CSCanada
Management Science and Engineering
Vol. 5, No. 3, 2011, pp. 72-76
DOI:10.3968/j.mse.1913035X20110503.1z140

ISSN 1913-0341[Print]
ISSN 1913-035X[Online]
www.cscanada.net
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Research on Enterprises' Cleaner Production Incentive Mechanism Based on Profit-Pursuit Essence

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Supported by "Natural Science Foundation of China" (No: 71072039), and supported by "Humanity and Society Science Research Foundation of China Education Department" (No: 09YJC630124), and supported by "University Natural Science Foundation of Jiangsu" (No: 09KJB630001), and also supported by "University Philosophy and Society Science Foundation of Jiangsu" (No: 09SJD630052).

Received 28 June 2011; accepted 17 July 2011

Abstract
Facing the increasing pressure of cutting emissions and the increasing consumption of traditional resources, enterprises should actively implement cleaner production mechanism to accelerate sustainable economic development. However, most enterprises just passively meet the requirement of emission reduction and environmental control at this stage, and the environmental production technologies are mostly in the end of treatment phase. Starting from the profit persuit nature of enterprise, this article firstly analyzed the reason of forming Cleaner Production Mechanism , then established the model of Cleaner Production Mechanism from the perspective of economic interests .at last, the model analyzed the economic benefits brought by implementing Cleaner Production Mechanism from three channels and five results.

Key words: Cleaner production mechanism; Economic benefit; Reasons; Mechanism model

WANG Lin, LI Kun, & LI Dejuan (2011). Research on Enterprises' Cleaner Production Incentive Mechanism Based on Profit-Pursuit Essence. *Management Science and Engineering, 5*(3), 72-76. Available from: URL: http://www.cscanada.net/index.php/mse/article/view/j.mse.1913035X20110503.1z140 DOI: http://dx.doi.org/10.3968/j.mse.1913035X20110503.1z140

INTRODUCTION
On the 2009 Global Climate Change Conference in Copenhagen, Denmark, China announced that by 2020 carbon dioxide emissions per unit of GDP dropped by 40% to 45% over 2005. On one hand, this commitment reflects the image of China as a major power to positively take the responsibility of climate change and shows the determination and confidence in the implementation of emission reduction. On the other hand, taking the actual state of China's economic growth and industry development patterns into account, there is tremendous pressure within the commitment. According to statistics, fossil energy in the whole consumption structure of industrial energy accounted for 93.5%, while the hydro, nuclear, solar, wind, biomass and other energy consumption currently accounts for only 6.5%[1]. Fossil energy generated a large number of sulfur, nitrogen oxides, carbon dioxide and other polluting emissions during use, which constituted a serious threat to the ecological environment and the health of residents.

According to the data provided by <Annual Report On Enterprise Citizenship in China(2009)>, China's industrial enterprises pollutions form about 70% of the total pollutions, and 50% of industrial enterprises pollutions is caused by poor corporate governance, lack of social responsibility of sustainable development and weak awareness of pollution control and emission reduction, which largely increased the pressure on the environment and resources. Besides, the investigation found that most enterprises only passively coped with environmental regulation, and the technical level are

mostly end- treatment, rather than considering the use of clean technology in the links of product structure adjustment, product design, manufacturing processes, logistic chain .In fact, the promotion of cleaner production ,energy consumption reduction and pollution control face multiple challenges, the most important among which is companies' cost constraints, namely the economic benefits.

1. RELEVANT RESEARCH COMMENTARIES

The dynamic mechanism theory of cleaner production has been the focus of domestic and foreign scholars for decades. Chen Yuxiang[2] raised that for self-interest considerations, enterprises have to improve their innovation capacity and adopt resource-saving and environment-friendly technologies for further development. Xie Jiaping, Chen Rongqiu[3] made professional and deep research on the internal motivators of implementing ecological operation, analyzing the costs and benefits of parts reuse, material recycling, safe disposal and other waste disposal strategies from the accounting methods of disassembly cost, and building a '0-1' goal programming model of product recycling strategy optimization. Su Jin, Ying Yu[4]analyzed the benefit effect brought by cleaner production, then pointed out that environmental operation would bring about higher investment return, significantly increasing output, shortening production cycle, improving production reliability, enhancing product quality, improving the working environment and encouraging staff morale . Moreover, environmental operation has high potential to provide more new jobs, the growth rate of which is also higher than other economic forms. Daniel C. Esty, Andrew S. Winston[5] used adequate cases to demonstrate that the top enterprises involve environmental protection factors into the corporate strategy and then construct dynamic competitive advantages by encouraging innovation. Studies of Morioka[6] also included incentive and restraint mechanisms for enterprise micro-ecological activities; he thought necessary administrative intervention would contribute to enterprise ecological operation. Above studies emphasize that the key of ensuring energy saving and emission reduction positively develop is to fully stimulate enterprises' own initiative and enthusiasm.

2. REASONS OF FORMING CLEANER PRODUCTION MECHANISM (AS SHOWN IN FIGURE 1)

2.1 External Factor

Circular economy in China developed late; it is now dominated by government guidance. Market forces and corporate consciousness are inadequate, so it still basically stays in the level of pollution abatement, and there is no enough stress on efficient use of resources and reuse of waste, so that the work moves slowly. There are several drawbacks lied in the development of government-led circular economy at the present stage.

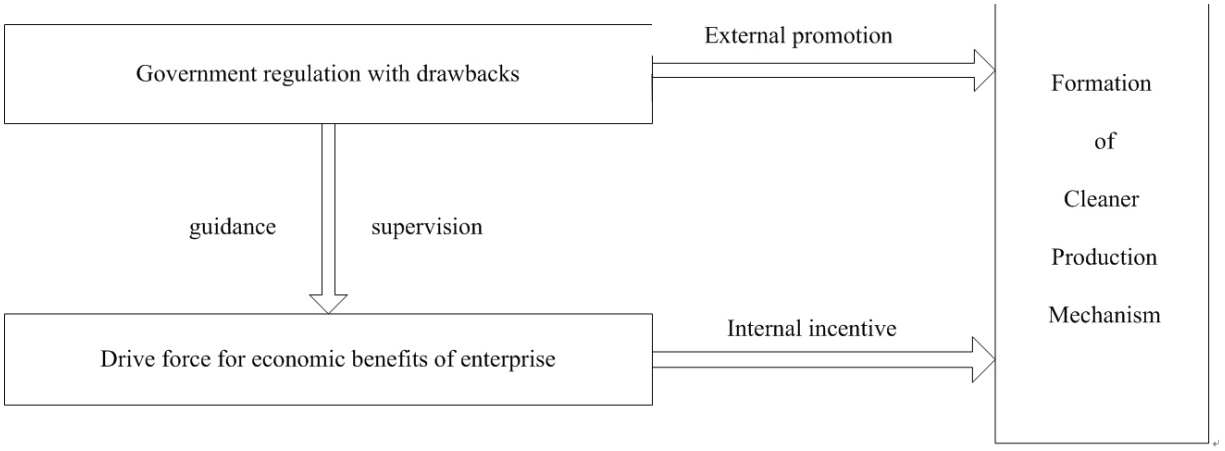

Figure 1
Formation of Cleaner Production Mechanism

(1) Weak power on implementation and supervising of environmental policies and regulations[7]. Since 1949, especially since it began opening up 30 years ago, China's environmental legislation has made significant progress and now begin to take shape, forming a more complete environmental legal system. However, China's weak power on implementation and supervising of environmental policies and regulations mainly are as following: first, environmental control organization has no effective restraints on the policy execution of executive authorities; second, China's environmental protection administration department lack for independence. China's local environmental protection administration department is vertically led by the administration department of

environmental protection at the next higher level, more importantly, it is horizontally led by the local government at the same level. In addition, the local governments often overlook environmental control and pursue high-speed economic growth because of the tax distribution fiscal system and promotion incentives.

(2) Imperfect legal system of circular economy. Although China's environmental legislation has made some achievements, there are still some problems. For example , local government frequently and improperly intervene in the environmental regulation, the legal powers and responsibilities of the local environmental protection department regulated in law are too broad, which is not helpful to conduct and implement , etc.

(3) Government's low investment into research and development of clean technology and direct production. Although government can make research and investment as one of the market forces, it is easy to cause "free rider" and other bad phenomenon since government is not the source of environmental pollution, leading to low production efficiency.

2.2 Internal Factors

Higher efficiency of resource use will lead to enhancement of enterprises economic benefit, so enterprises will actively take responsibility of environmental protection. Cleaner production made enterprises begin to consider how to maximize the intensive use of resources by technological progress and management upgrading at the source of production, so that the enterprises are able to obtain economic benefits as well as reduce the negative impacts.

3. ECONOMIC BENEFITS RESEARCH OF CLEANER PRODUCTION MECHANISM

In the traditional production process, 'production first, treatment last' was mainly adopted. On one hand, the cost of 'end-treatment' is so high that enterprises don't want to or even cannot afford to, on the other hand, looking at the aspect of mass balance, producing act which is simply for the production is not helpful to improve the efficiency of material resources use[8]. Therefore, for the purpose of sustainable use of resources and ecological environment protection, taking profit maximization as the incentive and restraint mechanism, cleaner production mechanism adopted by enterprises has dual functions of environmental and economic benefits.

3.1 Model of Cleaner Production Mechanism Within Enterprise (As Shown in Figure 2)

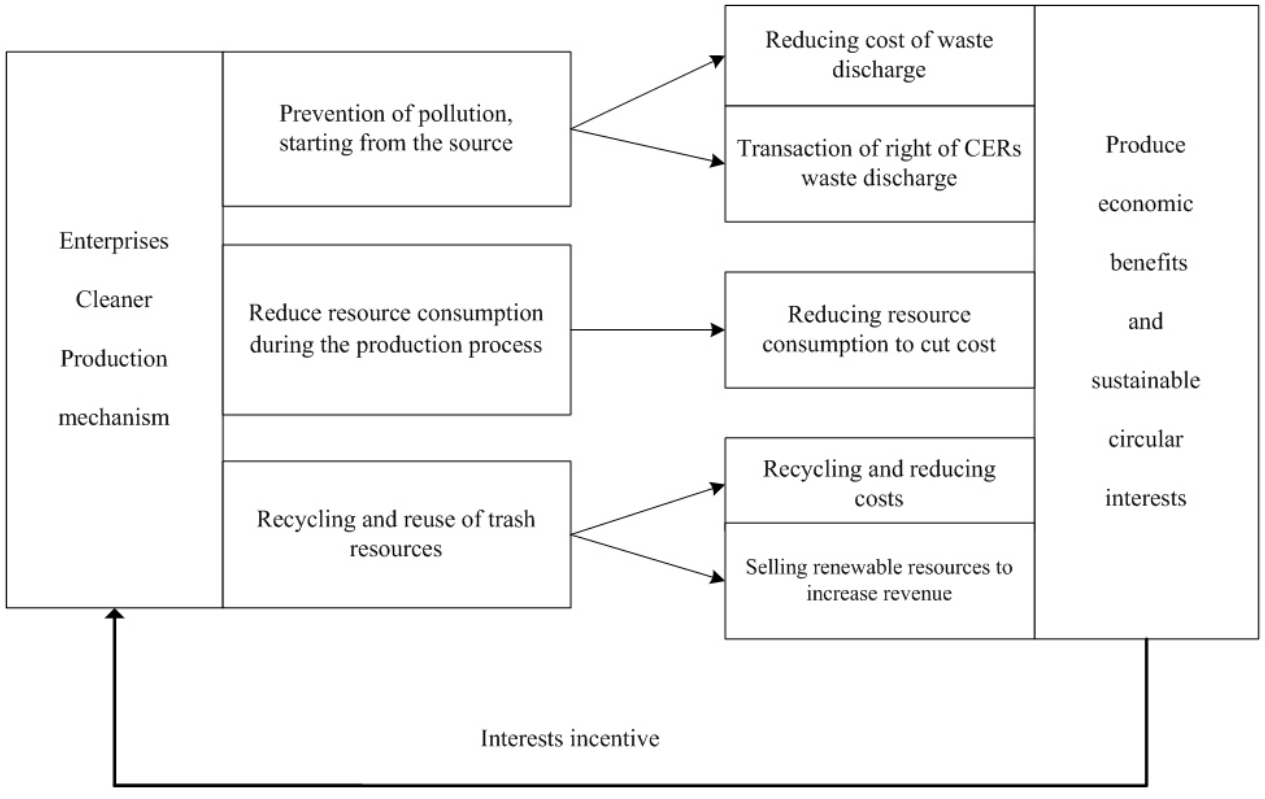

Figure 2
Model of Cleaner Production Mechanism Within Enterprise

From the model of Cleaner Production Mechanism in figure 2, centered around 'economic benefit', the entire mechanism explained the main channels and laws of implementing cleaner production for profit-maximizing enterprises. The model elaborated the cleaner production within enterprise from three aspects: pollution prevention, starting from the source, reduce resource consumption during the production process, recycling and reuse of trash resources. The first channel, 'prevention of pollution, starting from the source', the fundamental objective of which is to reduce pollution, reflecting the core content of early environmental management theory. The second channel, 'reduce resource consumption during the production process', its main purpose is to improve resource utilization, reduce resource consumption of production source, save production costs, improve economic efficiency, and realize the transfer from 'end-treatment' to 'source-control'. The third channel, 'recycling and reuse of trash resources', the act effectively combined 'end-treatment' with 'source-control' to achieve harmonization and unification of economic and environmental benefits.

The three channels of Cleaner production will surely produce corresponding results and performance, in this model; only 5 benefit results are listed. The 5 results are not only goals and results of the above 3 channels, reflecting the short-term specific targets of Cleaner Production Mechanism, but also reflects cost savings, revenue expansion and other economic performances. So implementing cleaner production mechanisms within enterprises can realize unification of social and economic benefit, form the interest incentives of corporate behavior, so as to ensure enterprises continuously implement cleaner production mechanism and further promote the recycling economy.

3.2 Economic Benefits Analysis of the Three Channels

3.2.1 Analysis of Results Caused by 'Pollution Prevention, Starting from the Source'

The channel mainly produce two economic benefits: reducing cost of waste discharge and transaction of right of CERs waste discharge. In the traditional enterprises, the main concrete measures of pollution prevention are investing into establishing relevant waste discharge equipment, or raising capital to establish waste discharge center with other enterprises, or outsourcing to intermediary institutions by paying some pollution charges.

(1) Reducing cost of waste discharge. Whatever kind of the above three channels will produce initial investment cost of waste discharge equipment, transaction cost of cooperative negotiation, the costs of pollution control and management. These costs can be divided into fixed costs (the cost of equipment investment and cooperative negotiation) and variable costs (cost of pollution control and management). Among which, the fixed costs will be defined at the initial stage and variable costs will be marginally decreased as the development of programmed and scaled pollution control[9].

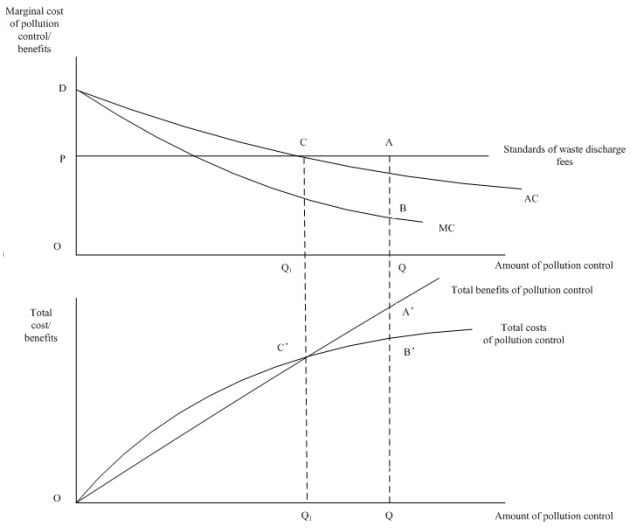

Figure 3
Cost of Pollution Control

Therefore, the cost of pollution control turns out to be a marginally declined curve with large initial value, as shown in Figure 3. MC represented the marginal cost of pollution control, AC represented the average cost of pollution control, P represented the standards of waste discharge fees. When the amount of pollution control is Q1, AC and P intersect at point C, which represented that the total cost of pollution control equal to the total revenue. But when the amount of pollution control is greater than Q1, the average cost AC is below the standards of pollution charges P due to the impact of decreased marginal cost, which represented that the total cost of pollution control is less than the total revenue. This shows that the effect of reducing waste discharge cost and increasing economic benefits is more significant as the amount of pollution control increases.

(2) Transaction of right of CERs waste discharge[10]. As the trend of global warming strengthened and Cleaner Development Mechanism (CDM) projects proposed, transaction of right of CERs waste discharge became increasingly possible. Transaction of property right of waste discharge at this stage refers to make clear arrangement about the permitted amount of waste discharge, and then enterprises will sell or buy a license to achieve efficient pollution control cooperation between each other. The premise of the results is the trading market of right of CERs waste discharge, so that enterprises can sell the surplus emission rights and attain the economic benefits caused by reducing emissions when their own waste discharge decreased,.

3.2.2 Analysis of Results Caused by 'Reduce Resource Consumption During the Production Process'

In this channel, reduce resources consumption during the production process through the efficiency of resource use and the use of clean energy, saving the cost of buying resources and improving economic benefits. Most of the traditional natural resources are non-renewable resources. With the development and acceleration of industrialization, the demand for resources is larger and larger, resulting in a contradiction between supply and demand, which violently raise the prices of traditional resource and so as to increase production costs. While some clean energy is seldom applied at this stage, so long-term use can not only reduce the expenditure of raw materials because of its low price, also can better develop the circular economy.

3.2.3 Analysis of Results Caused by 'Recycling and Reuse of Waste Resources'

At this stage, the waste resources for recycling and reusing mainly consist of three parts: the traditional "three wastes"; substandard goods during production process and damaged goods or returned by customers during sale; the goods up to the highest service life and entering into the retirement stage. For these waste resources, there are two main ways to increase economic benefits: recycling and disguised sale.

(1) Recycling and reducing costs. Among the above three waste resources, some can be directly or after-processing returned to the production process, such as damaged goods or returned by customers during sales. Enterprises can use these waste resources to produce new goods through reprocessing. Use of waste resources to produce new goods can reduce business costs, reduce the demand for raw materials and reduce the dependence on raw materials. In addition, it will reduce the pollution emissions and waste discharges of enterprises through recycling of waste resources, such as some useful resources of 'three wastes'.

(2) Sell renewable resources to increase revenue. For those trash resources which cannot be processed by the enterprise but can be utilized in the market, enterprises can directly or after-processing sell to other enterprises which will make use of these resources, to increase the added-value of their products, expand revenue channels and increase Profits.

CONCLUSION

Facing the growing pressure of emissions reduction and the increasing consumption of traditional resources, enterprises should actively implement cleaner production mechanisms and accelerate sustainable economic development. However, currently most enterprises only passively cope with environmental regulation, and the disposal of trash resources are mostly end- treatment, rather than considering the use of clean technology in the links of product structure adjustment, product design, manufacturing processes, logistic chain. Taking the corporate profit-maximization nature into account, the research emphasis has returned to profit-persuit nature of enterprises from the technical level, 'persuading' enterprises to assume more environmental responsibilities from the aspect of economic benefits and enable enterprises to achieve the unification of economic and environmental benefits by using clean development mechanism(CDM).

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