

# GREENING CHINA'S FINANCIAL SYSTEM

## CHAPTER 1:

# A FRAMEWORK FOR GREEN FINANCE: MAKING CLEAR WATERS AND GREEN MOUNTAINS CHINA'S GOLD AND SILVER

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<b>EXECUTIVE SUMMARY</b>	30
<b>1 INTRODUCTION</b>	31
<b>2 DEVELOPING A CONCEPTUAL FRAMEWORK</b>	32
2.1 Defining Green Finance	32
2.2 A Framework for Internalizing Externalities	32
<b>3 THE POLICY SYSTEM</b>	34
3.1 Macro- and Industrial Policies	34
3.1.1 Monetary Policy	34
3.1.2 Fiscal and Taxation Tools	34
3.1.3 Environmental Policies	34
3.2 Financial Regulations	34
3.2.1 Regulatory Standards	34
3.2.2 Information Disclosure	35
3.2.3 Self Regulation and Public Scrutiny	35
3.3 Emission Trading	35
<b>4 KEY INSTITUTIONS</b>	37
4.1 Policy-Based FIs	37
4.2 Commercial FIs	37
4.3 Internet-Based FIs	38
<b>5 FINANCIAL INSTRUMENTS</b>	39
5.1 Green Credit	39
5.2 Green Insurance	39
5.3 Green Bonds	39
5.4 Green Venture Capital Funds	40
<b>6 THE DEVELOPMENT OF CHINA'S GREEN FINANCIAL SYSTEM</b>	41
<b>REFERENCES</b>	43

# EXECUTIVE SUMMARY

The existence of externalities has made it hard to quantify the intrinsic value of the “green mountains and blue water” of the natural environment. This has led to a dysfunction in traditional financial markets, which are delivering an insufficient supply of capital for green development and an oversupply of capital for highly polluting activities.

As a new financial development paradigm, green finance seeks to internalize these externalities in financial decision making. Systems for allocating and trading emission rights are a critical foundation, creating price signals that transmit information about scarcity and the value of environmental assets. These are complemented by other government policies focusing on enhancing risk assessment and information analysis, and providing targeted financial support for green investment through monetary and fiscal support.

This paper lays out a framework for considering the design of a green financial system in China, encompassing:

1. **The policy system** for internalizing environmental costs and benefits.
2. **The financial actors**, including the policy-based financial institutions (FIs), commercial FIs and Internet-based FIs that respond to these signals.
3. **The financial products**, such as green credit, green insurance, green bonds and green venture capital funds, which serve as instruments for managing risk and intermediating capital.

While green finance is a topic of increasing interest around the world, the context in China differs from that of the developed economies, not only in the different industrial needs, but also in the existing state of development of the financial system. The development of a green financial system is not an “additional” requirement, but is intrinsically linked to other core and ongoing reforms in China’s financial system, namely strengthening capital markets, shifting from administrative interventional measures to market regulatory tools and turning implicit guarantees into explicit guarantees.

# INTRODUCTION

The global financial system has been a key enabler of accelerated economic development over the past 100+ years, dramatically changing the outlook of global economic and social development through the course of the industrial age. It is at the core of modern economies. However, it is struggling to adapt to the need to rapidly transform into a greener and less resource-intensive mode of development. For example, while clean energy investment grew to about USD 250 billion in 2012, it represented barely one third of the USD 674 billion invested in fossil fuel exploitation in the same year (United Nations Environment Programme [UNEP], 2014).

The challenge of green financing is often expressed in terms of project viability: green technologies are in their incubation period and green projects require large-scale financing with a long payback period, which makes them unattractive for private finance. Underlying this barrier is the failure to internalize the costs and benefits of green versus brown investment, due to such reasons as the lack of property rights and pricing systems for emission rights, pollution reduction and biodiversity. It is very hard to realize the optimized allocation of financial resources through market-based activities if these benefits cannot be demonstrated, monetized and included in financial decision making. The externalities constrain the capacity of the profit-seeking financial system to provide support to the field of green development.

The development of a modern system of green finance is indispensable to the development of a modern green economy. Ultimately, the aim is to steward, protect and better manage our use of the green mountains and blue water, blue sky and white clouds. This requires that environmental costs and benefits are internalized into financial decision making, reducing the flow of financing to activities that exert negative influences on the environment and increasing the flow of financing to activities that play a positive role. The key question is what policies, institutions and financial instruments can effectively support this internalization?

This topic has gained significant attention internationally and in China in recent years, under the heading of “green finance.” However, there is no clear-cut definition of the term, nor is there clarity on the rationale for promoting it or the relevant research needs to determine how best to do this. A conceptual framework is useful to help us understand green finance theory, practice, policy and regulation.

# 2

## DEVELOPING A CONCEPTUAL FRAMEWORK

### 2.1 DEFINING GREEN FINANCE

A clearly demarcated and explicit definition of “green finance” is critical for any working use of the concept and, in particular, is necessary to enable targeted policy design, statistical monitoring and assessment of the effectiveness of regulation. However, in practice, there is no single agreed definition of green finance.

Some define green finance in terms of processes that guide and monitor financial flows: “Green finance [in the banking sector] is defined as financial products and services, under the consideration of environmental factors throughout the lending decision making, ex-post monitoring and risk management, provided to promote environmentally responsible investments and stimulate low-carbon technologies, projects, industries and business” (Pricewaterhouse Coopers, 2013). Others use a range of specified environmental objectives or sectors related to climate change mitigation and adaptation, biodiversity conservation, waste management and pollution control (Höhne, Khosla, Fekete, & Gilbert, 2012).

Often “green finance” is used to denote finance associated with greenhouse gas emission reductions; however, it is clear that it should address a broader range of environmental issues. Some argue for a broader concept of “green and inclusive” finance addressing environmental, social and economic aspects of sustainable development (UNEP, 2014). In our case, however, while recognizing that green finance indirectly promotes economic and social sustainability through realizing environmental benefits, we prefer to define green finance as **a financial system targeted to realize environmental sustainability.**

In considering how to green China’s financial system, we are concerned not simply with measuring volumes of investment tagged as “green” in any particular statistical definition. We also seek to understand the dynamics of the system that can help to **reduce the financing of activities or assets that exert negative influences on the environment and help to increase financing to the assets or activities (including energy conservation, emission reduction and pollution control) that play a positive role for the environment.**

### 2.2 A FRAMEWORK FOR INTERNALIZING EXTERNALITIES

The problem of externalities is central to the challenge of aligning investment flows with sustainability. Clear skies, clean air, blue water and green mountains have an intrinsic value that is hard to quantify and that cuts across existing property rights and market transactions as “public goods.” The benefits that flow from the environment, and the costs imposed on it by pollution, are rarely monetized. This makes it difficult for the traditional financial system to recognize value and to allocate funds adequately.

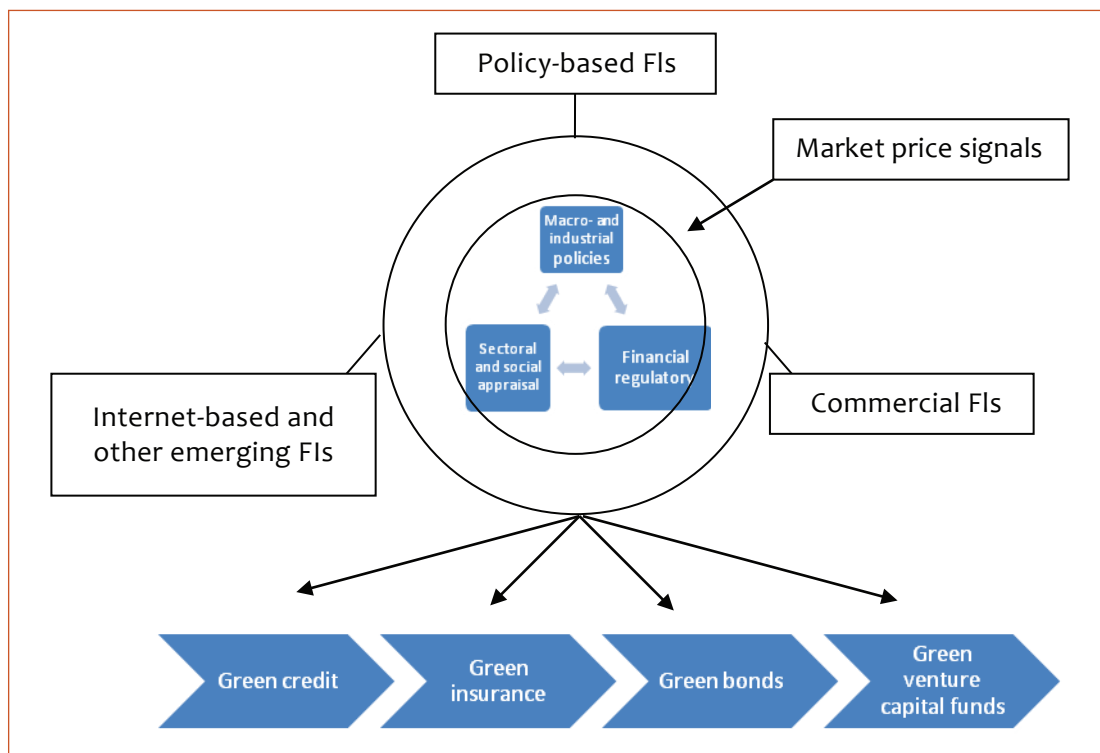
Green finance is not a corporate social responsibility for financial institutions; rather, it is a new policy-driven space for development of the financial industry. A new financial paradigm is needed—one that makes explicit the benefits of green mountains and blue water and the costs of pollution through policies and market signals; enhances the liquidity of environmental assets; ensures adequate environmental risk management; and improves corporate governance. Ultimately, the new paradigm should affect the relative values of different assets and the behaviour of investors and their agents.

A focus on green finance, at its broadest, encompasses:

1. **The policy system** for internalizing environmental costs and benefits, including governmental macro-economic and industrial policies, and financial regulations and standards.
2. **The financial actors**, including the policy-based financial institutions (FIs), commercial FIs and Internet-based FIs that respond to these signals.

3. **The financial products**, such as green credit, green insurance, green bonds, and green venture capital funds, that serve as instruments for managing risk and intermediating capital.

FIGURE 1: FRAMEWORK FOR GREENING THE FINANCIAL SYSTEM



The rest of this chapter outlines each element of this framework.

# 3

## THE POLICY SYSTEM

### 3.1 MACRO AND INDUSTRIAL POLICIES

#### 3.1.1 MONETARY POLICY

The Central Bank may adopt **sectorally targeted monetary policies** to shift the preference of FIs toward green projects. Window guidance is an informal mechanism by which a central bank issues loans to specific industrial sectors or companies. However, as a voluntary mechanism, it may not be effective enough. Policies could be trialled that replace moral suasion with market-based means that directly interface with the cost-benefit models of the financial institutions by changing the relative cost of capital. For example, the use of direct conventional monetary policy tools such as deposit reserve ratio, interest rates, short-term liquidity operations and standing lending facility can be targeted towards green economy sectors, including energy conservation, clean energy and environmental protection.

#### 3.1.2 FISCAL AND TAXATION TOOLS

Fiscal and taxation tools can be used as levers for a greater volume of green investment through the financial system. One key approach is **green public procurement**. Long-term and large-scale procurement of products and services such as hybrid electric city buses, renewable electricity and green energy-conserving buildings can provide these green industries with stable cash flows in the future and enhance their credit for financing. A second approach is **discounted green credit**, where governments provide direct support to enable discounted loans—for example, to small and medium-sized enterprises (SMEs) in the environmental protection field. A third tool is **tax exemption for green bonds**. By lowering income tax for investors, governments can increase the after-tax returns on the investment of green projects, making them more attractive. Finally, **green funds** use funding from public balance sheets directly to capitalize green investment funds, which are then used to attract additional private capital into green industry.

#### 3.1.3 ENVIRONMENTAL POLICIES

Governments' environmental policies constitute the foundation to demarcating emission rights and quantify externalities. By establishing clear property rights and emission limits, the government can enable the development of prices that reflect the scarcity true value of environmental assets and services. Such environmental policy tools include regional and sectoral **quotas on energy (e.g., coal) consumption and on major pollutants, payment for ecosystem services policies, resource and environmental taxes**, and administrative regulation through examination and approval of **environmental impact assessments** on projects. The common orientation of these policy tools is to create the scarcity of the right to pollute or use natural resources through the mandatory power of the government. This then changes the calculation of costs and benefits for investment in energy conservation and pollution control.

### 3.2 FINANCIAL REGULATIONS

#### 3.2.1 REGULATORY STANDARDS

In a society where environmental protection is enforced, environmental damages caused by debt-financed projects will lead to the failure of the projects and impede the repayment of loans. Thus, environmental risks become an important variable for the banks' risk management. To encourage this recognition and increase its effect, financial regulatory authorities can **lower the risk weighting applied to projects that meet environmental standards** and increase the levels of risk-based capital charges for assets assessed as environmentally high risk. The financial regulatory authorities can also introduce **environmental stress**

**testing** and **publish the risk exposures** of the financial assets caused by the changes in environmental policies. They can use them as the basis to judge whether they are sources of systematic risks and make a mandatory requirement that FIs failing to pass the test increase their risk capital buffers.

Moreover, the financial regulatory authorities may adopt directive-type policies on the FIs by, for example, **including environmental impacts in the governance framework** for FIs (including commercial FIs and policy-based FIs); using **directed credit policies** that require FIs to allocate an agreed proportion of credits and/or credits to the target clients (such as farmers or rural enterprise) or specific asset classes (for example green bonds); or **allowing FIs to adopt targeted fundraising for special purposes** (for example, FIs could conduct dedicated refinancing for renewable energy fields on the capital market).

### 3.2.2 INFORMATION DISCLOSURE

Lack of standardized, usable information is another important external restraint to developing green finance. Asset valuation is the core function of the capital market, and the accurate valuation is only possible based on complete information disclosure. Information on enterprises' environmental costs should change their financing costs and valuation by investors. Financial regulatory authorities can make disclosures on emissions of major pollutants, pollutant control measures and other aspects of environmental performance **mandatory** for listed companies and bond-issuing. It can also support the development of **credit rating frameworks that incorporate environmental risks**, issue **environmental cost information** and require the enterprises to **assess environmental impacts**.

### 3.2.3 SELF REGULATION AND PUBLIC SCRUTINY

Sectoral self-regulation and independent third-party appraisals by social organizations have become an important influence in decisions concerning the allocation of financial capital, by shifting the balance of costs and benefits (including reputational benefits) for investment in green versus polluting projects. In recent years, international social groups, including industry bodies and non-governmental organizations, have increasingly focused their attention on quantifying environmental damages or benefits through **environmental appraisal of project investments** and establishing **standards and awards** to recognize good practice. Examples include various **socially responsible investment frameworks**, tools for assessing the **carbon footprint of “financed emissions”** and other **natural capital assessment tools** (for example, assessing the ratio of green to brown investment, the environmental costs of polluting emissions, water resource consumption and waste generation, etc., of enterprises and projects). Guided by these metrics, there may be **divestment** from the brown sectors or investments guided by environmental standards. Governments can **support the development of information sources and standards** that provide information to FIs for making investment decisions.

## 3.3 EMISSION TRADING

Putting a price on environmental resources, including the limited ability to absorb pollution, is central to transmitting information about scarcity to decision-makers. From this perspective, **a market for emissions rights** is the operational foundation of a green financial system. In this case, we focus on the carbon market. The global carbon exchanges comprise two trading systems. The first is based on trading emission rights quotas acquired under **cap-and-trade** rules. The other is trading project-based emission reduction certificates (Certified Emission Reductions and Emission Reduction Units) generated through the **Clean Development Mechanism** and **Joint Implementation** respectively.

Trades take place through both spot and futures markets. A mature and robust emission rights trading market can not only provide financing for emission reduction, but also enable price discovery, allowing emission reduction costs to be minimized and emission rights to be used for activities with the highest



utilization efficiency. This reduces the overall cost to society of achieving emission reduction goals. By providing a price on emissions, the market gives a signal that green industries can demonstrate returns, influencing investment decision making to support economic restructuring.

Emissions trading across national boundaries enables developed countries to reduce emission reduction costs and developing countries to obtain extra funds and advanced technologies. Standardized emission rights certificates enable liquidity and cross-sectoral transactions; for example, new energy enterprises may trade emission reductions with traditional iron and steel enterprises.

Emission trading exchanges provide liquidity and an exit mechanism for investors in green finance by enabling emission rights to be readily monetized and price volatility risks to be managed through financial derivatives.

# 4 KEY INSTITUTIONS

A green financial system will involve diverse institutions and players. In emerging spheres of green finance and technology, policy-based FIs may act as the first pioneers of financial service supply, withdrawing as the market matures and being replaced by commercial FIs. Internet finance also offers new opportunities for innovative financial instruments and services to meet the needs of green finance.

## 4.1 POLICY-BASED FIS

Green development projects tend to be characterized by technology risk due to early-stage technology adoption (such as offshore wind power and waste-to-energy) and often involve long payback periods (such as urban infrastructure for energy conservation). Under the influence of stringent post-crisis regulations and short-term commercial targets, these investments are often unattractive to commercial institutions (Working Group on Long-term Finance, 2013). This can lead to a negative feedback “trap,” where difficulty in obtaining large-scale financing holds back the prospects of making technology breakthroughs that would bring down risk and cost. This “valley of death” for investment is often bridged by policy-based FIs, which are not driven by short-term commercial interests and can develop the capacity to judge the development prospects of green projects from a longer-term perspective with information accumulated in the field. Policy-based FIs can use public funds and raise quasi-public debt to provide long-term and large-scale capital support to green projects. The rationale for public risk taking is that, by taking the lead to invest in green development projects, policy-based FIs will generate the information spillover effects for the whole financial market, overcoming the wait-and-see mood of commercial FIs and “crowding in” follow-up investments of private capital (Du, Zhang, & Wang, 2013). The U.K. Green Investment Bank (2014) reports that GBP 1.00 invested by the bank mobilizes GBP 2.81 of private capital (see Table 1). Policy-based FIs can be supported by a country’s sovereign credit (e.g., China Development Bank) or trans-sovereign international organizations (e.g., the International Finance Corporation, BRICS Development Bank or Asian Infrastructure Investment Bank).

TABLE 1: GREEN INVESTMENT BANK’S INVESTMENT PERFORMANCE

	2013–14	2012–13	Overall
Number of projects	18	8	26
Capital committed (£m)	668	635	1,303
Private capital (£m)	1,879	1,630	3,509
Total funds mobilised (£m)	2,547	2,265	4,812
Mobilization ratio (%)	2.81	2.57	2.69

Source: Green Investment Bank (2014)

## 4.2 COMMERCIAL FIS

Commercial FIs account for the majority of the USD 225 trillion in assets held by the financial system, and must therefore be the main players in greening investment. Measures such as discount loans and guarantees, price signals and liquidity provided by carbon markets, as well as the catalytic investment of policy-based FIs, are all developed to influence and enable commercial FIs to green their investment portfolios. Green finance should not be seen as a corporate social responsibility expectation, but rather a response to a shift in the commercial environment for FIs, in which there are “new opportunities for financial services and an expanding space for financial innovation” (Yan, 2010). No doubt, there are more uncertainties and risks in the green financial field than in the traditional financial field. But for the FIs and investors who obtain

profits through the operation and management of risks, it means greater space for product innovations and broader boundaries for financial services. By innovating new instruments and commercial strategies aligned to green development, commercial FIs can enhance their competitiveness, expand their client base, find new profit growth areas and improve their corporate governance, risk management and business procedures.

### 4.3 INTERNET-BASED FIS

New flexible investment and financing tools are needed to solve the market failures that prevent green investment. Internet-based finance offers a new pattern of finance and may develop the creative financial instruments needed in such fields as payment settlement, financing, investment, financial planning and insurance. There are several key ways in which the characteristics of Internet-enabled FIs may serve the needs of green finance. First is the sophisticated use of data analysis to assess creditworthiness of enterprises and individuals. This can help to solve the issue of information asymmetry in the field of green development. Second, new mechanisms such as crowd-funding lower the barriers to financing and create a trial-and-error process that further lowers information asymmetry. Third, by reducing the thresholds for investment and increasing the number of participants, Internet-based finance can effectively disperse the risks caused by the uncertainties in the field of green development, and also hedge the risk premium generated by the large-scale and long-term investment of green projects.

Finally, the operation of the green financial system depends on concrete financial instruments. While government incentives, regulations and emission pricing can partially solve the problem of externalities, market players still need to find ways to overcome other market failures and manage the inherent risks and long payback periods of green projects. The design of financial contracts is critical to enabling commercially sustainable green finance that supports economic sustainability.

### 5.1 GREEN CREDIT

FIs for green credit enable current bank deposits to be allocated towards green projects by reducing information asymmetry in mortgage and guarantee methods. The measures outlined in Section 2 for restricting credit allocation for polluting projects and granting preferential loan rates for green projects fall under the category of green credit *policies*. Green credit *instruments* put more emphasis on financial innovation to unlock the value of emission rights and increase in energy utilization, replacing traditional loans based on collateral with loans based on an information analysis of the future returns from green projects. Specifically, green credit products include financing under the Clean Development Mechanism, financing under energy management contracts, financing for energy conservation and emission reduction technologies, and buyers' credit financing by suppliers of energy conservation and emission reduction equipment.

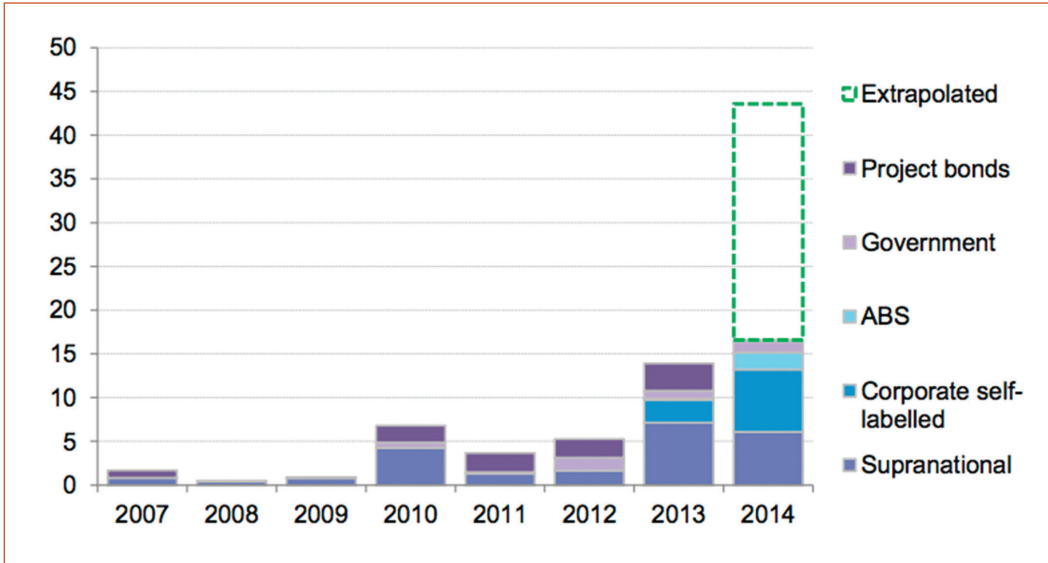
### 5.2 GREEN INSURANCE

Green insurance is the financial instrument adopted to enhance environmental risk management by making explicit the implicit costs and internalizing the negative externalities of pollution. Currently, the most common green insurance instrument in China is environmental liability insurance. Polluting sectors are required to buy insurance to indemnify them against the expenses associated with a pollution event, such as clean up and fines, loss of real estate value, legal charges and medical expenses. Environmental liability insurance makes these environmental costs explicit, reducing the relative attractiveness of investments with overly high environmental risks, providing incentives for risk management and securing rapid responses to pollution events. In addition, green insurance can provide an effective mechanism for managing the long-term risks, such as those associated with natural disasters, floods and windstorms exacerbated by climate change.

### 5.3 GREEN BONDS

Green bonds are a direct financial instrument issued by the international organizations, governments or FIs to support green projects at preferential interest rates. After issuers such as the World Bank and Asian Development Bank obtain financing, they use the raised funds to invest in the selected projects and support the green project at low interest rates, relying on their high credit ratings or entitlement to such governmental policies as tax exemptions. The green bonds attract investors as: (1) they usually have shorter terms than the terms of the projects to which they provide financing support (usually 3–7 years) and have better liquidity on the secondary market (Ma, 2014); and (2) many green bonds are entitled to the preferential policies of tax exemption and have very good returns on investment. Green bonds have attracted diversified investors including pension funds and global asset management institutions, blue chip companies and central banks. One example is the floating rate green bond issued by World Bank in January 2014, which was bought by institutions including Blackstone Group, TIAA-CREF and Private Wealth Management Company of Goldman Sachs Group. By June 2014 global issuance of green bonds had reached USD 16.6 billion (see Figure 2) and it was expected to exceed USD 40 billion within the year (Bloomberg New Energy Finance, 2014).

FIGURE 2: GLOBAL ISSUANCE SIZES OF GREEN BONDS IN LAST 8 YEARS



Source: Bloomberg New Energy Finance (2014).

Note: For 2014 data, the shaded box indicates the data by June 2014 and the dashed line box indicates the forecast of the latter half year.

### 5.4 GREEN VENTURE CAPITAL FUNDS

A green venture capital fund is the financial instrument that guides funds to the SMEs that have started green projects but are not qualified to be listed. Most green venture capital funds invest in green projects as equity stakes and make investment in resource-saving enterprises with large market risks and environment-oriented, high-tech enterprises. After guiding the invested enterprises to grow and reach the stage of Initial Public Offering on the stock markets, the funds exit from the venture and continue to invest in other green venture capital projects. The initiators of the green venture capital funds include the New Ventures project of World Resources Institute, Climate Change Capital and other international FIs.

## THE DEVELOPMENT OF CHINA'S GREEN FINANCIAL SYSTEM

The background and conditions for the development of green finance in China are different from those of developed economies. As China is still a developing country, green finance needs to focus not only on areas such as clean energy, low-carbon transport and energy-efficient buildings, but also provide financial support to industrial restructuring, the energy efficiency of traditional enterprises and environmental pollution control. At the same time, China's financial system is different from the mature financial system of developed economies in terms of the degree of financial deepening and credit environment.

For China, establishing a green financial system is not an “additional” demand on the financial system, but is targeted at providing the long-term financing to meet the development demand of the healthy and robust real economy. The formation and evolution of green finance in China is aligned to three larger areas of core reform of the whole financial system:

- **Develop capital markets.** China's financial system remains banking-dominated with bank loans providing 55 per cent of the RMB 17.29 trillion aggregate financing to the real economy in 2013. Banks also are directly or indirectly involved in the bond market, trust market and shadow banking market, taking their true share of financing even higher. Banks are poorly placed to finance green development projects that are characterized by technological, market and policy-related uncertainties that account managers and credit approval specialists, constrained by their knowledge and capacities, are not able to adequately assess. Therefore, green credit alone is far from meeting the need for green finance. Efforts should be made to vigorously develop direct financing markets covering **green stocks, green bonds** and **green derivatives**, and to broaden the range of intermediaries including **institutional investors, venture capital investors** and **Internet users** to contribute their judgment, realize accurate pricing on project risks and expand the space for financial service supply.
- **Shift administrative measure to reliance on market forces.** Chinese government intervention into industrial financing has traditionally taken the form of direct intervention through sectoral support policies, window guidance on credit and local financing platforms. During the period in which the country was pursuing the developed countries as a late starter, this intervention was positive in meeting the large-scale, long-term financing needs of infrastructure and traditional sectors with explicit technological roadmaps. In the green development period, however, China is working on the technological frontier in many fields, so the government does not have information advantages on the prospects of the innovation of green projects. On the contrary, the large-scale, high-speed and long-term financial allocation caused by direct intervention will more easily result in capital misallocation and directly lead to a systematic financial crisis (for example, the financing risks of the photovoltaic industry emerging in recent years). Therefore, Chinese government intervention in green finance should rely on market-based tools including **fiscal discount interest, structural reserve ratio, differentiated venture capital ratios** and the **improvement of environmental protection information disclosure** to guide the green financial market to play its roles in price discovery, information screening and risk management.
- **Shift from implicit to explicit government guarantees.** The Chinese government has adopted implicit guarantees for new energy and other green development projects, represented by the local fiscal support, administrative debt restructuring and forced mergers and acquisitions after the breakout of the regional financial crisis. Though implicit guarantees can solve temporary risks, they also prevent the creative destruction mechanism of the market, and give enterprises and banks the expectation that the government will foot the bill on the losses, thus constituting off-budget contingent liabilities and jeopardizing the sustainability of green finance. Unlike many developed economies, China's credit system has been dominated by the commercial guarantee, with profit-seeking commercial guarantee

institutions using high interest rate financing and illegal credit granting as common practice. Due to the frequent breakout of risks, over 400 finance guarantee institutions went out of business in 2013. Explicit government guarantees for the green development sector should replace these destabilizing implicit guarantees through two channels: first, policy-based guarantee institutions can directly provide guarantees for enterprises engaged in green projects; and second, a government-dominated green reinsurance system should be established to provide reinsurance services to green projects and enhance credit throughout the project cycle.



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