

# International Experiences in the Development of Green Finance

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**How to cite this paper:** Peng, H., Feng, T. and Zhou, C.B. (2018) International Experiences in the Development of Green Finance. *American Journal of Industrial and Business Management*, 8, 385-392.  
<https://doi.org/10.4236/ajibm.2018.82024>

**Received:** January 25, 2018

**Accepted:** February 23, 2018

**Published:** February 26, 2018

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## Abstract

Green finance is rapidly developing around the world in recent years and has become a new means of environmental governance. The development of green finance in China is particularly flat and the improvement of market mechanisms becomes the key to it. After analyzing the trading markets of many developed countries, this paper gives corresponding suggestions for China's development of green finance.

## Keywords

Green Finance, Carbon Trade, Carbon Fund

## 1. Introduction

China has entered a crucial period of changing its direction of economic development in the face of harsh environmental problems. The growing demand for finance from the development of green industries and the green improvement of traditional industries has made green finance become a new trend. The development of green finance not only reflects the sense of social responsibility of financial institutions, but it's also an inevitable choice for the development of green financial institutions themselves. However, compared with the green financial markets in developed countries, China started relatively late and the improvement of the green financial system and the enhancement of green financial capabilities have yet to be addressed. Thus, drawing on their experience will contribute to the rapid development of green finance in our country.

In developed countries, green financial instruments include trade of carbon emissions, carbon funds and other financial products. After introducing these kinds of tools, this article gives corresponding suggestions for the development of green finance in our country. The following parts will introduce the carbon emissions' trading, carbon fund and other products, followed by suggestions and

conclusions.

## 2. Trade of Carbon Emissions

As a core tool of green finance, trade of carbon emission has gained tremendous growth in the global transition of low-carbon economy. The Kyoto Protocol has established three cooperative mechanisms, including the Joint Implementation (JI) Mechanism, the International Emissions Trading mechanism (IET) and the Clean Development Mechanism (CDM) [1]. Accordingly, the global carbon market has evolved into the JI market, the IET market, the CDM market and other markets not covered by the Kyoto Protocol such as the NSW Greenhouse Gas Emission Reduction System, the Chicago Climate Exchange and the retail market. There into, the IET market and the CDM market are the major carbon markets [2]. The former is based on carbon credits and the latter the project-based carbon funds, set up by developed countries for reducing greenhouse gas emissions in developing countries [3].

According to the statistics of the World Bank, the global volume of carbon trade had reached 126 billion dollars in 2008. The British New Energy Finance Company predicts that the global carbon trading market will reach 3.5 trillion dollars in 2020 and is expected to become the largest market in the world surpassing the oil market. There are two relatively representative types of carbon emissions trading [4].

### 2.1. EU Greenhouse Gas Emission Trading Scheme: Cap-and-Trade Trading Scheme

EU Gas Emission Trading Scheme set up by the authority and for enterprises adopts cap-and-trade trading scheme and is used to regulate the carbon emission allowances distributed by auction or free in each prescribed period. Enterprises that receive emission allowances can reduce emission and sell excess allowances, or increase their emissions and purchase additional allowances, but at the end of the period, must submit a quota to the regulatory that is equal to the actual emissions during the period [5] [6]. The amount for trading can be so large and the available time so long that it can be used to financing, because enterprises can sell their emissions allowances and use forward contracts for re-purchasing.

It is allowed that enterprises use a certain emission credits besides EU ETS. However, the credits can only be the Certified Emission Reductions (CERs) or the Emission Reduction Units (ERUs) obtained through CDM or JI under the Kyoto Protocol [4] [7].

From the outcome, pricing of the EU ETS reflects the scarcity of emission rights initially formed and the operation has accumulated rich experience in the further application of the emissions trading mechanism used to address climate change. EU has fostered a multilevel market of carbon emissions trading at present, where emissions trade was initially over-the-counter, followed by several large-scale carbon trading centers such as the European Climate Exchange, the

European Energy Exchange, the Nord pool and the Power next. The European Exchange launched futures and options linked with the EU's emission-rights in June 2005, which increased the liquidity of the carbon emission trading market and promoted the development of carbon-trading derivatives.

## **2.2. UK Emissions Trading Group: Baseline-and-Credit Trading System**

Britain was the first country in the world to develop and implement a greenhouse gas trading system [8]. In 2002, Britain launched an emissions trading system covering 6 kinds of greenhouse gases. UK adopts baseline-and-credit trading system where the authority, by the end of one period, issues the emission credits to the companies whose actual emissions are less than the highest emission baseline set by authority, and requires the companies that exceed the standard emissions to submit excess credits. In the system, only when the balance is settled can the quota be traded, so the amount for trading is small and the available time is short. The baseline, the annual allowance, is the average emissions from 1998 to 2000 minus the voluntary reduction committed by enterprises each year. If the actual emissions of enterprises exceed the baseline, enterprises must fit imbalance from the market. If baseline is not exceeded, the remainder can be stored for later use or sold.

UK emissions trading group has achieved significant emission reductions and carbon dioxide emission reduction has added up to 15.74 million tons from the start-up date of April 2002 to 2004 [8]. In 2005, the EU's greenhouse gas trading scheme was launched and UK emissions trading system ended on December 31, 2006 to harmonize with the EU emissions trading policy.

## **3. Clean Development Mechanism and Carbon Fund**

The CDM market is a project through which developed countries cooperating with developing countries to reduce emissions and fulfill their emission reduction commitments by CERs in the market. Generally, in the trading of CERs the exporter is developing countries and the importer is developed countries [9]. At present, the CDM market in developed countries mainly have five forms.

First, projects are created by governments and international organizations and managed by the international organizations. The part of CDM project is mainly driven by the cooperation between the World Bank and governments. The prototypical carbon fund of the World Bank is the earliest carbon fund in the world, managed mainly by the World Bank, with the participation of the governments of Canada, Finland, Norway, Sweden, the Netherlands and Japan Bank for International Cooperation. In addition, 17 private companies are also involved in the formation of this carbon fund. In addition, the Italian Carbon Fund, the Netherlands Carbon Fund, the Danish Carbon Fund, the Spanish Carbon Fund, etc. are using this form.

Second, projects established by the government and enterprises adopt commercial management. The German Carbon Fund, the KfW Carbon Fund,

co-founded by the German government and KfW and managed by the KfW, and the Japanese Carbon Fund, invested by Japan Bank for International Cooperation and Development Bank of Japan and 31 private enterprises, are representatives of this type.

Third, projects are set up by the government and run in a business model. The main representatives of this type are the Japanese Carbon Fund and the British Carbon Fund. These are independent companies, invested by the government in 2001 and operating in a business model. The operation and management of expenses, investment and personnel wage and bonuses of the fund are decided by the board of directors without interference from the government.

Fourth, projects are all set up and managed by the government. The Ministry for Foreign Affairs of Finland set up the JI and CDM pilot program in 2000 and identified potential projects in El Salvador, Nicaragua, Thailand and Vietnam [10] [11]. Since 2003 Finland has purchase CERs from small CDM projects in these countries. The Kommunalkredit Public Consulting, founded by the Austrian government, has been implementing the Austrian JI and CDM projects and has completed several CDM projects in India, Hungary and Bulgaria.

Fifth, projects are funded by enterprises and adopt enterprise managing model. These small carbon funds are usually small in scale and mainly engage in the middle of CERs transactions [10].

## **4. The Other Developments in Financial Institutions**

### **4.1. Implementing Green Credit Policy**

According to the Equator Principles, the current global green credit policies, banks will refuse to provide loans to the projects if the borrowers are unwilling or unable to comply with the social and environmental policies and procedures set forth in the Equator Principles [12]. By the end of 2008, 63 financial institutions around the world had announced the adoption of the Equator Principles, and their green project financing accounted for over 80% of the total global green project financing, which greatly contributed to the development of the global green credit market [13].

In terms of vehicle credits, Wells Fargo set up a National Cleaner Technologies Commercial Banks team in November 2009 to provide commercial banking products and services to the manufacturing, marketing and developing of clean technologies and has raised more than \$5 billion in financing. Bank of America invested more than \$200 million in the Low-Income Tax Credit program from 2014 to 2016. In respect of green buildings, Bank of America's Quick Start for Small Business Administration loans provide unsecured and preferential loans to trucking companies under a quick approval process to support their investment in fuel-saving technology and helping their purchase an upgrade package for Smart Way cars that can save 15% fuel.

### **4.2. Introducing Related Financial Products**

In 2007, JP Morgan launched the JP Morgan Environment Index-Carbon  $\beta$

Fund, while Barclays simultaneously launches the Global Carbon Index Fund, the first fund to track carbon credit transactions in major global greenhouse gas emissions trading systems. HSBC launched the HSBC Global Benchmark Climate Change Index Fund and four global climate change indices, forming a series of climate change indices.

United Bank of Switzerland launched five different climate products in 2007. One is the first Global Warming Index on the Chicago Mercantile Exchange that relies on weather meteorological contracts of 15 cities in the United States, making investors affected by the uncertainty of weather able to be hedged and diversified their portfolios. The second is the equity funds, mainly investing in renewable energy, water, nutrition and health projects. The third is the World Emission Index, a world benchmark index to which the derivatives are based on emissions allowance. The fourth is the Climate Change Strategy Voucher, containing 25 stocks of renewable and energy efficient technology companies. The last one is the Harmonious Global Biofuels Index, which is the first biofuels index.

### **4.3. Providing Direct Financing**

Funds are issued by businesses to tackle climate change. In 2007, Bank of America and Citigroup pledged to invest 20 billion and 50 billion dollars in the next 10 years to combat climate change. Bank of America plans to reduce the growth rate of loans-driven carbon emissions by 7% in a few years [13].

Corporations associated with emission reduction projects are supported in IPO or provided related financial services. In 2006, Citigroup underwrote the listing of Brazil Eco-diesel and provided financial advice to EDP, the world's second-largest wind power energy company to acquire Horizon Wind Energy. In 2007, Bank of America backed the listing of Ocean Power Technology, a company that supports the development of tidal energy technologies.

Investments on emission reduction projects are widely carried out. As early as 1999, Citigroup and WRI set up a new venture capital project, which played a very important role in promoting and demonstrating the rise of green venture capital in Latin America and the development of green industry in Latin America. In addition, through its private equity funds, Citigroup and WRI invested in related fields, including Jiangsu Lin Yang New Energy Group [14]. JP Morgan raised \$1.5 billion in equity funding for the wind power market in 2006. Wells Fargo has invested in Sun Edison's third solar energy fund and MMA's third renewable energy venture capital fund through the Environmental Financial Services Group. In August 2007, Bank of America, San Jose Unified School District and Chevron Energy entered into a partnership and jointly build a 5-megawatt solar generating unit with a projected carbon emission reduction of 37,000 tons.

### **4.4. Promoting the Personal Green Consumption**

The go Green car loan from Australia MECU Bank is Australia's first loan that requires the lender to plant trees for absorbing private car emissions and the car

loan has risen 45% since the launch of the loan. In 2004, Citigroup introduced structured energy-saving mortgage products to low-and middle-income customers and incorporate energy-saving measures such as power saving into the credit scoring system. Citigroup also came to a joint marketing agreement with Sharp Electric, providing convenient financing to customers who purchase solar energy for civilian use. Barclays Bank introduced Barclay Cardrea the in July 2007, which spends 50% of after-tax profits and 0.5% of the consumption amount on climate change projects. Barclays also introduced UK's first carbon-neutral debit card, with all carbon credit used to offset debit card production coming from British local environmental projects [15].

## **5. Suggestions**

From the development of green finance in developed countries, there are some international experiences for the construction of China's green finance system in the following aspects:

### **5.1. Strong Government Support Is the Guarantee of Green Finance Development**

The development of green finance cannot be separated from government support. In the early stage of development, the government should give certain stimulus policies, provide all-round support from philosophy to policy on green investment, and formulate a series of policy measures from green credit rules to long-term price mechanism to increase the attractiveness of green projects and green bonds such as subsidizing renewable energy generation and differentiating the issue rate of green bonds.

### **5.2. The Correct Guidance of Public Opinion Is the Prerequisite for the Formation and Development of Green Finance**

The correct direction of public opinion can lead the public to form an environmental protection philosophy that cares about environmental issues and supports energy conservation and emission reduction, and promotes the promotion and application of low-carbon products and technologies. In addition, a strong public opinion atmosphere has an invisible binding force on financial institutions to assume their social responsibilities. In the process of developing green finance in our country, we should pay attention to propaganda and guidance of public opinions, step up propaganda on environmental issues and guide social publics to form green consumptive concepts correctly and a society-wide understanding of the atmosphere supporting low-carbon economy. At the same time, we should give full play to the role of media supervision so that financial institutions' behavior of supporting low-carbon economy can linked to their social image and promote financial institutions to actively implement the principle of green finance and support the development of low-carbon economy in our country.

### 5.3. Market-Oriented Operation Is the Key to the Sustainable Development of Green Finance

At present, carbon emissions trade has become stock-like financial products that can be traded in the market. Therefore, the role of market mechanism can be brought into play and the relevant market players can be attracted to participate in the transaction through price fluctuations. Incentives inherent in such a mechanism make carbon trading a sustainable development capability. Therefore, in the process of developing our country's carbon finance, we must persist in the market-oriented death and give full play to the role of the market. The mechanism must be set up with sufficient incentives to attract enterprises and financial institutions to take the initiative to participate in related transactions. Only in this way can we mobilize the enthusiasm of the relevant parties and take various measures to truly reduce pollutants and carbon emissions.

## 6. Conclusions

In conclusion, green finance is not an end but a means. It is its mission to serve the real economy and it is its feeling that social responsibility should be practiced. Both government and commercial banks, as well as other financial institutions, play an important role in the process of development. While many achievements have been made, many problems and challenges remain to be solved. All stakeholders need to further strengthen their communication and cooperation around the challenges, and only in this way can the development of green finance be continued.

## References

- [1] Heil, M.T. and Selden, T.M. (2001) International Trade Intensity and Carbon Emissions: A Cross-country Econometric Analysis. *Journal of Environment and Development*, **1**, 35-49.
- [2] Eichner, T. and Pethig, R. (2010) Eu-Type Carbon Emissions Trade and the Distributional Impact of Overlapping Emissions Taxes. *Journal of Regulatory Economics*, **3**, 287-315. <https://doi.org/10.1007/s11149-010-9118-z>
- [3] Foxon, T.J. (2011) A Coevolutionary Framework for Analysing a Transition to a Sustainable Low Carbon Economy. *Ecological Economics*, **12**, 2258-2267. <https://doi.org/10.1016/j.ecolecon.2011.07.014>
- [4] Rosenbloom, D., Haley, B. and Meadowcroft, J. (2018) Critical Choices and the Politics of Decarbonization Pathways: Exploring Branching Points Surrounding Low-Carbon Transitions in Canadian Electricity Systems. *Energy Research & Social Science*, **37**, 22-36. <https://doi.org/10.1016/j.erss.2017.09.022>
- [5] Weber, G. and Cabras, I. (2017) The Transition of Germany's Energy Production, Green Economy, Low-Carbon Economy, Socio-Environmental Conflicts and Equitable Society. *Journal of Cleaner Production*, **167**, 1222-1231. <https://doi.org/10.1016/j.jclepro.2017.07.223>
- [6] Kardos, M. (2014) The Relevance of Foreign Direct Investment for Sustainable Development. Empirical Evidence from European Union. *Procedia Economics and Finance*, **15**, 1349-1354. [https://doi.org/10.1016/S2212-5671\(14\)00598-X](https://doi.org/10.1016/S2212-5671(14)00598-X)

- [7] Nishimura, M. (2017) Business Model for a Low-Carbon Economy. *Journal of Information & Management*, **1**, 112-122.
- [8] Burtraw, D., Palmer, K., Bharvirkar, R. and Paul, A. (2002) The Effect on Asset Values of the Allocation of Carbon Dioxide Emission Allowances. *The Electricity Journal*, **5**, 51-62. [https://doi.org/10.1016/S1040-6190\(02\)00316-0](https://doi.org/10.1016/S1040-6190(02)00316-0)
- [9] Cornell, B. and Green, K. (1991) The Investment Performance of Low-Grade Bond Funds. *Journal of Finance*, **1**, 29-48. <https://doi.org/10.1111/j.1540-6261.1991.tb03744.x>
- [10] Kanamura, T. (2016) Role of Carbon Swap Trading and Energy Prices in Price Correlations and Volatilities Between Carbon Markets. *Energy Economics*, **54**, 204-212. <https://doi.org/10.1016/j.eneco.2015.10.016>
- [11] Husso, M. and Nybakk, E. (2010) Importance of Internal and External Factors When Adapting to Environmental Changes in SME Sawmills in Norway and Finland: The Manager's View. *Journal of Forest Products Business Research*, **1**, 14.
- [12] Conley, J.M. and Williams, C.A. (2011) Global Banks as Global Sustainability Regulators: The Equator Principles. *Law & Policy*, **4**, 542-575. <https://doi.org/10.1111/j.1467-9930.2011.00348.x>
- [13] Chang, C.L., McAleer, M. and Zuo, G. (2017) Volatility Spillovers and Causality of Carbon Emissions, Oil and Coal Spot and Futures for the EU and USA. *Documentos De Trabajo Del Icae*, **10**, 1-51. <https://doi.org/10.3390/su9101789>
- [14] Chai, N., Zhao, T. and Lin, T. (2012) Grey Relation Analysis of Carbon Dioxide Emissions from Energy Consumption of Industries in China. *Ecological Economy*, **4**, 247-257.
- [15] Fuller, M., Portis, S.C. and Kammen, D. (2009) Toward a Low-Carbon Economy: Municipal Financing for Energy Efficiency and Solar Power. *Environment Science and Policy for Sustainable Development*, **1**, 22-33. <https://doi.org/10.3200/ENVT.51.1.22-33>