

# The Production Design of Green Credit of Environment Financial

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**Abstract.** Due to the increasingly grim situation of global environment issues, the scholars from all over the world have proposed that is urgent to change the way of economic growth of the industrial civilization. While from the point of micro-enterprises and financial institutions, how to improve environmental quality and transfer environmental has become an important practical problem by the means of financial product. This paper does a comprehensive research at the foreign banks' experience to carry out the business of green credit, and design the business process of green credit which can widely applied in China at last.

**Keywords:** Green Credit, Production Design, Business Process

## 1. Introduction

Green credit provide loans supporting and implement preferential low interest rates to who study and produce the pollution control facilities and any enterprise or organization which work on ecological protection and construction, development, utilization of new energy and engage in the production of circular economy, green manufacturing and eco-agriculture. The purpose of that is to guide the funding and loans into the enterprises and organizations which promote the cause of the national environmental protection, in the mean while detached from the enterprises and projects which would make destruction or pollution to the environment in order to achieve the green allocation of funds. <sup>[1]</sup>

The nature of Green credit is handling of the financial sector and sustainable development correctly. At the same time, green credit on behalf of a new kind of financial concept, and is a manifestation of responsibility which the financial institutions committed to achieving economic society sustainable development. Green credit is an important trend in the development of modern financial, and a change and development to the traditional financial concept.

## 2. The Domestic and Abroad Experience of Green Credit

Germany is one of the principal cradles of international green credit policy, and the banking sector participates in the formulation and promotion of the *Equator Principles* actively. When do the project credit approval, it classify the projects in according to the *Equator Principles* and the industry *Environment, Health and Safety Guide (EHS Guidelines)*, in the mean while it assess the impacts and risks (including health and safety aspects) that the project bring to the social and environmental, and propose the method that reduce and manage the adverse effects.

The German Government supports the national policy bank KfW Bankengruppe, use the capital markets and commercial banks to implement the financial subsidy policy on environmental projects. After several years of development, the green credit products which the German government participate in has formed a relatively complete operation mode <sup>[2]</sup> (Fig. 1).

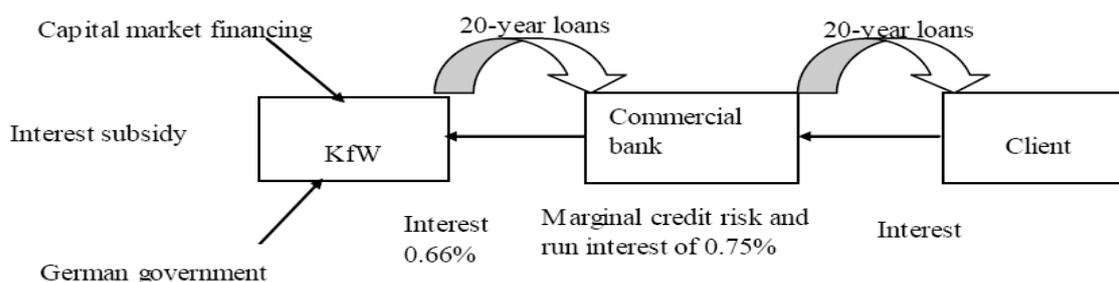


Fig. 1: The market operation mode of German Green of credit products

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The situation of KfW's credit on the field of environmental protection is: KfW's investment in environmental protection in 2008 accounted for 21.66% of the total policy loans, covering many aspects, such as energy saving, air and water pollution control and soil protection. The total project loans grow rate of 5% per year, and reach 4.8 billion euros in 2008. In addition, one can get up to 30% discount provided by the Ministry of the Environment who operate the latest environmental technology demonstration projects. And there are a total of € 4.2 billion of subsidized loans in 2008 to invest in renewable energy, an increase of 11 percent more than in 2007, nearly one half of the investment in this project in Germany.

The experience of German implementation in the green credit policy is in the following four points:

(1)It earns the development opportunities for the German banking sector that take actively participate in the green credit. The earlier participation in the international green credit, not only regulates the guidelines of industry in the field of environmental protection, and also promotes the green development of banking sector and national sustainable strategy.

(2)Country gives the subsidized loans to green credit projects, and the leverage effect is significant. The German government offers lending rates of less than 1% of the preferential credit policy for 10 years on the projects which have a good performance in environmental protection and energy saving. Actually, country can use less money to mobilize a large number of environmental protections and energy saving constructions and renovation projects, and the leverage effect is very significant.

(3)The financial products which support the green credit on the basis of policy banks have been designed. KfW plays an important role in the whole of green credit policy system, and its energy saving and environmental protection financial products from the initial financing to post-sales does not intervened by government. All the activities were been carried out through open and transparent tender forms, the main role of Government is to provide interest subsidies and make relevant management approach, which can protect the efficient and equitable use of funds.

(4)The recognition of the environmental protection department is critical to get green credit. In the implementation process of German green credit policy, the environmental protection departments would ensure that the discount policy to support energy saving and environmental protection projects powerfully.

Table 1 lists the green credit experience of many countries, and the credit measures and the main features of the typical bank which implement the green credit of the different countries in the world.

Table 1. Green credit experience of some countries

Country	Bank	Credit measures	General features of the
United States	Citibank, Bank of America, Chicago shore bank	Structure of the energy efficient mortgage products, credit environment system assessment, ecological deposits	Blameless the legal construction, appropriate policy guidance to encourage, determined implement of the bank
Britain	British National Westminster Bank, Barclays Bank	Credit business environment evaluation, low borrowing rates for green products	Protection of personnel, marketing, government support for green credit low interest rates, division of environmental risk rating
Switzerland	Union Bank of Switzerland	Systematic reviews of credit business environment	The evaluation system is perfect, the government support
Netherlands	Commercial bank	Green project plan - green mortgage loans	Green project plan
Bengal	Grameen Bank	Poor loan	Government widely promoted
Canada	Bank of Canada, Royal Bank of Canada	Clean air car loan	Blameless decision tree for approval mechanism
Australia	Australian bank	Auto loans	Government support for green credit

### 3. The Green Credit Product Design of the Banks of China

#### 3.1. Green Credit Products Business Choice

Table 2 lists the international mainstream green credit products business and product forms, it can be found after comparing that the National Development Bank cover three main foreign green products, housing

security, transportation and project financing. The National Development Bank implements the Ji district farmers' microfinance projects with Tianjin local government's cooperation in 2008, which supports 591 families, the amount of loans is more than 30 million. In this paper, the following two angles are been raised to choose green credit products:

(1) The choice based on environmental responsibility

The common means of domestic Green credit was used are always the floating interest rate, repayment period and the line of credit, but in fact the ways of financial support of the Bank for energy saving companies are far more than that. For example, the National Development Bank can combined with carbon emission reduction targets of China in 2020, commitment to the qualified enterprise access to finance according to different emission reduction requirements in different industries. From the point of view of pollution sources, the number of rural and agricultural sources of pollution is more than any others industries' amount, the distribution is more dispersed and governance is more difficult. Sources of pollution survey results which released in 2010 showed that: there were 2.899 million of agricultural sources, 1.576 million of the industrial sources and 1.446 million of living sources in all the 5.926 million survey objects. The amount of chemical oxygen demand of agricultural sources is 13.2409 million tons. We can see from the above data, the rural and agricultural development needs the support of the green funds more urgent. Table 3 gives the loan distribution of the National Development Bank in 2008 and 2009.

Table 2. World's classic green credit products

Type of Loans	Name of production	Bank	Characteristic
Home Mortgage	Mortgage of Structured Energy-saving	Citigroup	Add the Energy-saving targets, such as power-saving index, into the loan applicant's credit scoring system.
	Eco-home Loan	British Financial Service	Provide free home energy assessment and carbon offset service for all house purchase transactions and successfully offset carbon dioxide emissions by 50,000 tons in 2005.
Commercial Construction Loans	Concessional Loans	New resource bank in the United States	Provide 0.125% of loan discount to commercial or multi-dwelling units of green projects.
	First Mortgage Loan	Wells Fargo	Provide the first mortgages and refinancing for LEED-certified energy-saving commercial buildings and the developers do not need to pay the initial premium for that.
Home Equity Loan	Convenient Financing	Citigroup	Sign a joint marketing agreement with Sharp Electric Company for providing convenient financing to customers to purchase civilian solar technology
	Loan Donation	Bank of America	According to the VISA card spending amount used by the environmentally friendly home equity loan applicants, donate some to environmental non-governmental organization by a certain percentages
Auto Loan	Clean Air Auto Loan	Van City	Provide prime rate to all low-emission auto models
	Green Auto Loans	Bankmecu	Require lenders to plant trees to absorb emissions lending to the private automobile
Fleet Loan	Small Business Administration Express Loans	Bank of America	Support the investment in fuel-saving technology by the use of the quick approval process and offering the unsecured and preferential terms to trucking companies to help it buy fuel-efficient rate of 15% Smart Way Upgrade Kits
Green Credit Card	Climate Credit Card	Rabobank	Donate a certain proportion to the World Wildlife Fund according to the annual amount of energy-intensive products or services purchased by credit card.
	Barclay Breathe Card	Barclays Bank	Provide discounts and low borrowing rates to the card users to buy green products and services and 50% of the profits of card used for carbon emission reduction projects worldwide
Project Financing	Energy-From-Waste Project	Bank of Ireland	Give the loans support up to 25 years which needs to sign a waste disposal contract with the local government and promise to support the waste disposal which is outside the scope of contracts.

①Support the new rural construction continued

To support the rural construction, besides the gratuitous investment of financial capital is needed, it must be built on the strong financial support from banks and financial institutions. However, a narrow range of policy financial support for agriculture largely restricted to the function of that support. Agriculture support functions of the Agricultural Development Bank is mainly limited in the credit services of the state-owned cotton and oil circulation, while the functions of support agricultural development, industrialization of agriculture and rural infrastructure do not operate effectively and do a weak effect to the adjustment of industrial structure in rural areas and the promotion to the income of farmers'. The support of National Development Bank for rural infrastructure and, the small and medium enterprises in rural areas is still relatively small. However, the intensity of growth rate of support has increased each year, the growth rate of 2009 was nearly 50 percent over that of 2008.

②Industrial energy saving

The proportion of energy consumption of China's industrial sector in various economy sectors is nearly 70 percent. The order of these industries according to the sources of pollution is: Zhejiang, Guangdong, Jiangsu, Shandong and Hebei Province. Assuming to make China's energy demand growth rate dropped to half of GDP growth rate in 2008, Hebei Province need 15 billion yuan funds, while in 2007 the central budget just come up with a 23.5 billion in the nationwide total amount to support energy conservation. The focus of support is the sewage treatment facilities supporting pipe network construction in central and western area and the elimination of backward production capacity in less developed regions, therefore there is a huge green loan demand in energy saving.

③Support for new energy R&D

The gap of China's coal, oil and gas is huge, emerging oil shortage and electricity shortage shows the seriousness of our energy problems. The volatility of international oil prices seriously affects the sustainability of China's economic growth and social development. At present, more than a dozen new energy Research Institution has emerged, and the new energy development progress has an important relationship with China's economic.

Table 3 National Development Bank loan distribution

Industry	The loan balance in the end of 2008(100 million ¥)	The loan balance in the end of 2009(100 million ¥)	Order
Public infrastructure	8081.9	11061	1
SMEs	910	10065	2
Public road	5687.5	6980	3
New rural construction	3225	4729	4
Electric power	4405.3	4715	5
Coordinated regional development	1489.3	3666	6
Petroleum and petrochemical	1240.5	3270	7
National loans	/	2069	8
Energy saving	988	1715	9
Indemnity construction of housing	475.8	1680	10
Railroad	893.5	1234	11
International business	77.7	974	12
Agriculture Forest & Irrigation	571.7	743	13
Post and telecommunications	644.1	597	14
Coal	347.76	438	15
Education	66	119.2	16
Emergency	87	94.7	17

(2) The choice based on social responsibility

The objects of the green credit project services include government, businesses and individuals. It needs banks to coordinated development with the central government, local governments, businesses, consumers and other main subjects. Policy financial institutions on behalf direction of the national development planning, and therefore it can seize the source of development and systematically, efficiently develop and

nurture green loan programs by the way of participating in the formulation of development planning of regional and industrial clusters.

### 3.2. Safeguard Measures

#### (1) The establishment of Guiding Catalogue of green credit Industries

The primary problem in terms of the implement of green credit from the bank angle is: which industries and projects belong to the range of supporting areas of the green credit and how to identify an industry or project is energy saving or something else? So *The Guidelines of Investment to Green Credit Industry* need to be developed, which can subdivide the green industries and projects into environmental protection, energy saving, new energy development or usage, comprehensive utilization of resources, smart grid, bio-industry, high-end equipment manufacturing, application of new materials, new energy vehicles and others. The guideline stressed to incorporate environmental information on the basis of the entire process credit management, and also the product quality safety and production safety situation into it.

#### (2) Green credit process optimization

A complete process of management control point in corporate lending operations have loan marketing, loan negotiations, loan review, loan approval and loan checks. This process is just for the mode of enterprises, banks and government, not the banks, personal and enterprise mode.

The guarantee of successful implementation of this process is to establish a business environment, credit shared database, the environmental risk assessment which can be referred to the Equator Principles when reviewing and rating of enterprises. Not a member of the Equator Principles banks can refer to the credit rating assessment model to operate, which could adopt Possibility of the-Default (PD) model for scale enterprises<sup>[4]</sup>. And it could use scorecard to determine the credit rating to the utilities industry and the newly formed enterprises. Only introduce the PD model: it is a statistical model based on the probability of default, that is, to calculate the probability of default customers within the next year through a series of quantitative and qualitative indicators and according to the probability of default to determine the customer's credit rating. The indicators that PD model used for the manufacturing sector include the following:

- a. Solvency indicators, such as asset-liability ratio, current ratio, cash ratio;
- b. Profitability indicators, such as the main business profit margins, return on capital rates;
- c. Management indicators, such as sales cash content, accounts receivable turnover, inventory turnover rate;
- d. Performance indicators, such as credit assets of the principal repayment record, the record of interest on credit assets to repay;
- e. Development capacity and potential indicators, such as the main business revenue growth, profit growth;

In addition, there are limit indicators and credit rating modification indices for adjustments and amendments to the rating results. It is more mature and scientific of the PD model for the evaluation of corporate credit rating. But if its modification covering a wide range and from the point of environmental factors it could not have a significant impact to business credit and the probability of default, it is not appropriate as the evaluation index. So in this situation, we should consider the second option: establish an independent environmental risk rating system, which can set up a series of evaluation index to quantitatively evaluate the level of environmental protection rating. As a model of PD, different scale and the different enterprise should apply the different industry sub-model. In the environmental risk rating system, different criteria should be set to compare the similar kind of enterprises in its environmental standards.

#### (3) Client classification management

The loan companies can be divided into to three types: encourage, early warning and restrictions. It should do dynamic adjustment and adopt the different credit admittance and conditions for different categories of enterprises.

① The encouraged category: the enterprises which are in line with national industrial policy, and have significant effectiveness of the implementation of emission reduction projects, and have the outstanding achievements in circular economy and clean production; the Environmental Protection Advanced Enterprise which have a long-term stability compliance emissions.

② Warning category: the enterprises which have the long-term excessive emissions, serious lag in emission reduction projects, non-payment of sewage charges for more than fifty percent, and does not eliminate the significant environmental risks overdue for more than half a year.

③ The restricted category: the enterprises which are officially eliminated by of the national industrial policy, ordered to shut down by the local government above the county level, constructed or product unauthorized and violated the Environmental Impact Assessment Law, cause of large environmental damage and a serious threat to the safety of citizens.

#### (4) Evaluation mechanism

What the performance of green credit business carried out in the end? Have the expected economic and social performance been produced? What are the shortcomings and point that can be improved in the process of business development? Ex-post evaluation can provide useful suggestions for the green credit policy. The banks can entrust the third-party professional organizations to evaluate the performance of implementation of the green credit, the quantifiable indicators should be used to evaluate, and the content of assessment evaluation includes loan size, rate of bad debts, economic efficiency, the size of the energy saving and social evaluation, which would adhere once each year.

## 4. Conclusions

The banks of China should play their own advantages in the field of green credit and take corresponding responsibility to make the development of Chinese economy low power consumption, health and sustainable. And we should also learn much more experience from all over the world, make policy banks as a leader to improve China's financial system and take widely application of the business of green credit.

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