



Interim Report

of

*"China Green Transition Outlook
2020-2050" Project*

by Project Task Force

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1.Preamble

The Green Transition is the most comprehensive and profound transformation in the development pattern since the Industrial Revolution, in a manner much more profound and extensive than generally thought environmental issues. While its starting point is primarily to resolve the environmental crisis, the fundamental approach for solving environmental problems is to turn the conflicting relationship between economic development and the environment into compatibility or even a mutually reinforcing relationship by transforming the content and pattern of development. Therefore, the report has two obvious characteristics: i) Although the environmental issue is the starting and end point of report analysis, the report itself is not an environment report. Instead, it seeks solutions to environmental issues from the perspective of transformation in the economic development pattern; ii) Analysis and policy views in this report are built on fundamental rethinking of the traditional development patterns that have led to grievous environmental problems.

This report's core message is that the conventional development patterns of the industrial age have resulted in an expensive economy, which is contrary to what is widely thought. However, people usually lose sight of costs such as hidden cost, external cost, and opportunity cost. On the contrary, the green economy, as a new pattern of economy based on ecological civilization, is of lower costs and tremendous new opportunities, representing the future orientation, although, transitioning to it is an arduous task.

This report answers the following questions: I) Why perform the Green Transition and what is its vision? II) In what historical context will the Green Transition take place in China? III) What will the green economy look like after the Green Transition? Why will the Green Transition lead to a more efficient economy, rather than a more expensive one? IV) What is the policy framework design and roadmap of the Green Transition and how will its goals be achieved? The research is a flagship project for 2016-2017 of China's Council for International Cooperation of Environment and Development(CCICED). This interim report presents some preliminary findings and immature policy suggestions, and the final report will be formulated after the analysis is completed at the end of 2017.

2.Preliminary Findings

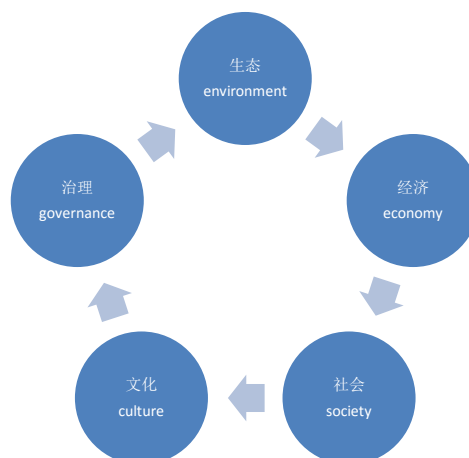
In **the First Part**, four core viewpoints will be set out.

1.1 The problem is HOW TO implement Green Transition, rather than WHETHER WE SHOULD do it OR NOT. Industrial civilization denotes the great progress achieved in human history, especially in terms of material wealth. However, traditional industrialization has inevitably brought about a grievous environmental crisis, since material wealth production is based on “high consumption of material resources, high carbon emissions, and high depletion of the environment.” Meanwhile, the ends and means of development have been turned upside down to a great extent, and well-being has not been increased proportionally with GDP growth. Furthermore, in such a traditional pattern, only few population in the world represented mostly by the industrial countries can live in opulence while global prosperity is impossible.

1.2 The new vision of Green Transition. Manufacturing is the core of economic development in the conventional mode of industrialization, which leads to high environmental costs. In the meantime, the factory-like organization of large-scale production and the migration of huge populations from rural to urban areas also have great impact on the traditional social fabric and local culture. Moreover, enormous environmental and social problems have been caused as agriculture is transformed into chemical industrial agriculture, relying heavily on the

utilization of fertilizers, pesticides, herbicides, antibiotics and auxin. In a word, the internal characteristics of conventional industrialization determine a **conflict relation among economy, environment, culture, society, and governance.**

Environmental problems will not be really resolved until the conflict relation is substantially changed through a profound transformation in the development pattern. While a green development concept is emerging with the advent of the digital era, the concept and content of economic development, related resource concepts, and organizational modes are experiencing tremendous changes, and the conventional development concept of the industrial era is becoming history. Therefore, China needs to **redefine development on the basis of ecological civilization, and build a benign development vision where “economy, environment, culture, society, and governance” promote one another.**



1.3 Creating a new narrative of green development. According to

the existing narrative, the traditional development mode is unsustainable because it leads to huge environmental problems, so a higher cost must be paid to clean-up environment and to realize the so-called green development. There are two problems with the narrative: on the one hand, Green Transition is regarded as a burden and the gigantic benefits of a green economy for growth and well-being are not understood fully; on the other hand, the harm caused by the traditional development to people, especially to contemporary people is not proclaimed sufficiently. According to the theory of behavioral economics(Tversky and Kahneman, 1974), due to risk aversion, the existing narrative will lead to cognitive bias against Green Transition, and people will be unwilling to undertake the risk of transition. Therefore, it is critical to create a new narrative of green development from two aspects—the first is to reveal the traditional development pattern's great harm to the people and nature, especially to contemporary people, and the second is to show the tremendous benefits that Green Transition may bring about.

1.4 China's Green Transition is of worldwide significance. First, the Green Transition would establish a win-win situation between China and the world, which avoids the competition for resources with other countries and also generates green opportunities for them. Second, China's success in Green Transition will be of significant importance in solving global environmental problems such as climate change. Third, if

China plays a leadership role in Green Transition, it would contribute significantly to world development.

The Second Part presents an analysis of the historical context in which Green Transition will take place in China between 2020 and 2050 to uncover unique opportunities and conditions. The dramatic changes in these historical conditions signifies that we can no longer understand economic development from the traditional industrialization perspective because the “game” of economic development is changing, and that Green Transition marks enormous opportunities and future directions.

Changes in historical conditions include:

2.1 The growth stage is experiencing historical changes. China will step over the high-income threshold and become the largest economy in the world. Since by 2030 it will become a high-income country, the period up to 2030 is the time window for accelerating its Green Transition. Once China’s economy is locked in a non-green state, the transition will require a much higher cost.

2.2 Resource and environmental constraints are drawing on the threshold value and are extremely hazardous. If Green Transition is not performed, the threshold value will be surpassed with regard to *air, soil, water, food, health, energy, climate and etc.* These changes will become restrictions on development and cause a series of environmental

and social problems. In the main report and the technical reports, a detailed analysis will be presented on the environmental hazards in China.

2.3 The industrial age is turning into a digital age. In the digital era, various concepts such as resource concept, development content, business model, economic organization, and urbanization model are experiencing revolutionary changes, which will *redefine development*, and has different implications to environment, and welfare. It means that the understanding and prediction of development, and the policy suggestions can no longer be from the perspective of traditional industrialization. The new development pattern will be built on digitization and greening.

2.4 Green market demand is expanding rapidly. With growing income and emerging social and environmental problems of the existing development pattern, people are transitioning to green development concepts, and green demand and green preference for all consumption. Consequently, tremendous growth opportunities are emerging, reshaping the entire social and economic structure.

2.5 Demographic factors are changing. Declining labor force, aging population, low birth rate (one child policy) and its lock-in effects, and increasing health problems due to serious environmental damage all

signify that the conventional labor-intensive manufacturing-based economy will have to transition to a greener service-oriented and knowledge-based economy.

2.6 The international configuration faces drastic changes. Earlier, the international environment was an external factor for the development of China. However, as its economy expands rapidly, China's problems become issues influencing the world. China accounts for a rapidly increasing share in economic output, trade, investment, and resource consumption. Therefore, China's Green Transition is associated directly with the world's development.

The Third Part concentrates on the transition in the six pillar sectors of **industry, agriculture, service, urbanization, rural development, and resources and environment**. Quantitative analysis will be undertaken to investigate the high hidden economic and social cost of conventional development patterns, and to show why Green Transition will lead to a more promising scenario. Analysis of each pillar sector starts with a fundamental rethinking of their problems and their hidden costs. Accordingly, their direction of transition is uncovered and the Green Transition scenarios are specified.

3.1 Rethinking industry and its Green Transition scenario. Besides a discussion on its low efficiency and the high environmental

cost of China's industrial structure and institutions, this report concentrates on investigating the intrinsic problems of industrial logic, including why conventional industrialization must result in consumerism and over-consumption, and why consumerism-driven economy inevitably causes environmental problems, especially in the Chinese context. Accordingly, China's industrial Green Transition is analyzed in **two co-existing scenarios**: the *first* is the upgrading and transformation of the existing industrial system, including improvement of technological levels and service value added of industrial products, to reduce the environmental footprint of industrial output. These transitions must be based on the Internet, the Internet of Things, industrial design, flexible production, and Industry 4.0. The *second* is to change consumption patterns from goods to services and contain the immoderate expansion of material "consumerism" and redirect it towards consumption of services using policies such as regulation, taxation, tariff, and export restriction.

3.2 Rethinking agriculture and its Green Transition scenario.

Agricultural pollution is largely attributable to agricultural transformation following industrial logic. Unsustainable environmental problems have been caused by chemical industrial agriculture that flourished since World War II, featuring large-scale monoculture and confined animal feeding operations (CAFO). The industrial agriculture relies on the extensive

application of chemical fertilizers, pesticides, herbicide, antibiotics, and auxin. It registers a higher cost than eco-agriculture, actually, as its hidden costs include substantial agricultural subsidies, environmental pollution costs, biodiversity damage, reduction in rural community value, product quality costs, and damage to human health. Accordingly, in this report, agricultural transition is analyzed in **two co-existing scenarios**. *First*, efforts are made to reduce the ecological footprint of the industrial agriculture through new technologies, such as precision agriculture and facility agriculture. *Second*, efforts are made to transition the industrial agriculture to ecological agriculture and substantially reduce the use of chemical fertilizers and pesticides.

3.3 Transition in the emerging service sector. Due to cognition limitation in the industrial era, there are some misunderstandings about the nature and development potential of the service sector. Therefore, it is necessary to re-recognize the service industry. First, there is huge potential in the service sector. Many activities that being thought creating no value in the traditional opinion are actually valuable and can serve as an important source of economic development. Second, technically being non-rival, many service activities substantially overweigh industrial products in productivity and are environmentally sustainable. Third, upgrading the traditional service industry through new business models, such as sharing economy, or forming new service sectors can improve the

efficiency and reduce resource consumption significantly. Accordingly, the analysis is conducted for **two co-existing scenarios**. *One* is the scenario of service development following the similar traditional service path of industrialized countries, and the *other* is a scenario where full play is given to emerging service sectors.

3.4 Green urbanization. To transition to green urbanization, we must start with the question: why do cities exist? The existing urbanization models are somehow an outcome of the industrial age centering on manufacturing. The urbanization model may experience huge changes, with the advent of the digital era and rapid transport and development content is turning to the lightweight trend. Certainly, instead of a simple deurbanization of population, it signifies that production and lifestyles will experience profound changes, obscuring urban and rural boundaries. Accordingly, the Green Transition of urbanization is analyzed in **two co-existing scenarios**: *one* is the transition of stock urban areas, that is, greening the high-carbon urbanization of the industrial age through new concepts and techniques, including urban space transition, rebuilding of urban communities, and commercial activities and energy-saving retrofit of buildings. Examples include Smart City, zero(near-zero)-energy passive housing and ecological technology. The *other* is the increment transition scenario, which means forming a new green urbanization pattern through new concepts and patterns.

3.5 A new path for the green development of rural areas. Rural decline is largely an inevitable result of traditional industrialization-led development. In the traditional development pattern of industrialization and urbanization through the massive transfer of agricultural population, rural areas are a supply base for agricultural products and surplus labor; their potential for cultural, relaxation, aesthetic, and sport values is overlooked to a large extent in favor of employment potential, which is tapped further. In the meantime, agricultural transformation based on industrial logic and chemical agriculture has further reduced the employment capacity of rural areas, with huge impact on their social and ecological systems, causing problems such as hollow villages, left-behind elderly and children, family separation, local cultural destitution, and grievous pollution. Therefore, the value of rural areas must be re-discovered and their development potential expanded substantially without the constraint of traditional industrialization thinking. Analysis of the rural development scenario rests with the recognition and redefinition of rural development. Accordingly, analysis is conducted for **two co-existing scenarios**: *one* is the rural development scenario following the existing industrialization and urbanization paths, and the *other* is the scenario based on new development definitions.

3.6 Environmental effects of Green Transition. The fundamental transition in the above-mentioned development patterns will thoroughly

transform the relations between economy and environment, making good eco-environment and culture an important source of economic growth. *On the one hand*, the report will present an analysis on the effect of Green Transition on environmental improvement in China. It will analyze the environmental impact under various Green Transition scenarios from the perspectives of resource consumption, carbon emissions (emissions and two degree) and eco-environmental issues (pollution free China, ecology). *On the other hand*, this report will also undertake analysis of the influence of China's Green Transition on global environmental issues under various scenarios.

3. Preliminary Policy Suggestions: Five Policy Instrument Packages

The overall strategic objective is to achieve China's Green Transition on the basis of ecological civilization, and build a Five-in-One self-enforcing mechanism of development. After a moderately prosperous society develops by 2020, the well-being oriented national development strategy shall be implemented, a green development measurement and assessment system shall be established, and China shall lead the world in green development. In terms of approach, local governments shall be fully mobilized under the central government's *top design* of ecological

civilization and green development concepts, and an effective green development pattern shall be formed through bottom-up *local competition*.

Systematic policy instrument packages are proposed in the following five aspects—

Package I: Forming new mindset, social normal, and green transition consensus on the basis of a new narrative of green development.

The objective is to implement green development actually, not orally. Governments at all levels and the general public will understand the substantive differences between ecological civilization and green development and traditional development, and make green development operational. This report proposes a “*new narrative*→ *education*→ *demonstration*” policy suggestion as follows:

First, create a new narrative of green development so that the public knows about the severely harm caused by environmental problems as well as the major opportunities offered by green development. The new narrative will reduce action impedance and also form a new social psychology for green consumption and facilitate the development of green industries.

Second, undertake extensive green development education to

remove the cognitive bias against green development. Further, conduct training about the apprehension of the public and governments at all levels regarding green development and have adolescents accept the green development concept through courses.

Third, transform an abstract green development concept into a specific and operable one through demonstration of green development regions and projects making it easier to understand and accept.

Package II: Green industry promotion policies that focus on fair competition and empowerment.

The objective is to create conditions for fair competition and empowerment, since subsidies is not the most needed for green industries. Efforts may be made in the following aspects.

First, effectively internalize the external cost of non-green products by enacting strict environmental standards and laws so to improve the competitiveness of green products. In particular, mobile Internet technology and dispersive supervisory mechanisms can substantially reduce the cost of enforcing environmental law and make the law more enforceable.

Second, re-evaluate subsidy or support policies for fossil energy, chemical agriculture, chemical industry etc., and make adjustments according to green standards.

Third, give awards to green products for their environmental benefits, which means shifting the huge governmental expenditure of pollution improvement from end-of-pipe treatment to source treatment.

Fourth, re-define the nature of subsidies for green industries into “the payment for their provision of environmental services,” instead of extra subsidies.

Finally, support green industries in capital, R&D, talent cultivation, infrastructure, and green government procurement.

This project will assess green industry, green agriculture, and green service as well as new energy, green building, electric cars, and green transport from the above-mentioned aspects and present targeted policy measures.

Package III: Making breakthroughs in the establishment of incentive mechanisms for green development, and conducting holistic pilot projects in some regions.

The objective is to make systematic changes, as many institutions and policies are inconsistent with the requirements of green development because they were established under and serve the traditional development pattern. Seen from methodology, initially, many policies can be piloted in an all-round way in a small region.

--Establish new development performance measurement indexes to

surmount the disadvantages in the single measurement of GDP. For instance, pilot regional ecological capital accounting, assess it comprehensively, and evaluate all aspects of the influence of economic growth on the aggregate wealth of society to prevent GDP growth leading to decrease in social aggregate wealth and well-being.

--Performance assessment of cadres. GDP assessment shall be faded. After a moderately prosperous society develops by 2020, in particular, the weight of GDP assessment shall reduce sharply and well-being oriented assessment policies shall be implemented thoroughly.

--Land. While sticking to land ownership as specified in the Constitution, farmers' idle land shall be vitalized and their land revenue increased through the separation of "ownership, contracting right and operating right" of land, and the various forms of rural-urban cooperation including sharing economy.

--Green fiscal tax. First, substantially increase the taxes imposed on "high-energy, high-pollution and resource-intensive" products; second, expand the range of consumption tax and establish a taxation system on the principle of "where there is consumption, there is tax"; and third, build a green transfer payment system.

--Finance. Introduce green standard into all financial system, and establish green development funds and inclusive finance.

--Resource. Ecological and environmental protection policies.

--Green insurance system. Provide disaster insurance and market insurance for the transition in ecological agriculture.

Package IV: Building a digit-based green economy for the future through the “new green stimulus plan.”

The objective is to substantially improve the confidence in green development by issuing landmark policies and to inject great momentum into the development of green industries.

--New stimulus plans for green investment. Different from the conventional plans of investment in infrastructure such as water and electricity pipelines and manufacturing, the new plans focus on investment in next-generation digital infrastructure, new eco-environment, culture, and other non-conventional green infrastructure intended to create conditions for green supply.

--Stimulate green service demand by adjusting vocation system and improving career flexibility. For instance, conduct study on the implications of reducing weekly working hours, prolonging the statutory paid leave year by year, and implementing diversified vacation systems such as unpaid leave, job retention with suspended salary, flexible vacations, and flexible working hours.

--Assess China's strategy in the areas with the heaviest ecological

footprint, such as new energy, electric vehicle, thermal power plants, and green building, and discuss whether it is feasible to establish pilots with a small scope and promote Green Transition more boldly similar to some Nordic countries.

--Achieve breakthroughs in new business models based on “Internet Plus,” such as sharing economy (traffic, accommodation, catering, and inclusive finance).

--Implement strict green standards in strategies such as “One Belt One Road” initiative, South-South cooperation, and China's outward investment.

--Green poverty relief strategy. While 90% of the ecological function zones are located in poverty-stricken counties, targeted adjustments should be made to development policies of existing ecological function zones according to green development requirements.

Package V: Building a more inclusive society and a more resilient economy.

The objective is to provide assistance to specific groups, sectors, and regions that are impacted by the Green Transition, and establish corresponding all-round risk prevention and control systems.

An important aspect of this is the national uniform unemployment insurance system. While de-capacity and removal of zombie enterprises

are in progress, support should be given to special projects and capacity building. Special transfer payments should be performed in regions (especially counties) where the revenue is largely sourced from high-pollution enterprises to reduce this dependence. Much attention should be paid to the substantial overlap between impoverished areas and main functional zones and targeted measures should be promulgated. Accordingly, integrated risk prevention and control mechanisms should be developed to improve economic resilience.

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