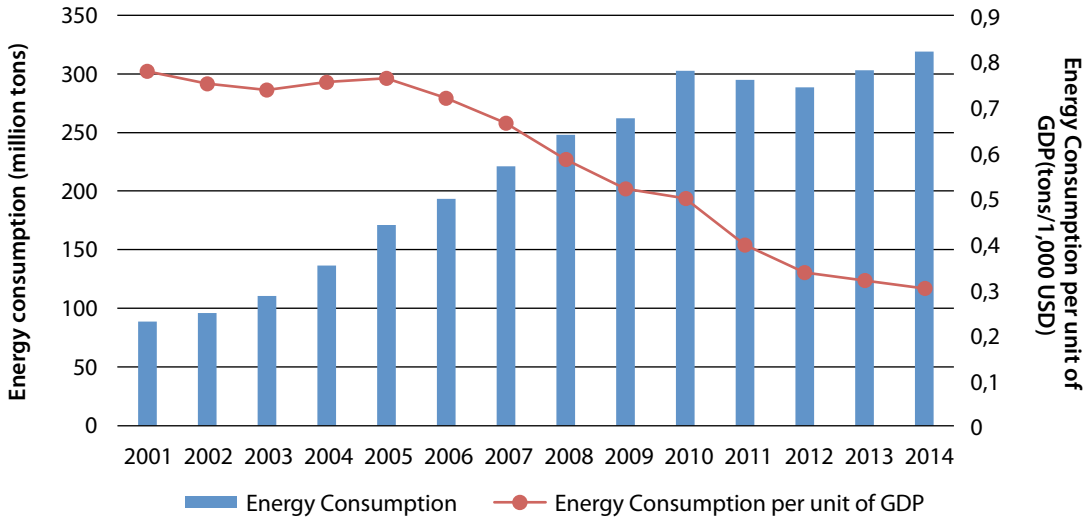
In terms of land resource use, construction land of Jiangsu reached to 24,462 square kilometers[3] in 2013, accounts for 24.17% of the province's land area and increased 6,148 square kilometers than

FIGURE 4 COMPOSITION OF URBAN EMPLOYMENT IN JIANGSU PROVINCE (10,000 PEOPLE)



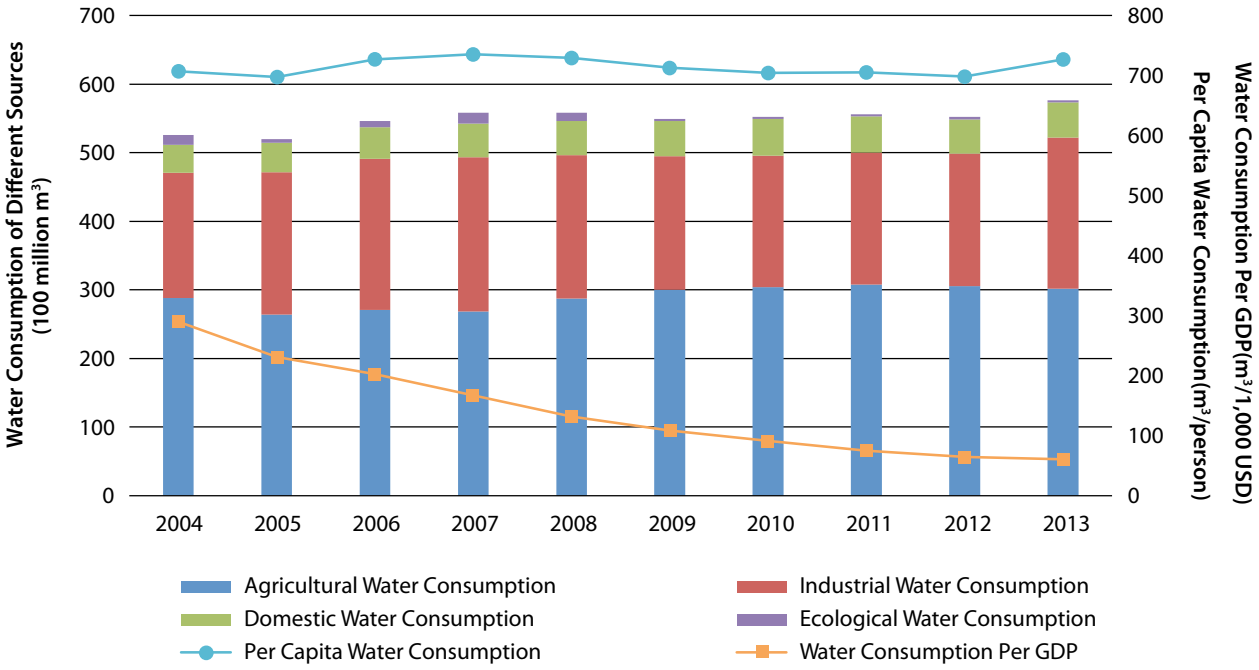
Source: *Jiangsu Provincial Statistics Bureau, 2015*

FIGURE 5 ENERGY CONSUMPTION IN JIANGSU PROVINCE2015)



Source: *Jiangsu Provincial Statistics Bureau, 2015.*

FIGURE 6 WATER RESOURCES UTILIZATION IN JIANGSU PROVINCE



Source: *Jiangsu Provincial Statistics Bureau, 2015.*

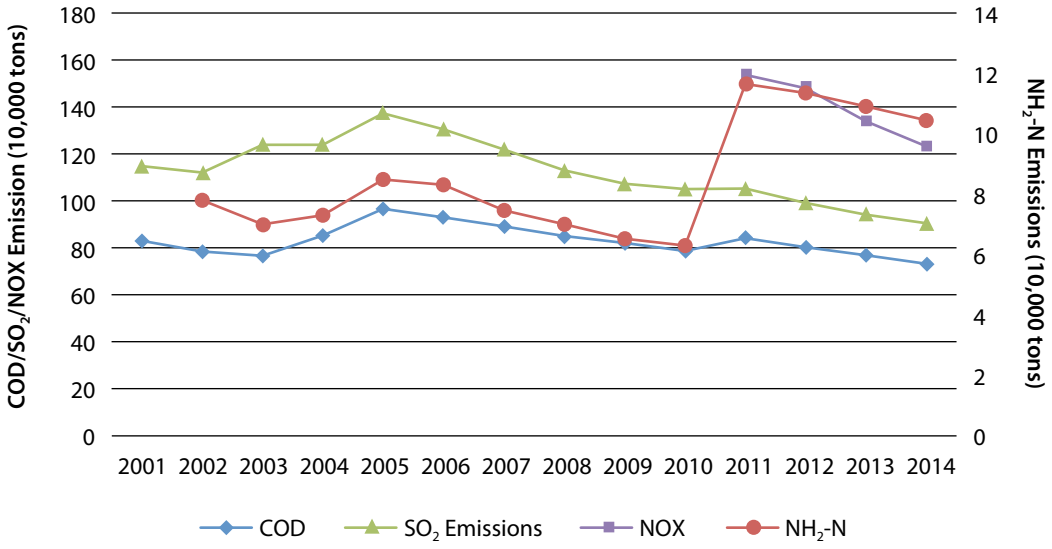
in 2006 (Jiangsu Provincial Government, 2006). At the same time, construction land productivity rose from 15 million per square kilometer in 2005 to 36.6 million USD per square kilometer in 2013, with an increase of 140%[4].

Total emissions of major pollutants are decreasing continuously but still remain at a high level. From 2001-2014, the chemical oxygen demand (COD) emissions reduced from 831,000 to 732,200 tons, the sulphur dioxide (SO_2) emissions reduced from 1,148,000

to 904,700 tons. The ammonia nitrogen (NH_3-N) and nitrous oxide (NO_X) emissions also shown a decreasing trend since 2011, due to the total emissions of these two pollutants were capped during the 12th Five-year period (see Figure 7).

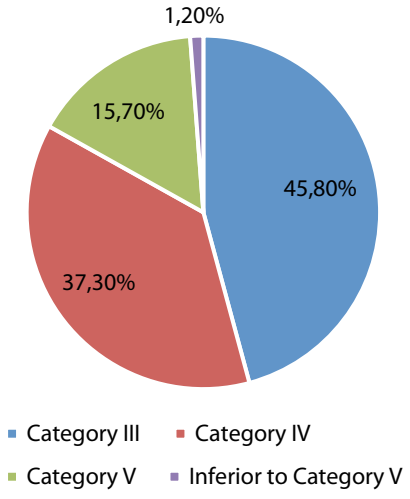
Overall environment quality in Jiangsu could be improved, but relatively speaking, the province is considered to be in a state of light pollution. In 2014, among the 83 state-controlled surface water monitoring sections, 38 met the requirements of water quality Class III[5], accounting for 45.8%. 31 met the requirements of water quality Class IV[6], accounting for 37.3% (see Figure 8). According to the *Air Quality Standard (GB3095-2012)*, 64.2% of days in 2014 met the standards.

FIGURE 7 EMISSIONS OF MAJOR POLLUTANTS IN JIANGSU PROVINCE



Source: *Jiangsu Provincial Statistics Bureau, 2015.*

FIGURE 8 SURFACE WATER QUALITY IN JIANGSU PROVINCE



Source: *Environmental Protection Department of Jiangsu Province, 2015a.*

4.1.3 Comparison between Jiangsu Province and the rest of the country

Compared with the rest of China, Jiangsu is much better on the indicators of economic development, urbanization, energy and resource efficiency and emissions intensity, which are considered to have created conditions favorable for for the transition to a green economy (see Table 1).

The level of economic develop and urbanization is relatively high. The GDP of Jiangsu accounted for 10.4% of China's GDP in 2015, ranking only second to Guangdong Province (see Figure 9) and its per capita GDP was nearly 2 times of the country's average (see Figure 9). Urbanization rate is 10.4% higher than the national level, and surpasses the target set in the "National Plan on New Urbanization (2014-2020)" by around 60% (State Council, 2014).

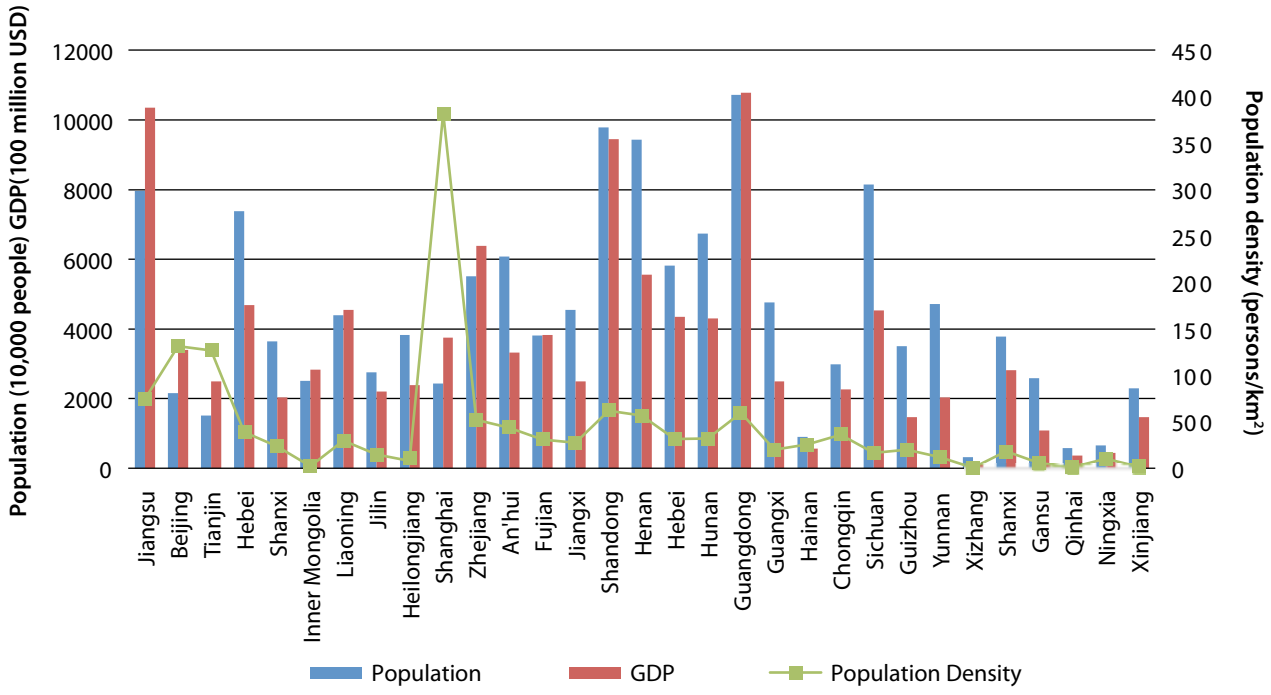
Energy and resource consumption, and pollutant emission intensity is relatively low. In 2013,

TABLE 1 COMPARISON BETWEEN JIANGSU AND THE COUNTRY ON ECONOMIC AND SOCIAL DEVELOPMENT[7]

Category	Indicators	Jiangsu	China
Economy	Per capita GDP (USD)	14128	7924
	Ratio of secondary industry (%)	45.7	40.5
	Ratio of tertiary industry (%)	48.6	50.5
	Ratio of heavy industry (%)[8]	74.1	74.6
	Urbanization level (%)	66.5	56.1
	Ratio of exports of goods (% of GDP)	30.0	20.9
Society	Total population (10,000 people)	7976	137462
	Sex ratio (female=100)[9]	101.5	105.2
	Per capita life expectancy (years)	76.63	74.83
	Urban per capita disposable income (USD)	5968	4328
	Rural per capita disposable income (USD)	5009	1834
	Gini coefficient[10]	0.40	0.47
Resources and environment	Energy consumption per unit of GDP (tons/ 1,000 USD)	0.30	0.49
	COD discharge per unit of GDP (tons/10 million USD)	10.06	21.47
	NH_3-N discharge per unit of GDP (tons/10 million USD)	1.30	2.23
	SO_2 discharge per unit of GDP (tons/10 million USD)	8.28	18.47
	NO_X discharge per unit of GDP (tons/10 million USD)	11.28	19.44

Source: National Bureau of Statistics of China and Jiangsu Provincial Statistics Bureau. http://www.stats.gov.cn/; http://www.jssb.gov.cn/.

FIGURE 9 COMPARISON BETWEEN JIANGSU AND THE COUNTRY BY POPULATION AND GDP

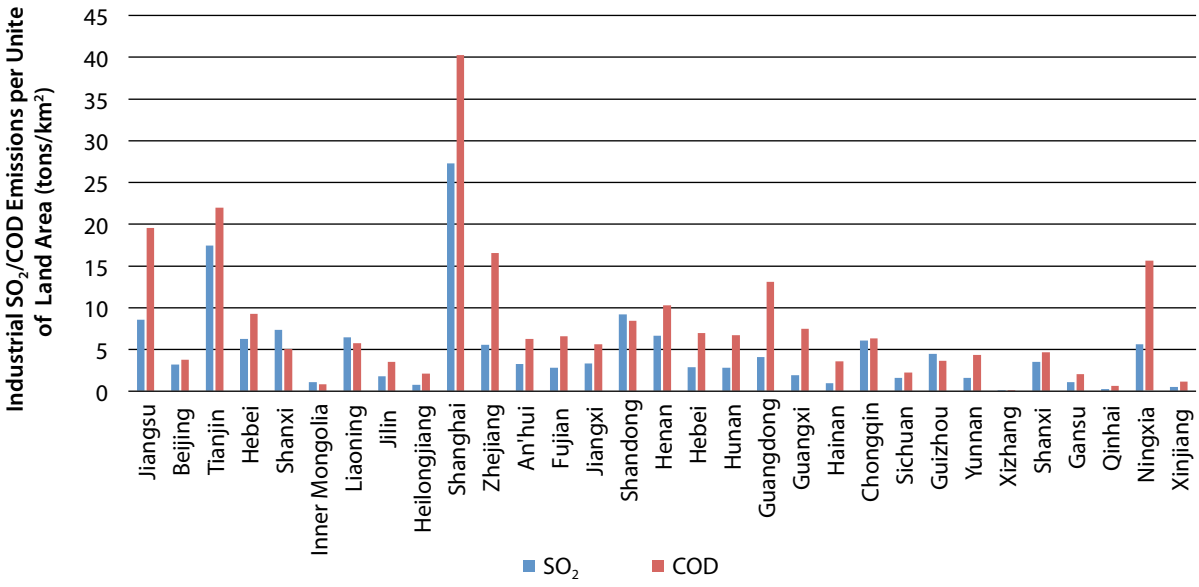


Source: *National Bureau of Statistics of China, 2015.*

Jiangsu's energy intensity was 0.32 ton of standard coal per 1,000 USD of GDP, approximately 40% lower than the country's average. The COD, NH_3-N, SO_2 and NO_X emissions per 10 million USD of GDP of Jiangsu were 10.63 tons, 1.38 tons, 8.74 tons and 11.91 tons in 2013, accounted for 46.9%, 58.4%, 44.8% and 58.0% of the country's average level, respectively (see Table 1).

However, some problems also emerged, including high population density, overloading of environmental capacity, and a reliance on heavy industry. In 2014, the population of Jiangsu accounted for 5.82% of the national population and its population density was 743 people per square kilometer, making it the fourth most densely populated province, after Beijing, Tianjin and Shanghai (see Figure 9). High reliance of secondary industry also caused environmental pressure. In 2013, the industrial SO_2 and COD emissions per unit of land area are 8.48 and 19.51 tons per square kilometer, respectively, the land capacity of pollution was overloaded and ranked third in the country (see Figure 10). As of 2015, heavy industry accounted for 74.1% of the added value of the secondary industry, which shows an urgent demand for green economic structural change.

FIGURE 10 COMPARISON BETWEEN JIANGSU AND THE COUNTRY BY INDUSTRIAL POLLUTION PER UNIT OF LAND AREA



Source: *Jiangsu Provincial Statistics Bureau, 2015; National Bureau of Statistics of China, 2015.*

4.2 Green Economy Progress

Jiangsu has already been committed to advancing inclusive green economy for the past decade, with particular achievements in strategies, plans, actions and policies.

4.2.1 Strategies

Jiangsu provincial government has paid close attention to inclusive green economy for many years and has highlighted green development as a long-term strategy vital to the province's modernization and its people's well-being, and taken ecological civilization (or "eco-civilization" for short) as the guiding strategic framework for promoting a green transition.

Jiangsu started mainstreaming green elements into its economic development plans in 2000 and set the overall target of "building up a moderately prosperous society in an all-round way and realizing modernization by 2020" in 2003. In 2004, Jiangsu provincial government issued the *Planning Outline*

for Construction of an Ecological Province, and in 2010, the government published the *Opinions on Accelerating the Promotion of Ecological Province Construction and Comprehensively Improving Ecological Civilization*. Notably, in 2013, Jiangsu started to implement the *Outline for Plan on Ecological Civilization Construction*, which provides a blueprint for the next 10 years of green development in the province (Jiangsu Provincial Government, 2013a).

In March 2016, Jiangsu Province released the *Outline of the 13th Five-Year Plan for the National economic and Social Development of Jiangsu Province*, which proposes a green development approach for building a resource-efficient and environment-friendly society that will facilitate the construction of a beautiful and livable Jiangsu (Jiangsu Provincial Government, 2016a).

4.2.2 Plans

The Jiangsu provincial government has issued and implemented a group of action plans relevant to green economy. Table 2 lists some of the long-term and short-term plans that have been implemented since 2011.

TABLE 2 ACTION PLANS RELEVANT TO GREEN ECONOMY IN JIANGSU PROVINCE

Term	Name	Date Issued
Short-term	Outline of the 12th Five-Year Plan for the National Economic and Social Development of Jiangsu Province (2011-2015)	2011
	The 12th Five-Year Plan for Agricultural and Rural Development of Jiangsu Province	2011
	The 12th Five-Year Plan for Modern Agriculture Development of Jiangsu Province	2011
	The 12th Five-Year Plan for Industrial Transformation and Upgrading of Jiangsu Province	2012
	The 12th Five-Year Plan for Energy saving of Jiangsu Province	2012
	The 12th Five-Year Plan for Energy Development of Jiangsu Province	2012
	The 12th Five-Year development Plan for Energy Conservation and Environmental Protection Industries	2012
	The 12th Five-Year Plan for Forestry Development	2012
	Plan for Ecological Red Line Region Protection	2013
	Plan of Jiangsu Province to Tackle Climate Change	2013
	The 12th Five-Year Plan for Cyclic Economy Development	2013
	Outline of the 12th Five-Year Plan for Circulation Industry Development	2013
	Plan for Participating in International Competition and Cooperation	2013
	Implementation Measures on the Air Pollution Prevention and Control Action Plan	2014
	Outline of the 12th Five-Year Plan for Rural Poverty Alleviation and Development	2014
Mid and long-term	Comprehensive Plan on Water Resources	2011
	Outline for Plan on Ecological Civilization Construction (2013-2022)	2013
	Plan for Green, Cyclic and Low-carbon Development of Transport (2013-2020)	2013
	Plan for New Urbanization and Integrated Development of Urban and Rural Areas (2014-2020)	2014
	Action Plan for Upgrading and Transforming Energy Conservation and Emissions Reduction of Coal Power (2014-2020)	2014
	Plan for Ecological Protection and Construction (2014-2020)	2014
	Wetland Protection Plan (2015-2030)	2015
	Outline of the 13th Five-Year Plan for the National Economic and Social Development (2016-2020)	2016

Among the mid and long-term plans, *Outline for Plan on Ecological Civilization Construction (2013-2022)* and *Plan for New Urbanization and Integrated Development of Urban and Rural Areas (2014-2020)* are of great importance in identifying key fields for green economy in Jiangsu. The former stresses optimizing ecological space, promoting the green transition, constant improvement to environmental quality and advocating environmental-friendly lifestyle, while the latter focuses on improving the quality of urbanization and urban rural integration, optimizing spatial layout, improving basic public service and strengthening the capacity of sustainable development at city level. Table 3 below shows the progress of some short-term plans by comparing the targets set in the 12th Five Year Plan in 2011 and the result achieved by the end of 2015. It is encouraging to see that most of the targets have been met.

TABLE 3 SOME INDICATORS OF THE 12TH FIVE-YEAR PLAN AND ITS COMPLETIONS STATUS

Indicators	Targets set in 2011	Results in 2015
GDP (trillion CNY)	6.58	7.01
Average annual GDP growth rate (%)	10	9.6
Per Capital GDP (10,000 CNY)	8	8.8
Ratio of service sector value added (%)	48	48.6
Ratio of high-tech industry value in industrial output value above the designated scale (%)	40	40.1
Contribution of consumption on economic growth (%)	60	51.5
Urbanization rate (%)	63	66.5
Urban per capita disposable income growth rate (%)	10	13.4
Rural per capita disposable income growth rate (%)	10	15.9
New created urban jobs (10,000 jobs)	500	681.6
Drop in emission of major pollutants (%)	10	Already completed the state indicators
Drop in energy consumption per unit of GDP (%)	25	Already completed the state indicators
Forest coverage (%)	22	22.5

Source: *Jiangsu Provincial Government, 2011; Jiangsu Provincial Government, 2016a.*

The *Outline of the 13th Five-Year Plan for the National Economic and Social Development of Jiangsu Province (2016-2020)* provides guidance for Jiangsu to set development indicators and targets for the next five years. The Plan presents 4 goals – a strong economy, rich people, a beautiful environment and a high-degree social development – and 39 indicators, of which 15 are about greening the economy (see Table 4).

Although not all of the Sustainable Development Goals (SDGs) are explicitly mentioned in the 13th Five-Year Plan of Jiangsu province, the Plan's indicators are still strongly linked with other SDGs (see Table 5). In fact, Goal 5 and 14, while not explicitly mentioned in the Plan, are embodied in other plans and policies. For example, the provincial government has taken the lead in establishing an evaluation mechanism on gender equality policies and regulations at local level and promoting women's participation in policy-making and administrative management fields. According to the official statistical data, the proportion of women in various professional and technical positions is 50.36%, and the maternal mortality rate has been reduced 4.65 per 100, 000 people in 2014 with a decline rate of 6.86% compared to the previous year (China Women's News, 2015 & Jiangsu Provincial Commission of Health and Family Planning, 2015). In terms of the conservation and sustainability of the oceans, seas and marine resources, the *Plan of Jiangsu Province for Ecological Civilization Construction (2013-2022)* also sets the target of offshore environmental function area water quality compliance rate at 85% in 2017 and 90% in 2022.

TABLE 4 MAJOR INDICATORS OF THE 13TH FIVE-YEAR PLAN OF JIANGSU PROVINCE

Category	Indicators	2020 Objective	Average Annual Growth (Accumulative)	Attribute
For strengthening economy	Regional GDP (trillion CNY, at prices of 2015)	About10	About 7.5%	Predictive
	Overall labor productivity (10,000 CNY)	18.5		Predictive
	Urbanization rate of registered population (%)	67		Predictive
	Ratio of R&D expenditure in regional GDP (%)	About 2.8		Predictive
	Contribution of technological advancement (%)	>65		Predictive
	Invention patents held by every 10,000 people (Pieces)	20		Predictive
	Ratio of service sector value added (%)	About 53		Predictive
	Ratio of high-tech industry value in industrial output value above the designated scale (%)	About 45		Predictive
	Modern agriculture development level (%)	>90		Predictive
For enriching the people	Per capita disposable income of residents (10,000 CNY)	About 4.2	About 7.5%	Predictive
	Average schooling of working-age population (years)	12.2		Binding
	Urban employment / New created urban jobs (10,000)		[500]	Predictive
	Registered urban unemployment rate (%) <4		Predictive	
	Rural population lifted out of poverty (10,000)		[300]	Binding
	Urban and rural coverage of basic social insurances (%)	>98		Binding
	Indemnificatory housing coverage for urban permanent population (%)	>=23		Binding
	Coverage of grassroots comprehensive cultural service centers (%)	>=98		Predictive

Category	Indicators		2020 Objective	Average Annual Growth (Accumulative)	Attribute
For beautifying the environment	New construction land (10,000 mu)			Within state indicators	Binding
	Cultivated land quantity (10,000 hectares)		Complete state indicators		Binding
	Drop in water consumption per 10,000 CNY of GDP (%)			[25]	Binding
	Ratio of Non-fossil energy in primary energy consumption (%)		About 10		Binding
	Drop in energy consumption per unit of regional GDP (%)			Complete state indicators	Binding
	Drop in CO_2 emission per unit of regional GDP (%)			Complete state indicators	Binding
	Drop in emission of major pollutants (%)	COD		Complete state indicators	Binding
		SO_2			Binding
		NH_3-N			Binding
		NO_X			Binding
	Air quality	Ratio of days with air quality at Level II or above (%)			Binding
		Drop in concentration of particulate matters (PM2.5)	72		Binding
	Surface water quality	Ratio of surface water with state-controlled sections superior to Category III (%)		[20]	Binding
		Ratio of surface water with state-controlled sections inferior to Category V (%)	70.2		Binding
	Forest growth	Forest coverage (%)	24		Binding
		Forest stock (100 million m^3)	1		Binding
For improving social civilization	Legal system construction satisfaction		90		Predictive
	Public sense of security (%)		>=90		Predictive
	Number of social organizations owned by every 10,000 people		>15		Predictive
	Standard attainment rate for harmonious community construction (%)	Urban	98		Predictive
		Rural	95		Predictive
	Social civilization evaluation index		>=90		Predictive

Source: *Jiangsu Provincial Government, 2016a.*

TABLE 5 COMPARISON BETWEEN THE INDICATORS IN THE 13TH FIVE-YEAR PLAN OF JIANGSU PROVINCE AND SUSTAINABLE DEVELOPMENT GOALS[11]

Sustainable Development Goals	Relevant Indicators in Jiangsu Province[12]
Goal 1: End poverty in all its forms everywhere	• Rural population lifted out of poverty(3 million people) • Per capita disposable income of residents(42 thousand CNY)
Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	• Modern agriculture development level (above 90%) • Cultivated land quantity

Sustainable Development Goals	Relevant Indicators in Jiangsu Province[12]
Goal 3: Ensure healthy lives and promote well-being for all at all ages	• Urban and rural coverage of basic social insurances (above 98%) • Indemnificatory housing coverage of urban permanent population (above 23%)
Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	• Average schooling years of working-age population (12.2) • Coverage of grassroots comprehensive cultural service centers (above 98%)
Goal 5: Achieve gender equality and empower all women and girls	/
Goal 6: Ensure availability and sustainable management of water and sanitation for all	• Ratio of surface water with state-controlled sections superior to Category III (70.2%) • Ratio of surface water with state-controlled sections inferior to Category V (0%) • Drop in NH_3-N emission • Drop in COD emission
Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all	• Ratio of non-fossil energy in primary energy consumption (10%)
Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	• Regional GDP (about 10 trillion CNY) • Ration of service sector value added (53%) • Overall labor productivity (185 thousand CNY) • New created urban jobs(5 million people during 5 years) • Registered urban unemployment rate (below 4%)
Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	• Ratio of R&D expenditure in regional GDP (2.8%) • Contribution of technological advancement (above 65%) • Invention patents held by every 10,000 people (20) • Ratio of high-tech industry value in industrial output value above the designated scale (45%)
Goal 10: Reduce inequality within and among countries[13]	• Urbanization rate of registered population (67%) • Rural population lifted out of poverty (3 million people) • Urban and rural coverage of basic social insurances (above 98%) • Standard attainment rate of harmonious community construction (98%)
Goal 11: Make cities inclusive, safe, resilient and sustainable	• Drop in energy consumption per unit of regional GDP • Drop in CO2 emission per unit of regional GDP • Indemnificatory housing coverage for urban permanent population (above 23%) • Coverage of grassroots comprehensive cultural service centers (above 98%) • Standard attainment rate of harmonious community construction (98%) • Ratio of days with air quality at Level II or above (72%) • Drop in concentration of particulate matters (PM2.5)
Goal 12: Ensure sustainable consumption and production patterns	• Drop in water consumption per 10,000 CNY of GDP • Drop in energy consumption per unit of regional GDP
Goal 13: Take urgent action to combat climate change and its impacts	• Drop in CO_2 emission per unit of regional GDP
Goal 14: Conserve and sustainably use the oceans, seas and marine resources	/
Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	• Forest coverage (24%) • Forest stock (0.1 billion cubic meters) • New construction land
Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	• Legal system construction satisfaction (90%) • Public sense of security (above 90%) • Number of social organizations per 10,000 people (above 15) • Social civilization evaluation index (above 90%)
Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	/

4.2.3 Policies

Since 2011, in order to implement the strategies and plans, Jiangsu has adopted a series of policies relevant to green economy.

4.2.3.1 Industrial upgrading and greening

Energy conservation and emission reduction

Jiangsu has implemented effective policies on phasing out "brown" production capacities and improving industrial energy efficiency. These include strictly controlling on the approval of high-energy consumption and high emission projects, electricity price subsidies for desulfurized and denitrated power plants, and promoting the clean use of coal.

Clean production

Jiangsu issued the *Plan of Jiangsu Province for the Implementation of Cleaner Production Transformation in Key Industrial Sectors* in 2014, requiring cleaner production by using advanced and appropriate technologies in key industries, such as the iron and steel, cement, glass, petrochemical engineering and chemical industries. The objectives for the end of 2017 are: 1) air pollutant discharge intensity of key

BOX 4-1 Circulation renovation projects of industrial parks

In order to promote circular economy development in industrial parks, Jiangsu Province issued the Work Program on Circulation of Industrial Parks in 2013 and the Administrative Measures for Province-Level Eco-industrial Parks in 2014, with the aim to facilitate efficient utilization of resources and centralized treatment of emissions:

- **Adjusting spatial arrangement of enterprises, industries and infrastructures in the industrial parks;**
- **Optimizing existing industrial and product structures, cultivating and developing advantageous and leading industries;**
- **Exploring circular linkage among projects, enterprises and industries in the parks;**
- **Exploring gradient utilization of energy, waste exchanges among enterprises and cyclic utilization of water resources;**
- **Conducting green transformation of logistics, water supply, power supply, heat supply, lighting, buildings and other infrastructures in industrial parks.**

Source: *Jiangsu Provincial Government, 2013b.*

BOX 4-2 Green development of Gold East Paper in Zhenjiang City

Gold East Paper (Jiangsu) Co., Ltd. was founded in 1997, is engaged in the production and sale of various types of paper and paper products and has positioned itself as one of the largest coated paper companies in the world as well as the Top 500 enterprises of China. The company has established a sustainable paper making system from forest planting to environment-friendly pulping and then to the production of high-quality paper products. The enterprise has established fast-growing and high-yield forest covering an area of nearly 3,500 square kilometers to not only provide raw materials for paper-making but also to increase forest coverage.

Gold East Paper has also established a committee to advance energy conservation and cleaner production. In the last five years, it has spent 96 million USD on 22 projects for improving energy efficiency, which have saved 50,000 tons of standard coal on average every year. Furthermore, both emissions discharge and resources consumption have decreased progressively, and COD emission, water consumption and energy consumption per ton of paper are 16%, 29.5% and 59% of the national standards, respectively.

Source: *Zhenjiang Economic and Information Technology Commission, 2015.*

industries should be reduced by over 30% compared to 2012; and 2) to establish a group of advanced clean production enterprises. Measures include intensifying financial support on cleaner production projects and auditing the cleaner production performance of key enterprises, among others.

Environmental Industry

Jiangsu has issued the *Opinions on Accelerating the Development of Energy Conservation and Environmental Protection Industry* for promoting the development of the environmental industry. Major measures include promoting the upgrading of environmental equipment and products in key fields; promoting the adoption of energy management contract (EMC) by public institutions, large-scale public buildings and key energy-consuming units; and accelerating the environmental services sector, such as ecological and environmental restoration, environmental risks assessment, and emissions trading, among many others.

BOX 4-3 Environmental industry grows rapidly in Yixing city

Yixing Industrial Park for Environmental Science and Technology is located in Yixing city. The industrial park covers an area of 212 square kilometers and it is the largest and densest environmental industry cluster in the world, with over 1500 environmental equipment manufacturers, over 3000 supporting enterprises, over 100,000 environmental jobholders and an annual output of over 7.7 billion USD. At present, the environmental industry of the city covers water, gas, noise, solid waste treatment and instruments.

Source: *Workers' Daily, 2015.*

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4.2.3.2 Ecological and environmental protection

With a relatively developed economy, Jiangsu features a large population, a small land area, high GDP and fragile ecosystems. By 2012, its built-up land accounted for 21% of the total provincial land area. It is extremely urgent to balance the benefit of residents and industries, as the province's environmental carrying capacity cannot bear the current level of environmental damage caused by development activities. In June 2013, Jiangsu took the lead to formulate and implement the *Plan for Protecting Ecological Redline Areas*, which encircled 779 redline areas covering natural reserves, forest parks, scenic spots, geoparks, drinking-water source protection areas, flood control areas, key water conservation areas, key fishing waters, important wetlands, watercourse maintenance areas, ecological forests, and special ecological industry areas. These totaled over 23,431.65 square kilometers, or 22.91% of the province's land area. The differentiated regulations and controls for different areas are intended to provide effective protection of key ecological functions and major species, to promote regional sustainable development, and to reserve favorable living and development space for future generations.

Jiangsu launched the "Green Jiangsu" Project (see Box 4-4) to increase total forest resources and raise the forest coverage rate. Since 2009, Jiangsu has also taken the lead in launching high-standard farmland demonstration projects, which aim to improve the soil structure and fertility of farmland while increasing overall agricultural production capabilities. Major measures include steps to improve soil quality, constructing assorted irrigation and drainage facilities, and building farmland forest networks. An ecological compensation and payment system is also being established to encourage local governments to provide more ecological services.

Four major policy measures were undertaken in Jiangsu for protecting the environment. The first

BOX 4-4 "Green Jiangsu" Project

Since Jiangsu has a relatively small area of forestland and few forest resources, the provincial government committed to implement the Construction of Green Jiangsu – a major program at the provincial level – at the beginning of 2003. During the past decade, the gross forest resources of the province have doubled. The forest coverage rate rose from 11.36% in 2002 to 22.2% in 2014. Meanwhile, the total output of forestry increased from 3.3 billion USD to 63.5 billion USD during the same period of time.

Source: *Jiangsu Forestry Bureau, 2015.*

BOX 4-5 Eight consecutive years of sustained improvement of water quality in Tai Lake Basin

Since 2015, all sources of centralized water supply in the Tai Lake basin have met the state requirements, all water supplied by water plants meet or superior to the state standard and no lake flooding has taken place. The quality of Tai Lake water has improved constantly, and the comprehensive nutrition index of Tai Lake is 55.8, a year-on-year drop of 1.3, indicating a mild eutrophic state. Water quality of the 15 major rivers fluxing into the lake has remained stable and never been below Class V14. In addition, the algae situation of Tai Lake is stable on the whole. The first aggregation of blue algae took place at around the same time as the previous year. In total, 81 aggregations were monitored, decreased by 13 over the previous year. Maximum algae density is 121.13 million/ liter, lower than 280.92 million/ liter in the previous year.

Source: *Environmental Protection Department of Jiangsu Province, 2015b.*

is to strictly implement the environmental impact assessment and environmental standards for intensifying the source control of environmental pollution. The second is to accelerate the construction of pollution treatment plants and to reduce the use of pesticides and fertilizers to enhance industrial, domestic and agricultural pollution control. The third is to strengthen the environmental supervision and improve the environmental risks control mechanism. The fourth is to enhance the market-based instruments, including environment pricing and water pollution trading pilot programme in Tai Lake basin.

4.2.3.3 Green trade and consumption

In order to promote green trade and enhance international competitiveness on green products, Jiangsu Province has taken the following measures. The first is to strengthen the environmental supervision over export enterprises and impose administrative penalties on those violating environmental laws and regulations. Based on the penalty decisions issued by environmental authorities, trade authorities could restrict or terminate the export business of relevant enterprises. The second is to improve the environmental awareness of export enterprises through communication and training. The third is to optimize the trade structure. The government is providing increasing efforts to support eligible processing trade enterprises to carry out high-tech, high value-added and pollution-free businesses at home and abroad through advancing the upgrading of processing trade. The fourth is to strengthen early warning, monitoring and information service platform to proactively tackle trade conflicts caused by green trade barriers.

In 2013, Jiangsu provincial government released the *Implementation Plan for Green Building Actions,* with the aim to increase the total area of projects consistent with the green building standard to over 100 million square meters during the 12th Five-Year period, and design and construct 50% of its new urban buildings as per the green building standard at Two-Star Level or above by 2020. Therefore, Jiangsu has formulated a series of policy measures, including promoting its subsidized housing, government investment projects and large-scale public buildings to follow the green building standard comprehensively and advancing major projects such as energy-saving campus and energy conservation and renovation of public buildings.


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Jiangsu is also undertaking measures to establish a green transport system. The first of these is to popularize energy-saving and new energy vehicles in the public transport sector. At present, there are over 9,000 buses powered by compressed natural gas or liquefied natural gas, over 35,000 taxies powered by both fuels and over 3,000 intercity passenger and freight vehicles powered by Compressed Natural Gas or liquefied natural gas in Jiangsu province. The second measure is to advocate green trips through optimizing the public transit network, developing urban railway system and rapid public transit system. In 2013, the rate of urban public transport vehicles per million people reached 12.1 standard units, with an urban public transit share of 20%. The third measure is the construction of green transportation infrastructure. All expressways, state and provincial arterial highways, railways and waterways of Jiangsu province are compliant with provincial environmental standards. The fourth measure is to carry out demonstration programs to raise awareness and trigger more action. For example, Wuxi and Huai'an have been selected as demonstration cities for low-carbon transport system development by the Ministry of Transportation. Nanjing is in the first group of cities named as "Transit Metropolis" in China (Jiangsu Provincial Government, 2014a).

The government is also advocating green consumption through various approaches. The first is to provide tax incentives or financial subsidies throughout the production, sales and consumption of the products with green labels. For instance, the government provides financial subsidies to public and private consumers for purchasing energy-efficient and electric vehicles offers financial incentives to service suppliers who construct charging facilities in the public service sector. The second approach is to encourage the use of environment-friendly packaging and limit the production, sale and use of disposable goods. The third approach is to intensify government procurement of energy-efficient and environment-friendly products.

4.2.3.4 Green employment and ecological services for poverty alleviation

Green employment includes both the greening of existing jobs and the creation of newgreen job opportunities. Jiangsu Province has identified two major policy objectives related to green jobs. The first is, to stabilize job opportunities during businesses green transitions. To ensure minimum job loss during transitions, the government provides enterprises in transition with unemployment insurance. Moreover, government funds that enterprises receive for eliminating outdated capacity and land compensation should be used to

BOX 4-6 Organic integration of precision poverty alleviation and ecological economy in Siyang county

In Siyang county, the poplar industry is the most important sector of the economy. However, farmers have been increasingly inactive due to the increased diseases and pests in poplars and the decline of earnings in recent years. To solve the problem, the government of Siyang county has bought 1.25 million high-quality seedlings and offered them to low income farmers free of charge. These seedlings have been planted along the old course of the Yellow river and on the banks of the Liutang River and the Huaimu River as well as around houses. The 26 square kilometers ecological forest increase has brought earnings to low-income farms and also improved environmental quality.

To solve the problem of capital shortfalls and technology gaps for low-income households, the government has guided over 7,500 households to participate in the mechanism of virtual contribution in terms of shares, where enterprises provide funds for plantation of forest and then, low-income households repay such funds directly after rewards and compensations are paid by provincial finance and dividends, 10% of shares, with a minimum guarantee are distributed every year. There are 109 low-income households in Nongli Village, Likou Town have bought the shares of Sufeng Agriculture, planted over 200 mu of peach trees and enjoyed 10% dividends as well as the priority to plantation, management and picking jobs at the company's agricultural base with a daily wage of 8 USD or above.

Source: *People's government of Suqian city, 2016.*

fund associated staff resettlement. The second is to create more jobs through supporting the development of green industries. In 2012, enterprises engaged in environmental industry reached over 1,600 and employed over 400,000 staff. Meanwhile, the government is striving to increase people's employability by providing vocational and entrepreneurship training on green business and green job skills.

to the government has also dedicated significant resources towards rural poverty alleviation. By the end of 2014, 2.95 out of the 4.11 million registered rural low-income population had been lifted out of poverty, with a poverty relief rate of 72%. Major measures adopted include: (1) Identifying key poverty alleviation targets, putting emphasis on poverty reduction through developing projects for rural low-income populations with annual average net income below 637 USD, and providing salvation to rural low-income populations incapability of work; (2) Promoting poverty reduction through industrial development, including encouraging low-income farmers to develop agriculture through efficient facilities, guiding enterprises to invest in less-developed regions, increasing income for low-income farmers and intensifying financial support to promote the development of collective economy. This included strengthening vocational education, labor skill training and career guidance service for poor populations in rural areas where development-based poverty reduction projects are implemented; (3) Promoting poverty reduction through improving social security standards, including determining rural subsistent guarantee standard according to the schedule and raising the basic pension standard of new rural social insurance gradually. Measures were also introduced to improve rural education and provide better healthcare to rural populations (Jiangsu Provincial Government, 2014b).

Based on the review of the foregoing policies, the current policies share the common features in terms of promulgation and implementation.

Firstly, fiscal policies play an important guiding role. Powerful government finance is required for the implementation of various plans, schemes and measures of green transition. To promote green economy, the provincial government has issued a group of financial subsidy policies to weed out outdated capacities, support the development of strategic emerging industries and modern service industries and adjust the energy structure.

Furthermore, although policies are implemented mainly through administrative means, economic means are starting to play an important role. Administrative orders, regulations and rules are important means adopted by the government of Jiangsu Province to promote the transition to green economy, supplemented by subsidies, awards and tax benefits. During the implementation phase, policies such as desulfurization and denitration, electricity price subsidies, differential electricity prices, ladder-like water pricing, emission trading, and other market approaches have started to show their effects and are to be reformed and deepened further.

However, some policies remain in the initial phase and need cross-sectoral support. During the 12th Five-Year Plan period, intensive policies related to green economy have been promulgated. Staged objectives are set for some policies, such as energy conservation, emission reduction and ecological protection, and continuity should be taken into account during the implementation. As various sectors and fields are involved in the transition to a green economy, policy measures cannot be implemented until these sectors are well coordinated.

Finally, major government-led construction projects have demonstrated positive impacts. To ensure that objectives are achieved, the provincial government has promoted the implementation of energy conservation, emissions reduction and clean production policies through major government projects, such as energy conservation of public institutions, cyclic transformation of industrial parks and construction of green transport infrastructure.

5. Green Economy Challenges in Jiangsu Province

Although significant achievements have been realized in Jiangsu Province, various green economy challenges remain. In this report, major issues and challenges are identified from a macro-level analysis and a sectoral analysis.

5.1 Macro-economic analysis

5.1.1 Economic structure

The reliance on heavy industry intensifies the conflict between economic development and natural resources and the environment. The share of heavy industry in the output industrial enterprises rose from 57.8% in 2002 to 74% in 2013 in Jiangsu. Presently, the land-use intensity of the province approximates 21% and that of the southern part is nearly 28%, with a prominent conflict between the rigid demand for construction land and the protection of cultivated land. In regards to energy consumption, over 92% of coal, over 93% of crude oil and over 99% of natural gas are imported from other provinces or countries (Jiangsu Provincial Government, 2012).

The overcapacity of traditional industries intensifies the pressure on green economy by impairing the profitability of enterprises and weakening the expenditure effect of financial policies. At the same time, the removal of large-scale excess capacity also entails financial costs. In 2012, the capacity utilization rate of pig iron in Jiangsu Province was 77%, crude steel 76.3%, cement clinker 87%, powder grinding 68%, plate glass about 77% and shipbuilding 74%, all lower than 79%-83%, which is the reasonable level recognized by the international community (Jiangsu Provincial Government, 2013c).

The long-term dependence on secondary industry slows down the pace of green economic growth. The secondary industry stably contributes to 60%-70% of the economic growth of Jiangsu Province. In 2014, the contribution of the tertiary industry reached to 42.3%, still 13.6 percentage points lower than the 55.9% of the secondary industry. Meanwhile, the conventional sectors in the secondary industry are less powerful drivers of economic growth and emerging industries are not yet major contributors to the economy.

5.1.2 Economic growth

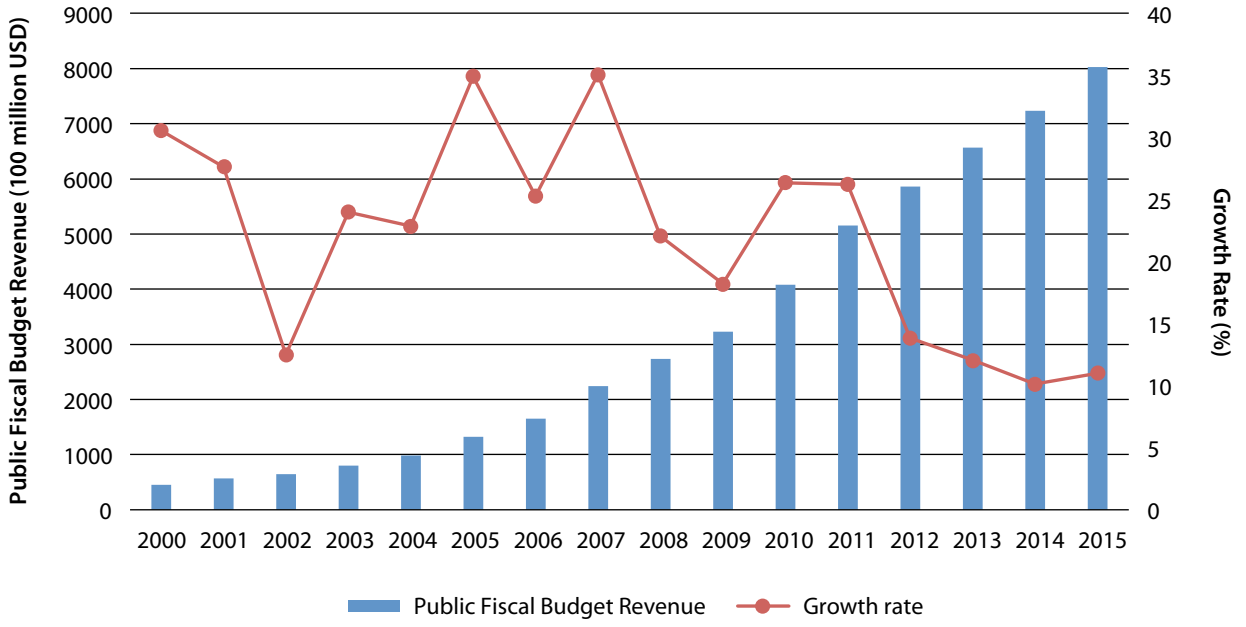
In terms of economic growth, Jiangsu is shifting from a level of high-speed growth to one of medium-to-high speed growth. The economic growth rate of Jiangsu dropped from 12.6% in 2010 to 8.7% in 2014. The slowdown has had some negative effects on the development of the green economy. Reduced financial revenue restricts the capacity of green transition and he fiscal revenue of Jiangsu has witnessed a constant decline since 2011, with fiscal revenue growing at a mere 10.1% in 2014 (see Figure 11). Similarly, the pressure of economic growth may also make local governments less active in green transition. As a consequence of the economic downturn, heavy industries have been hard hit, which in turn has resulted in loss of jobs. In addition, to control pollution, heavily polluting enterprises haven been shut down and the admittance standard to control pollution has been raised by local governments. For instance, over 5,000 enterprises were shut down in Wuxi city. However, despite the difficulties they face, cities are facing increasing pressure on to maintain steady economic growth.

5.1.3 Urbanization

The development gap between urban and rural areas and among regions needs to be urgently reduced. The urban to rural per capita disposable income ratio reached to 2.2:1 in 2015 and the gap is a primary reason for social inequality. At present, the labor productivity of the agricultural sector of Jiangsu is only 25% of that of the industrial sector. At the same time, urban-rural gaps in transport, public infrastructure and public service supply remain evident. In addition, there are huge regional gaps regarding urbanization. In 2013, the urbanization rate was 73.5% for Southern Jiangsu, 59.7% for Central Jiangsu and 56.1% for Northern Jiangsu (Jiangsu Provincial Government, 2014c).

However, despite these differences, both urban and rural environmental protection needs to be

FIGURE 11 PUBLIC FISCAL BUDGET REVENUE OF JIANGSU PROVINCE



Source: *Jiangsu Provincial Statistics Bureau, 2016a.*

strengthened. As a whole, the environment of Jiangsu is suffering from high pollution and continues to be at risk. The pollution load per unit of national territorial area is high, watershed pollution is yet to be solved, and regional dust-haze pollution trends are worsening. Energy consumption levels are high and energy conservation and emission reduction tasks remain daunting. Cultivated land reserves are deficient and it is increasingly hard to balance requisition and compensation. Tensions still exist between high production and consumption lifestyles and the fragile carrying capacity of the local environment.

5.1.4 Regional differences on green economy progress

Jiangsu Province is divided into three regions based on geography and levels of economic and social development: Southern Jiangsu (Nanjing, Zhenjiang, Suzhou, Wuxi and Changzhou), Central Jiangsu (Yangzhou, Taizhou and Nantong) and Northern Jiangsu (Xuzhou, Huai'an, Yancheng, Lianyungang and Suqian). In general, Southern Jiangsu represents a well-developed economy, followed by Central Jiangsu, and Northern Jiangsu, which are less developed.

The *Report on Green Development Evaluation of Jiangsu Province (2010-2012)* issued by Jiangsu Provincial environmental protection bureau in 2014 established a Green Development Index (GDI) for evaluating the green performance of the 13 cities in the province. Research results indicate that Southern Jiangsu has achieved a relatively high level of green development, followed by Central Jiangsu and Northern Jiangsu (CAEP, 2014).

In terms of resource consumption, the Index shows that Southern Jiangsu has lower water resource consumption and construction land-use intensity, but its energy consumption presents a challenge. With the exceptions of Yancheng and Suqian, where energy consumption is lower, there is still huge potential for Northern Jiangsu to improve on water resource consumption, construction land use and energy consumption.

In relation to pollution discharge, the Index shows that Southern Jiangsu performs better than Northern Jiangsu, with higher environmental costs for industrial pollution than household pollution. The contribution differs remarkably amongst different pollutants, and and pollution takes the lead.

In the aspect of ecological benefits, Northern Jiangsu ranks top, followed by Central Jiangsu and Southern Jiangsu. However, Southern Jiangsu has experienced the highest rates of improvement and its ecological

benefit index is approaching that of Northern Jiangsu and Central Jiangsu. Therefore, major differences in the green development of these regions are related to the resource consumption index and the pollution deduction index. In general, Northern Jiangsu and Central Jiangsu show a poor efficiency of resource utilization and have paid an environmental cost for their economic development. In the future, the government of Jiangsu Province should make special efforts to improve resource efficiency and reduce the pollution intensity of Northern Jiangsu and Central Jiangsu.

5.2 Sectoral analysis

5.2.1 Energy sector

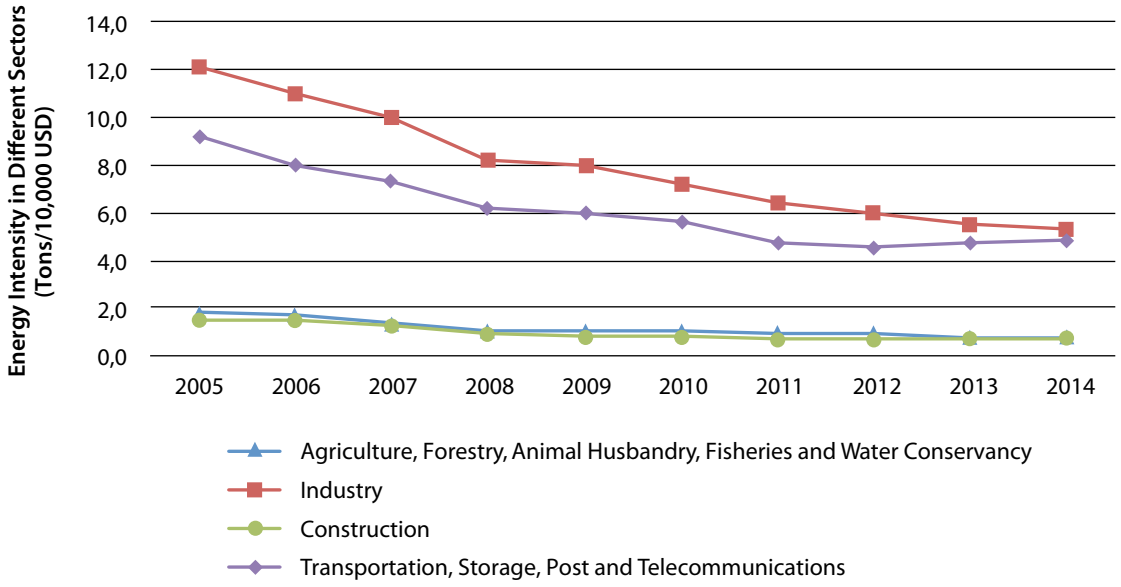
Energy consumption in Jiangsu Province rose from 88.81 million tons of standard coal in 2001 to 319 million tons of standard coal in 2014, with an annual average growth of 19.9%. From 2005 to 2014, the energy consumption intensity per 10,000 USD of value added decreased from 0.22 to 0.12 ton of standard coal in agricultural sector, from 1.49 tons to 0.86 ton in industrial sector, from 0.19 ton to 0.11 ton in construction sector and from 1.13 tons to 0.78 ton in transportation, storage and post and telecommunication industries (see Figure 12).

Jiangsu Province is still facing a number of challenges related to energy consumption. For example, energy demand is far from self-sufficient, and 92% of coal, 93% of crude oil and 99% of natural gas are imported from other provinces or countries.Furthermore, though the province's energy efficiency is 1.4 times of the national average, its energy intensity is still higher than Beijing, Guangdong, Zhejiang and Shanghai and much higher than developed countries. For example, the province's energy consumption intensity is 3 times of the U.S., 4 times that of the EU and 8 times that of Japan (Jiangsu Provincial Government, 2012).

5.2.2 Agricultural sector

In 2015, the total grain yield reached 35.61 million tons, increased by 707,000 tons, which is 2.0% over the preceding year. Agricultural modernization keeps advancing, with the high-standard farmland ratio exceeded by 50% and the contribution of agricultural science and technology raised to 65% (Jiangsu Provincial Statistical Bureau, 2016b). However, to achieve this its agricultural water consumption rose from 28.85 billion cubic meters in 2004 to 30.19 billion cubic meters in 2013, and the ratio of agricultural water consumption increased to 53.4% in 2013. Pesticide use intensity dropped from 13.5 kg to 10.4 kg from 2005 to 2014, but fertilizer use intensity is

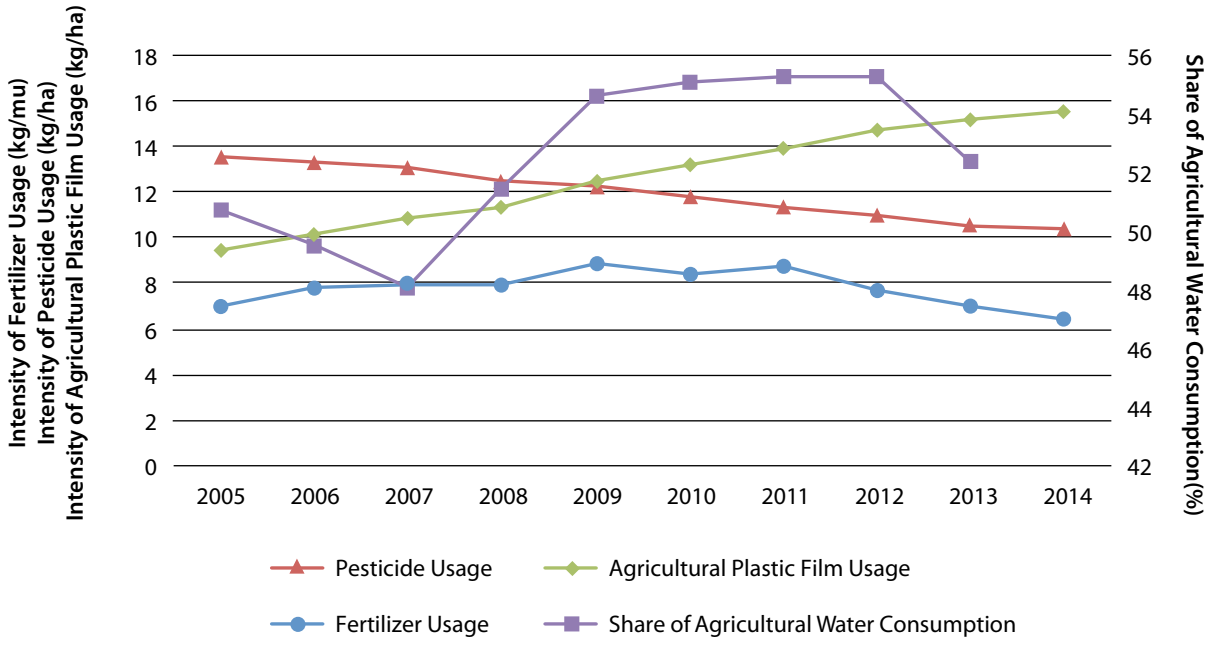
FIGURE 12 ENERGY CONSUMPTION INTENSIFY IN DIFFERENT SECTORSAREAPOPULATION AND GDP



Jiangsu Provincial Statistics Bureau, 2015.

stable between 46 kg and 49 kg. In particular, agricultural plastic film use intensity rose from 9.4 kg in 2005 to 15.6 kg in 2014 (see Figure 13). Therefore, on the whole, while making progress in agricultural modernization, Jiangsu Province is still facing issues and challenges. One challenge is the low water-use efficiency in agricultural sectors and the other is the high incidence of agricultural pollution.

FIGURE 13 RESOURCES CONSUMPTION OF AGRICULTURAL SECTOR



Source: *Jiangsu Provincial Statistics Bureau, 2015.*

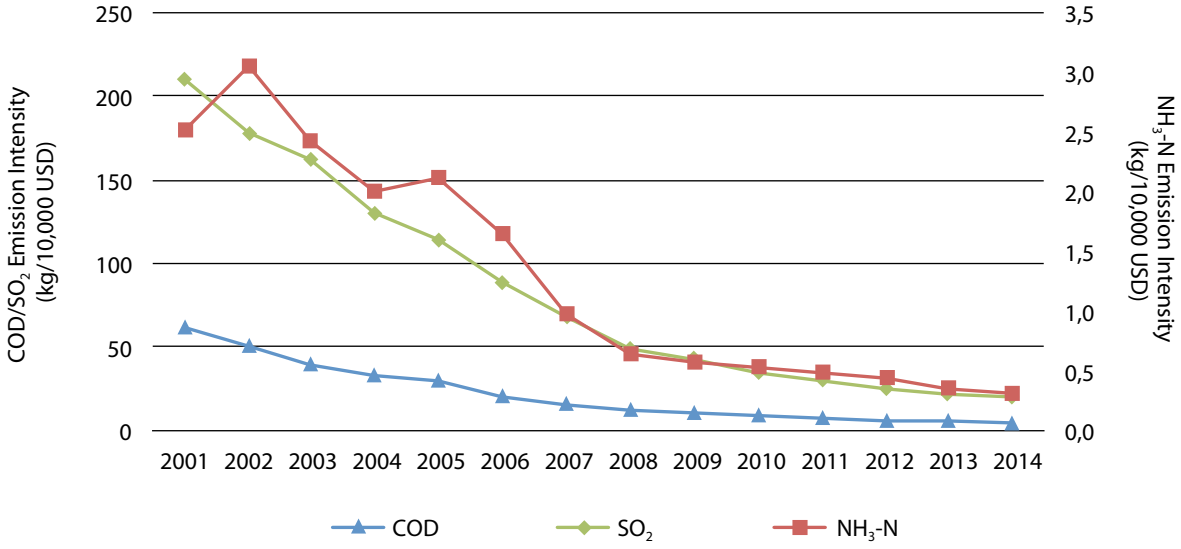
5.2.3 Industrial sector

The computer, communication and other electronic equipment manufacturing sectors account for the largest share – 12.7% – of total industrial output value, followed by chemical raw materials and chemical products, electrical appliance and equipment manufacturing and ferrous metallurgy, with the ratio of 11.8%, 11.4% and 7.4% respectively. In 2014, the output value of high-tech industries in Jiangsu province reached 928 billion USD, or 39.5% of the total industrial output value of the province. Most of the top 10 industries for output value were part of the high-tech sector. Among them, output value of pharmaceutical manufacturing, automobile manufacturing, general-purpose equipment manufacturing and instrument manufacturing have all grown at a rate of 10%. As can be seen from the investment structure, each of electrical appliance, general-purpose equipment, special-purpose equipment, transport and communication equipment end electronic information has exceeded 2.6 billion USD, with a growth rate of 8%-12% (Jiangsu Development and Reform Commission, 2015). This indicates that the green economy transitions is under way in Jiangsu province. As for pollution intensity, from 2001 to 2014, COD emissions per 10,000 USD of industrial value added dropped from 7.4 kg to 0.75 kg, SO_2 emissions declined from 25.5 kg to 3.2 kg and NH_3-N emissions decreased from 0.3 kg to 0.05 kg (see Figure 14).

Though Jiangsu Province has achieved a large scale of manufacturing as well as domestically advanced manufacturing capability and the ability to provide auxiliary facilities, it remains at the lower end of the international industrial value chain, with lack of technical capacity restricting the transition to a green economy. This is due to a number of factors.

Firstly, traditional industries are locked at the lower end of the international labor division system, with

FIGURE 14 EMISSION INTENSITY OF MAJOR POLLUTANTS IN JIANGSU'S INDUSTRIAL SECTOR



Source: *Jiangsu Provincial Statistics Bureau, 2015.*


© Robert Harding – High-Tech, switch production, women worker, technician.

fewer high-value added links. During transition and upgrading, enterprises may face barriers related to intellectual property rights and technological blockage of transnational corporations.

Secondly, the capacity for mastering core technologies and conducting research on emerging industries is lacking. Most key components, such as the top-grade numerical control systems, precision measurement instruments and top-grade bearings, are still imported. Imports of critical components of large-scale engineering machinery and top-grade NC machine tools account for more than 40% of the cost of the complete machine, which limits the international competitiveness of Chinese enterprises. With a technological dependence rate as high as 60%, many high and new technologies are still controlled by foreign interests (Jiangsu Development and Reform Commission, 2015).

5.2.4 Trade and foreign investment

The main exports from Jiangsu Province include electromechanical and high-tech products, textiles and garments, and automatic data and rolled steel, many of which are high-polluting. Some research suggest that every percentage increase in exports of electromechanical products from Jiangsu leads to a 0.22% increase in industrial emissions, a 17.24% increase of solid waste, and a 2.1% increase of industrial wastewater. These are 0.28, 6.95 and 1.68 times, respectively, in the levels associated with general modes of trade. Increased energy consumption is another negative effect of Jiangsu's export composition. Energy consumption rises by 18.7% for every percentage increase of processing trade export, whereas a 2.27% increase of energy consumption for every percentage increase of general trade export (Yuan, J. and Chen, Y., 2013). As demonstrated by the preceding analysis, greening Jiangsu's trade is challenged by an irrational import and export structure. The exported products are mostly goods with high resources consumption and serious environmental pollution, and at the lower end of the industrial chain. Furthermore, exports in general have a higher intensity of resource consumption and pollution, while imports tend to be lower. This is an important reason for the environmental deficit of trade.

5.2.5 Consumption sector

The ultimate cause of environmental problems is unsustainable production and consumption lifestyles, and building a green and sustainable consumption system is the key to promoting a green transition.

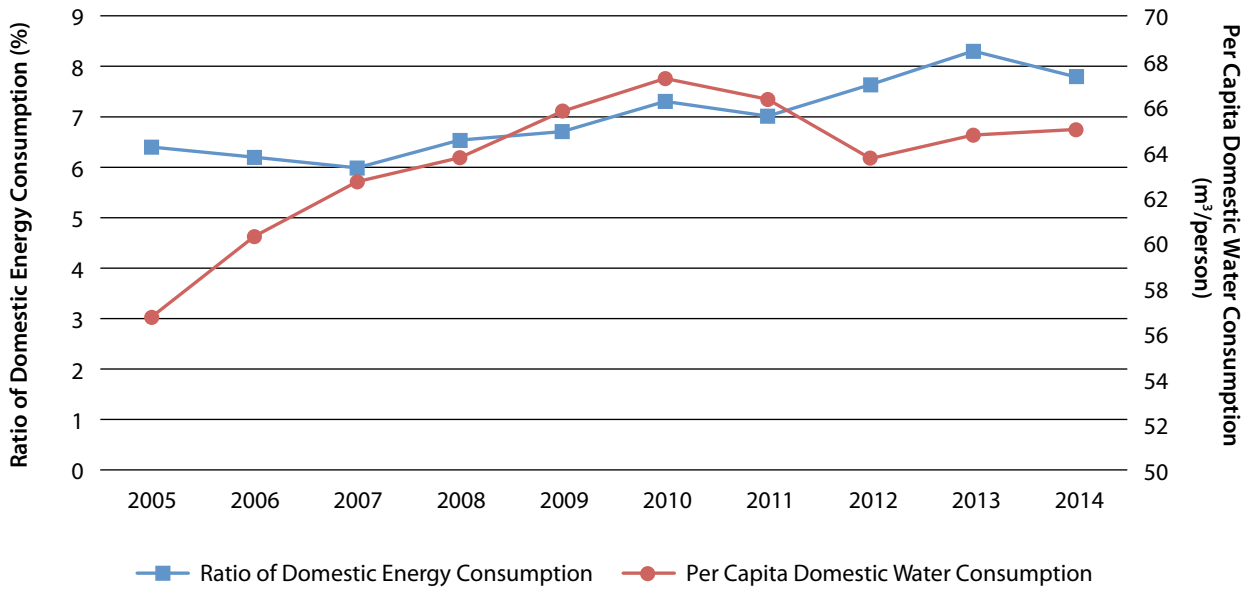
To achieve green transition, the government of Jiangsu Province has undertaken a group of measures with respect to green building, green transportation and green products consumption. However, its green transition in consumption is still at the preliminary stage in general, and various issues and challenges still remain. Firstly, household energy and resource consumption remains high. Per capita domestic water consumption rose from 56.7 m^3 per person to 64 m^3 from 2005 to 2014, with a growth of 12.9%. During the same period of time, Jiangsu's domestic energy consumption increased from 10.983 million tons of standard coal to 23.274 million tons of standard coal and the corresponding ratio of domestic energy consumption rose from 6.4% to 7.8% (see Figure 15). In 2014, COD emissions from domestic sources accounted for 48% of gross emissions and NH_3-N emissions was 63.7%.

Furthermore, green consumption initiatives are still at the stage of demonstration and piloting. With respect to energy efficient building and green transportation, the pilots and demonstration sites are mainly supported by government subsidies and investment by public institutions and key transportation infrastructure. In addition, reduced consumption through behavioral change has not yet been achieved in the province. To address this, the government has formulated a series of green consumption policies, such as new energy subsidy, investment to energy-efficient service sectors, subsidy for green vehicles and expansion of green government procurement. Although there is some level of influence on individuals and public organs, these policies have yet to affect a shift to green consumption across society and the market for green consumption has not yet been established.

5.2.6 Social sector

An inclusive green transition should benefit all social groups and promote social equity at large. Currently, major challenges from the social sector in Jiangsu could be categorized as below: 1) The increasing pressure to ensure stable and decent employment when the economy is experiencing a slowdown and structural change; 2) Social security issues for informal workers, many of whom lack of pension and medical insurance coverage; 3) Public service gaps between the urban and rural areas, especially the supply of basic medical treatment, environmental infrastructure and education for rural residents.

FIGURE 15 CHANGES OF DOMESTIC ENERGY AND WATER CONSUMPTION



Source: *Jiangsu Provincial Statistics Bureau, 2015.*

© You Ji/World Bank – A family enjoys some urban green space.

5.3 Summary of challenges

5.3.1 Awareness of green economy

Green economy differs from simple environmental protection in that it aims specifically to create new employment, trade opportunities and industries while improving the environment by guiding green trade, production and consumption, supporting the development of environmental industries, and achieving economic growth.Hence, more attention should be paid to the policies of the development of green projects and the growth of green industrial sectors. As green development has attracted increasing attention from the national government, relevant policy systems are developed and disseminated from central to local levels. However, efforts from governments, enterprises and individuals are required to realize green production and consumption and behavioral change. In addition, effective incentives and restraint mechanisms should be established to guide enterprises, individuals and society to develop the awareness and finally build a social atmosphere of green development.

5.3.2 Adjustment of economic structure

For a long time, the economic growth of Jiangsu has depended largely on industrial development, and heavy industries in particular. Although some efforts have been made in pushing changes to the industrial structure, due to the sunk cost, economy of scale and vested interest, traditional industries still rely to a large degree on the old development path. The key to the green transition is to build a fair market competition system and an efficient resource conservation and environmental protection system. By combing the upgrading of traditional industries with circular, low-carbon and green development Jiangsu can achieve resource-efficient and environment-friendly development.

5.3.3 Technological innovation

Technological innovation will play a critical role in enabling Jiangsu Province to transform its industries,, enhance industrial competitiveness, and reach the top of the value chain. Green economy related concepts should be incorporated into technological innovation to raise resource efficiency and reduce waste discharge. Various policies, such as those on finance and tax, and protection of Intellectual Property Rights (IPR) are needed to encourage traditional enterprises to strive for green development and new enterprises to embrace technological innovation. Also, support should be given to cooperation among local governments, research institutions and enterprises in building green industry alliances so as to accelerate the exchange of green technology.

5.3.4 Policy coordination and implementation

The government has adopted a series of green economy related policies in recent years. Mechanisms to facilitate the coordination, implementation, supervision and evaluation should be established so that these policies can work in a consistent and coherent manner. Green development has multiple objectives, including improved environmental quality, ,economic growth, and social equality. Coordinated implementation of employment policies, social security policies and environmental policies is another key aspect of green transition. In terms of strict control of environmental pollution, the government should guide and support enterprises to benefit from green economy through fiscal and tax policies.

5.3.5 Government governance system

Effective government management is needed to ensure the effective implementation of green development policies. On the one hand, effective government management is needed to engage enterprises and the general public actively in green development and build a favorable atmosphere of green economy. On the other hand, the objective of government management is to build an endogenous mechanism for green transition, for which administrative and economic measures are needed for market mechanisms to work and contribute to green economic transition.

© PRCEE – Visit Jiangsu green building and ecological intelligent city exhibition center.

6. Priorities of Green Economy in Jiangsu Province

6.1 Macro-economic level

Based on the summary and analysis in previous chapters, to scale up the green transition in Jiangsu at the macro-economic level, the Provincial government should prioritize efforts in five areas:

First, cultivating green economy concepts proactively. Defining long-term objectives for key areas of green economic transition, including energy and resource conservation, ecological and environmental quality, social equity and relevant security measures and implementation mechanisms. Using economic incentives to guide the market and the public to take part in green economy and form joint social forces for green economy. Facilitating the general public to understand and accept the concept of green economy under the regulation systems and policy framework.

Second, strengthening strategic management in key sectors to promote green investment and green industrial transition. In terms of renewable energy development, policy attention should be given to demand side to facilitate the capacity of utilization of renewable energy power. Methods including making compulsory laws and regulations, resolving challenges regarding to the integration of renewable energy power into the grid, driving down the cost of renewable energy through the combination of tax and subsidy policies, and encouraging the application of renewable energy in all industrial sectors, residential buildings and automobiles.

To facilitate green industrial transition, key areas include accelerating the phase-out of outdated capacities, restraining the excessive growth of industries with high energy consumption and high pollution and encouraging the concentration of industries to advantageous enterprises. In addition, more efforts should be given to apply clean production in traditional manufacturing sectors comprehensively, encourage the development of industrial agglomeration and facilitate gradient utilization of energy, circular utilization of water resources and intensive use of land.

To promote green trade, the structure of export products could be upgraded from resource-based to environmental technology-based. Moreover, strict resource and environmental standard should be applied to export products.

Third, enhancing the development of green markets and building green production and consumption systems. Green building is a key sector has significant potential to grow, efforts could focus on energy-efficient reform for existing buildings, the industrialization of green residential buildings and green renovation, and encouraging the public to choose energy-efficient and environment-friendly decorative materials to control indoor air pollution.

Another key sector is green transport. The focuses should be given to the efficient use of transport resources, strengthening urban green transports' carrying capacity, reducing the resource and energy consumption intensity of transportation and encouraging the general public to adapt to green transport. To catalyze the development of green markets, the overall process of product supply, market circulation and consuming behavior should be understood to improve green market service network. In promoting

© Robert Harding – Mid section view of two men working in a tea factory, Yixing, Jiangsu Provincecenter.

green procurement, efforts should focus on improving ecological products design , reducing excessive packaging, developing green logistics and popularizing garbage classification. In addition, a standard for green, energy-efficient and low-carbon products should be established to facilitate reducing consumption of unnecessary disposable products and cultivating service model and consumption pattern for green and low-carbon goods.

Fourth, strengthening basic capacity for green economy. Integrated support from infrastructure, technological innovation and management capacity are needed for a comprehensive green economy development. Thus, investment priority should be given to fields such as green transportation and environmental protection facilities infrastructure development. At the same time, more efforts should also be given to strengthening research capacity on green technology development, improving support to technological innovation for green industries and building a green industrial chain. Moreover, it is important to enhance basic capacity in respect to the green standards setting, statistics, measurements and monitoring of green growth fields in energy conservation, new energy and carbon emission reduction, as well as strengthen the ability to implement relevant laws, regulations and policies. It is strategic to advance dialogues and exchanges with other countries, regions and international organizations with regard to green development strategies and green technology innovation to maximize the coordinated effect for green economy.

Finally, improving relevant policy systems and stimulating endogenous dynamics of green economy. Establishing a sound system of green economy indicators to strengthen the assessment and evaluation to guide governments at all levels to implement green development concepts is essential. At the same time, fiscal policy' leverage effect could enhance green economy development through providing support to the research, development, sales and market promotion green and energy-efficient products. It is imperative to ensure adequate investment in green transition from private and public sources. By supporting green finance development, it could encourage financial institutions to provide preferential credit support to green technology and establish a sound credit guarantee system for technological innovation for small and medium-sized enterprises. By providing differential discounts from fiscal funds to green

© PRCEE – Solar panels & Windmills in Yancheng city.

technology financing, it can improve the expected return for businesses and encourage them to adopt green technologies. By guiding financial institutions and social capital to participate in green technology development, it can encourage financial institutions to provide more financial service for green technology companies.

6.2 Sectoral level

Based on the analysis in previous chapters, priorities for the energy, agriculture, industrial, trade and consumption sectors include the following:

Firstly, improving energy efficiency and controlling total energy consumption. Cutting down energy consumption from industries with high energy demand and excessive capacity is the first step, at the same time, controls for total energy consumption of all industries should be strictly managed through setting high entry criteria for high-energy-consumption, high-emission and resource-oriented industries and ensuring newly increased capacities meet the advanced energy efficiency standards of China. Equipment modification in traditional industrial sectors should be supported, such as developing efficient boilers, high efficient motor and carrying forward the utilization of residual heat and pressure. Through upgrading and transforming outdated coal power generating units, it can facilitate the development of clean and renewable energy, and intensify technological innovation and application in key fields, such as distributed energy, intelligent power grid, new-generation nuclear power and biomass energy.

Secondly, strengthening intensive water utilization in agriculture and improving the use-pattern of fertilizers, pesticides and agricultural film. On one hand, investment should be given priority to efficient water-saving projects, for example, popularizing the application of water-saving irrigation technologies and experience, and adjusting measures for balancing water saving and income increase of major grain producing areas according to local conditions. On the other hand, Value Added Tax policies for the sales of fertilizer should be strictly implemented, at the same time, to reduce direct subsidies to farmers on the use of fertilizers, pesticides and other producing materials, which may jeopardize the environment, and promoting standard transformation and construction of large-scale livestock breeding.

© Robert harding – A man rowing a rowboat in a canal, Zhouzhuang, Kunshan City, Jiangsu Province.

Thirdly, intensifying the control of excessive capacities, energy conservation and emission reduction in key industries, promoting industrial structural adjustment, and facilitating the greening and technological innovation in traditional manufacturing sectors. It is important to accelerate the phase-out of outdated capacities, suppress the excessively rapid growth of industries with high energy consumption and high pollution, and control the proportion of heavy industry effectively. At the same time, the entry criteria into high energy, high pollution and resource-oriented industries should be revised, specific requirements for resource allocation and indicators for energy conservation and pollutant emission should be defined. Moreover, environmental admittance conditions should be raised for all industries, strictly control the approval for land use and determine industrial scale and productive force

allocation reasonably. The contribution from sectors of environmental protection, renewable energy, information technology, high-end equipment and new material in the economy should be further enhanced; at the same time, clean production in traditional manufacturing sectors should be encouraged, concentrated development of industries and the establishment of an ecology-oriented industrial system should be promoted.

Fourthly, improving resource and environment efficiency of key industries and accelerating the green adjustment of trade structure. Formulate environmental standards and establish certification systems with the aim to raise environmental efficiency. Strengthen international technological cooperation, improve further technological level of exports and reduce energy consumption. Provide an enabling environment for participating into global value chains of environmental goods and services; help business move up the value chain of renewable energy products such as solar panels and explore opportunities in south-south trade and investment, including with African countries and "One Belt One Road" countries; encourage application of international sustainability standards and good practices in sustainability management of supply chains.

Fifthly, taking measures to encourage green consumption through green procurement, green transport, green buildings and green energy. Measures should focus on promoting the construction of standards and certification systems for green, energy-saving and low-carbon products; through enhancing the carrying capacity of urban green transport, reducing energy and resource consumption intensity, encouraging the public to take green transportation to improve the efficiency of transport resources. In terms of green buildings, focus should be focused on promoting energy-saving transformation of existing buildings, facilitating the industrialization of residential housing and green renovation, guiding the public to choose energy-efficient, environment-friendly decorative materials and enhancing the control of indoor air pollution.

Finally, exerting the guiding role of green policies to ensure green development to benefit all social groups. Through promoting investment in green infrastructure and enhancing green skills training to create more decent jobs and at the same time to satisfy the labor demand of green transition. By increasing green public service, such as clean water, clean energy in rural and poor areas, to improve the quality of life and promote social equality.

© Huang Tianhong – Flying birds.

7. Suggestions for Future Work

Based on the analysis above, priorities of the next phase PAGE project in Jiangsu could focus on:

(1) In cooperation with relevant government departments, carrying out training programmes, exchanges and discussions with relevant government departments, businesses, experts, researchers and social organizations to raise awareness and improve understanding of green economy;

(2) in partnership with local research institutes, developing the theoretical framework and application of green economy indicators for the province, including at the macroeconomic and business level;

(3) establishing a network of green industrial parks for peers to share information, exchange experience and facilitate cooperation;

(4) conducting green employment training, including training for trainers, entrepreneurs and policy makers, to help local government and businesses avoid green transition led job losses, and at the same time, to explore new green opportunities;

(5) taking energy restructuring as an entry point and the main line for future activities. Conducting studies on green industries, green employment and green trade relating to the construction of regional energy networks. Experience, advanced technologies and best practices from other regions will be shared with relevant policy departments, research institutes and enterprises of Jiangsu and policy suggestions will be provided accordingly;

(6) conduct studies for green trade, including trade in environmental goods and services (EGS), and trade and investment cooperation with developing countries on renewable energy products and clean technologies. Improving research and building capacity for promoting EGS trade, including statistical methods of environmental industry and its export potential, effective use of trade and investment policy instruments to facilitate a green transition. Summarize Jiangsu's experience in developing renewable energy and on this basis, attempt to expand trade and investment opportunities for renewable energy and environmental industries and cooperate with other developing countries in green trade, investment and clean technologies;

(7) conducting studies and capacity building on greening supply chains in the manufacturing sector, including the sharing of international good practices that are relevant to the industrial characteristics of Jiangsu Province. Assisting enterprises to discover opportunities from green supply chains to improve their competitiveness through sustainable value chain management.

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NOTES

1. Chinese government has incorporated the implementation of the *2030 Agenda* into the 13th Five-Year Plan, underpinned by the idea of promoting an "innovative, coordinated, green, open and shared development". The plan also put forward a series of targets and indicators for measuring inclusive green development.
2. According to the average RMB-to-USD ratio of 2015.
3. Construction land is the land used to establish buildings and structures, including the land used to build urban and rural houses and public facilities or infrastructure of energy, transport, water conservancy and communication land for industry and mining and tourism.
4. Construction land productivity is the value added of the secondary industry and the tertiary industry per unit of construction land.
5. Class III water is mainly suitable for centralized drinking, fishing areas and swimming.
6. Class IV water is mainly suitable for general industrial use and the water used for entertainment and the human body can't directly exposure to it.
7. All data of per capita GDP, ratio of secondary industry, ratio of tertiary industry, total population, urbanization level, urban and rural per capita disposable income are for the year 2015 and data of energy consumption per unit of GDP and discharge intensity of major pollutants are for the year 2014
8. Ratio of heavy industry of Jiangsu province is the data of 2013 and that of China is the data of 2011.
9. Data on sex ratio and per capita life expectancy are from *the Sixth National Population Census* in 2010.
10. Overall Gini coefficient of China is from the announcement by the National Bureau of Statistics and that of Jiangsu province is based on the data from *Jiangsu Indicator System for Basic Realization of Modernization*.
11. Some indicators are repeated for they can reflect several SDGs.
12. The target value of the indicators listed in the 13th Five-Year Plan, that is the goals in 2020, are marked in the bracket, but some of the indicators are not give exactly target number by the government.
13. As for Jiangsu Province, this goal reflects the equality within the province and among its regions
14. Class V water can be used for agriculture and general landscape, and the water below Class V almost has no function.

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PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

Jiangsu province is one of the most developed provinces in China, and actively explores green planning, regulations and policies. The Partnership for Action on Green Economy (PAGE) launched China's first local green economy promotion project in Jiangsu in November, 2015, and this report is the preliminary outcome of the project.

The report summarizes and analyses the successes and good practices of Jiangsu, and aims to provide lessons for other provinces and countries on promoting green economy. The report also identifies the challenges and priorities for Jiangsu's future green economy work, which can provide reference and guidance for upcoming PAGE work in the province and in China as a whole.

On the basis of this report, PAGE will further cooperate with relevant governmental departments of Jiangsu on green economy policy design and helping Jiangsu to deal with related challenges.

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