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Research on environmental cost control of manufacturing enterprises under double carbon target——Take the "public benefit snack box" product as an example

Jiaqi Chen[1], Jiayin Yang[1], Yingjia Li[1], Xingni Hu[1], Jin Qiu[1,*]

[1]Guangdong University of Science &Technology, Dongguan, China
[*]Corresponding author: 610192133@qq.com

Abstract: *Environmental cost control is an important part of enterprise cost management, which is based on the premise of enterprise environmental cost management objectives, environmental cost prediction, and the adoption of appropriate models and policies to control the whole process of environmental cost formation. This paper focuses on manufacturing enterprises and takes "charity snack box" as an example to establish a comprehensive environmental cost control system and performance evaluation system for charity snack box. It adopts specific methods to assist analysis, promote the development of environmental cost control for charity snack box enterprises and maximize the comprehensive benefits of economic and environmental benefits.*

Keywords: *Carbon peaking and carbon neutrality goals; Environmental costs; Accounting control of environmental cost*

1. Overview of related concepts and theories

1.1. Double carbon target

The "double carbon" goal refers to achieving carbon peak by 2030 and carbon neutralization by 2060. Among them, carbon peak by 2030 is a short-term goal, and is the basis and premise for moving towards carbon neutrality; Carbon neutralization is a long-term goal by 2060. Double carbon in the narrow sense means that the emission and absorption of carbon dioxide are in balance, while double carbon in the broad sense means that the emission and absorption of all greenhouse gases are in balance.

1.2. Environmental costs

Environmental costs refer to all environmental related expenses incurred by enterprises, mainly including pollution discharge fees, greening fees, environmental protection fines, environmental protection equipment expenditure and environmental protection technology investment,All expenses required to solve environmental pollution and ecological damage from resource exploitation, production, transportation, use, recovery to treatment.

1.3. Composition of environmental cost

According to different standards, there are many different classifications of environmental costs. First of all, according to the classification of undertaking objects, environmental costs can be divided into internal environmental costs and external environmental costs. The internal environmental cost is borne by the enterprise itself. It refers to the cost paid by the enterprise to prevent environmental pollution or environmental pollution caused by its production and operation activities, which can be clearly measured. The object of external environmental cost is not the enterprise, but the cost caused by the production and operation of the enterprise, but its responsibility cannot be clearly defined and the cost cannot be accurately measured. According to functional classification, environmental costs can be divided into environmental protection costs and environmental compensation costs. Among them, environmental protection costs include environmental prevention costs and environmental governance

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costs. Environmental prevention cost refers to the cost incurred when an enterprise checks whether its related activities will cause damage to the environment and takes measures to prevent harm to the environment in the course of operation, the cost of environmental governance refers to the human, material and financial resources that enterprises have to spend to improve the ecological environment when the environment is damaged. The environmental compensation cost refers to the compensation cost given to the government and society by enterprises that are subject to legal sanctions for harming the environment.

1.4. Environmental cost control

Enterprise environmental cost control is an important means and method to reduce environmental damage and pollution, improve the status of environmental protection, improve the quality of enterprise production environment, and highlight the "green competitiveness" of enterprises.Enterprise environmental cost control is a process to minimize the internal and external environmental costs of the enterprise, so as to achieve the highest comprehensive benefits of economic and environmental benefits.If enterprises do not pay enough attention to environmental protection, the external environmental cost of enterprises will be high. If the environmental protection investment of the enterprise is high, but the environmental protection benefit is not ideal, the internal environmental cost of the enterprise will be high.Therefore, environmental cost control is a relatively complex mechanism.On the one hand, enterprises need to pay attention to the protection of the ecological environment, so as to reduce the restorative environmental costs and compensatory environmental costs.On the other hand, enterprises should constantly optimize environmental cost control measures to reduce preventive environmental costs and achieve the optimal environmental costs.Specifically, the enterprise environmental cost control process includes four aspects: enterprise environmental cost prediction, supervision, accounting and early warning.

Enterprise environmental cost prediction refers to the process that enterprises explore the relationship between enterprise environmental cost and various factors through past data and experience, so as to predict the future environmental cost.Reasonable environmental cost prediction is the premise of environmental cost control.Time shows that enterprises can compare the economic benefits and environmental benefits of different projects by predicting the environmental costs of different projects, so as to make the most appropriate choice among different projects in combination with strategic needs.

Enterprise environmental cost supervision refers to the process in which enterprises supervise and constrain the production and operation processes related to environmental costs.Enterprises can conduct environmental cost supervision by issuing policies or rules and regulations, setting up regulatory mechanisms and other methods.

Enterprise environmental cost accounting is the process of accounting and measuring the environmental cost occurred in the whole process of enterprise production and operation.By recording environmental cost information, enterprise environmental cost accounting can not only provide useful information to the public, but also help enterprises make decisions by measuring the investment income ratio of environmental protection investment.

Enterprise environmental cost early warning refers to the process that the environmental cost monitoring and early warning system provides early warning information to implement effective measures to control environmental cost when the enterprise environmental cost reaches the critical value.Before the environmental cost of the enterprise occurs, the enterprise estimates the environmental cost through the environmental cost prediction, so as to take certain preventive measures for high-risk projects.Therefore, in the daily operation process of environmental costs, enterprises should establish an environmental cost monitoring and early warning system on the basis of environmental cost supervision.Only in this way can enterprises effectively implement environmental cost control measures in advance when environmental risks are about to occur and the early warning system gives early warning prompt in time[1].

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2. Problems of environmental cost control in manufacturing enterprises

2.1. Manufacturing enterprises environmental cost control method is not perfect

2.1.1. Lack of environmental cost control concept

Environmental cost refers to the cost that the quality of environmental service function decreases due to environmental pollution caused by the economic activities of manufacturing enterprises.Natural resources and environment mainly provide living space and ecological efficiency, which are characterized by long-term and repeated use, similar to the use characteristics of fixed assets.The cost of environmental quality degradation caused by the pollution of economic activities of manufacturing enterprises is environmental cost, which has the nature of "depreciation of fixed assets". Manufacturing enterprises should take this part of the cost into consideration and incorporate it into their accounting system.For the recurrent environmental expenditure of manufacturing enterprises, it should be maintained at a certain amount, the environmental cost should be calculated from the Angle of hidden cost, and the environmental cost information should be disclosed.

According to Wen Zongguo, director of the Circular Economy Industry Research Center at Tsinghua University, most plastic products used in take-out are made of polypropylene and polyethylene, which are difficult to degrade.At present, after food delivery waste enters the sanitation system that deals with household waste, some of it is buried, some is incinerated, and only a small amount is recycled.A large amount of take-away garbage directly or indirectly increases the pollution of atmosphere, water and soil.For non-biodegradable plastics, landfills retain waste in the soil for a long time; After incineration, it may contain chlorine elements will make the flue gas treatment more difficult, increase the generation of toxic and harmful substances.If the takeaway food residue is not handled in time, it is easy to affect the environmental health and increase the pressure of waste disposal at the end.Driven by economic interests, some businesses still ignore environmental problems and produce illegally, and even carry out excessive packaging because of competition from take-out food. These businesses lack awareness of environmental protection[2].

2.1.2. The means of environmental cost control are relatively backward

Most manufacturing enterprises only control the environmental cost of their own pollutants, focusing on the visible production or service stage or a certain step of pollution control, and do not carry out environmental cost control to the whole process of production and manufacturing.Most of the control only stays in the post treatment, and it is not possible to analyze and predict the pollution treatment expenditure in advance, and put forward the treatment plan with the lowest cost, and the environmental cost control means are lagging behind.

2.1.3. Environmental protection technology is backward, environmental protection cost investment is insufficient

Limited by small scale, wide distribution and low efficiency, manufacturing enterprises can hardly bear high environmental protection costs.Some manufacturing enterprises due to the financial strength and technical strength is relatively weak, coupled with the poor financing environment, directly lead to the reduction of environmental cost control of capital expenditure, environmental protection technology investment is limited, limit the smooth implementation of clean production and circular economy.When selecting technology, it mainly considers capital, production space, raw materials and the technological situation of the region, ignoring whether it is compatible with other production factors.

2.2. There are problems in the environmental cost accounting system of manufacturing enterprises

2.2.1. Environmental cost accounting is complicated and its source is uncertain

Under the cost accounting of traditional accounting, manufacturing enterprises include all the costs into the finished products, and environmental cost information will either not be included, or cannot be produced according to the existing accounting system, and the waste cost and resource consumption and utilization cannot be provided separately.Environmental assets are also different from the general types of assets in traditional accounting. They do not have the basic characteristics of money, and they cannot evaluate the actual value of material assets through simple barter.In economic development, China has produced a considerable amount of cost consumption, but according to relevant data, our government and manufacturing enterprises have ignored it intentionally and unintentionally.In order to control environmental costs, it is necessary to make clear the source of costs, so that all aspects of costs

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are verified and confirmed.The traditional direct cost is easy to obtain, which directly reflects the consumption and waste of resources by manufacturing manufacturing enterprises. However, there are still many other costs that are not easy to find, difficult to obtain and quantify, and may even be included in the financial system of manufacturing enterprises.If the cost method is adopted, environmental assets play the role of natural resources, which are not acquired through labor, and can only be valued in terms of the degree of environmental restoration.While the market law uses the relationship between supply and demand as the realization medium to use, but there is still a considerable amount of surplus in the use process and after the use of natural resources.

2.2.2. The division of environmental costs is unclear

The supporting system and system of environmental cost are not perfect, which cannot run through the whole process of production and operation of manufacturing enterprises. The cost classification is not clear, and the cooperation between various departments is not sufficient.Environmental cost accounting should have a complete and independent accounting system, to clearly identified and to reflect the cost of all kinds of, but, in terms of its current status, the environment of relevant business accounting has not been divided from the production and operation of accounting and all sorts of environmental cost is divided into management or manufacturing cost directly, not according to the existing accounting subjects reflect specific environmental cost.Only by establishing appropriate accounting subjects, can manufacturing enterprises record and manage these daily business, can they divide the cost correctly and improve the corresponding accounting information.Some manufacturing enterprises that pay attention to environmental costs only limit their accounting of environmental costs to explicit costs, and the hidden environmental costs in the production process are not fully and systematically reflected in the accounting information of manufacturing enterprises. This accounting mode is not conducive to the control and analysis of environmental costs in manufacturing enterprises.

2.2.3. The implementation of environmental cost audit policy is not in place

Environmental policies have a high level of public attention, so the government and manufacturing enterprises have a strong public nature to the implementation of environmental policies.As an important entry point of environmental governance, environmental cost control has gradually developed into whole-process control. However, it can be seen from relevant audit reports that few manufacturing enterprises adopt whole-process tracking in environmental audit.In addition, most audit cost control only focuses on the allocation of funds, and pays little attention to the effectiveness. For environmental cost control, more parts describe the idle and gap of funds, so as to evaluate the control policy itself or its effect.In addition, in the end stage of environmental cost control, information disclosure is incomplete.For example, relevant text descriptions only involve broad words such as "not completed" and "not up to standard" to elaborate relevant problems, without assessing the completion rate, which will directly affect the correct feedback of cost control results[3].Various environmental cost expenditures are directly divided into management expenses or manufacturing expenses, which cannot reflect specific environmental cost expenditures according to the existing accounting accounts.Only by establishing appropriate accounting subjects, can manufacturing enterprises record and manage these daily business, can they divide the cost correctly and improve the corresponding accounting information.Some manufacturing enterprises that pay attention to environmental costs only limit their accounting of environmental costs to explicit costs, and the hidden environmental costs in the production process are not fully and systematically reflected in the accounting information of manufacturing enterprises. This accounting mode is not conducive to the control and analysis of environmental costs in manufacturing enterprises.

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3. Countermeasures for environmental cost control of manufacturing enterprises under the background of double carbon -- A case study of "public benefit snack box" product

3.1. Mprove the awareness of environmental cost control

3.1.1. Adopt ecological design and choose environmentally friendly materials

Raw materials are located at the front end of the product life cycle, which can control the environmental cost of the whole product from the source.On the basis of ensuring the original functions of public service small meal boxes, the following principles should be followed:Choose recyclable and renewable materials to improve resource utilization: choose low energy consumption, less pollution, non-toxic, non-corrosive materials to reduce environmental damage;Select materials with good environmental compatibility to reduce environmental costs.PBAT and PLA are selected as the main raw materials for the charity snack box, and corn biomass and resin are added.

3.1.2. Adopt cleaner production mode and optimize production technology

Adopt cleaner production mode, choose more energy saving and environmental protection production equipment, maximize the utilization of raw materials and energy in each process, reasonable recycling of energy, raw materials and natural resources, reduce the waste of resources in the production process, waste generation and pollutant emission.

3.1.3. Adopt green design and promotion to optimize sales system

The green design and publicity of the public benefit snack box is the necessary way to optimize the sales system.The content includes: green packaging design and green product promotion.Green packaging design refers to the selection of environment-friendly packaging materials, the design of scientific packaging structure, saving and simplifying packaging, strengthening the recycling of packaging materials, and no pollution to the environment after waste.As a green product, the public benefit snack box can promote the green brand for enterprises and increase sales revenue.The price of public service meal boxes rises a certain proportion of similar meals boxes.

3.1.4. Reverse logistics recycling is adopted to realize the recycling of public snack boxes

Reverse logistics recycling is adopted to realize product recycling, treatment and reuse. The process is as follows:After users use the charity snack boxes, they will collect them to the fixed recycling base station, and the company's staff will transport them to the cleaning company, which will clean and disinfect the charity snack boxes, and then transport them back to the takeaway platform for reuse[4].The overall operation is shown in Figure 1.

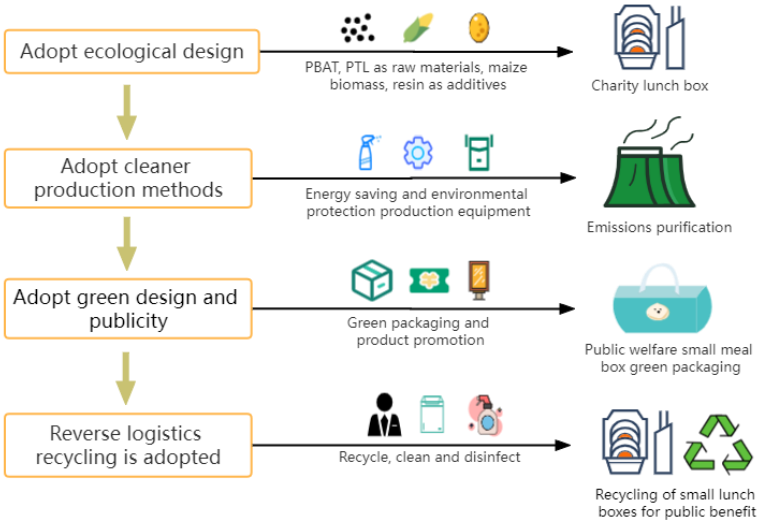

Figure 1: Environmental Cost Control chart of charity snack boxes

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3.2. Establish a comprehensive environmental cost control system for public benefit snack boxes

3.2.1. Public welfare snack box enterprises improve environmental cost information disclosure

Public benefit snack box enterprises need to build an environmental cost accounting system according to their own production and operation conditions, so as to provide required data for environmental cost control.Although there is no unified environmental cost accounting system at present, charity snack box enterprises can, on the basis of the existing accounting system and combined with the actual situation, disclose the content of the consumption of charity snack box materials, the environmental cost of recycling, and the environmental management risk of outsourcing enterprises.In terms of the disclosure of environmental cost information of public welfare snack boxes, environmental accounting statements and notes to financial statements can be combined to report.The disclosure of environmental cost information should not only use descriptive methods, but also organic combination of statistical methods, through the flexibility of tables, graphics and words, to improve the disclosure of environmental accounting information[5].

3.2.2. The public welfare small meal box enterprise should measure the environmental cost comprehensively

Public enterprises small boxes should be for what happened in the process of production and operation environment resource depletion cost, environment and resources protection, environment prevention cost, environmental cost, environmental cost, development cost, environmental compensation cost of environmental damage, environmental enterprise funds, and the environment, or have cost classification, monetary measurement and physical measurement of two methods for accounting.Environmental costs that can be accurately calculated are measured in monetary terms, while those that cannot be estimated or are difficult to estimate are measured in physical terms.At the same time, based on the measurement attribute of historical cost, the net price method, market valuation method, recovery cost method, replacement cost method, preventive cost method and other measurement methods are comprehensively used to calculate the environmental cost, so as to make the measurement more reliable and provide effective environmental cost control data for enterprises[6].

3.2.3. Charity snack box enterprises should adopt specific methods to help control environmental costs

3.2.3.1. Ex ante planning method

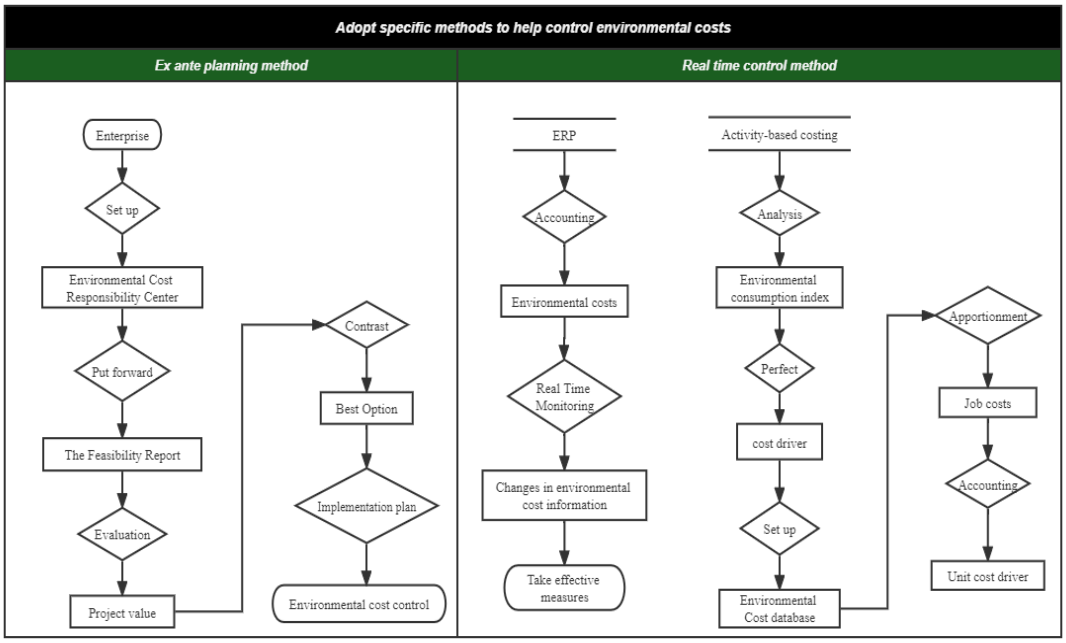

Figure 2: Specific methods to assist in environmental cost control

From the perspective of time, environmental cost control in the context of double carbon should not only pay attention to the occurrence of current environmental costs, but also pay attention to the possibility of future environmental costs.From the perspective of scope, it should not only include the

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environmental costs of the charity snack box itself, but also extend to the environmental costs outside the charity snack box[7].Therefore, enterprises should put forward feasible production schemes (i.e. pre-planning method) through the public welfare small meal box budget system.After planning feasible solutions, evaluate the value of various feasible solutions, choose the solution with the lowest expenditure and low energy consumption by comparing the future cash outflow, and implement the solution to further control the environmental cost.It is an essential process of pre-planning law for enterprises to set up a fixed environmental cost responsibility center and plan the environmental cost of public benefit snack boxes based on their scientific performance.The establishment of the environmental cost responsibility center can not only establish a more harmonious relationship between the internal departments of the enterprise and evaluate the environmental behavior affecting each department, but also control the environmental cost through the production stages of the public welfare snack box, so as to improve the overall planning of environmental cost.This is shown in Figure 2.

3.2.3.2. Real time control method

Real-time control method refers to the method that the public welfare snack box enterprises have good computer software and hardware conditions, and can monitor the environmental cost control problems found in the production process of enterprises in real time and feedback in time.The real-time control method mainly includes the environmental cost control method based on ERP and the environmental cost control method based on activity-based costing.ERP based environmental cost control method means that manufacturing enterprises use ERP system to calculate the environmental cost of production, sales and other links, monitor the change of environmental cost information in real time, so as to take more effective environmental cost control measures.The environmental cost control method based on activity-based costing means that manufacturing enterprises take activity-based costing as the object to conduct accounting and allocate environmental costs, so as to improve the control effect of environmental costs.Environmental cost accounting is more reasonable and correct in the process of measuring the cost of public lunch boxes and environmental costs, and more scientific in the process of business decision-making. It is a scientific and effective cost accounting method.The process of accounting the environmental cost of public snack boxes through activity-based costing is as follows:Based on the environmental consumption index, this paper analyzes the various factors in the charity snack box, further improves the cost motivation through the determination of the work cost method, and then establishes the environmental cost database of the charity snack box enterprise.For example, the energy consumption of the materials for the public welfare lunchbox and the waste water, waste residue and waste gas treatment generated in the production process; After the cost drivers are determined, the work cost will be apportioned, and the unit cost drivers will be calculated through the combination of cost driver data and activity-based cost database.

3.3. The performance evaluation system of environmental cost control should be established in public welfare snack box enterprises

Public small boxes enterprise build environment cost control system of performance evaluation, on the one hand can change inherent in the concept, the environmental performance and corporate profits are equally seriously, pay attention to the influence of the environment in enterprise production and operating activities, the establishment of environmental cost control plan is provided, rather than to control environmental pollution after the incident, At the same time, the environmental cost can be effectively internalized. The seriousness of environmental damage in each link of the enterprise is further analyzed, and the relevant reward and punishment system is formulated. On the other hand, it can motivate the management to take the initiative to control the environmental cost, make reasonable and effective use of resources and energy, reduce the loss of resources, reduce environmental costs, and commit to obtain better environmental performance evaluation. Specifically, we can start from the following aspects:

3.3.1. Change the whole staff concept, attach importance to environmental performance

Public welfare enterprises to establish a system for environmental performance evaluation, small boxes to build evaluation system, set up assessment index and rules, in strict accordance with the requirement to implement assessment, rewards and punishments for examination and assessment to implement, so that enterprises can attaches great importance to the environmental performance of the whole, change the traditional ideas, set up the concept of green manufacturing, enhance staff for examination and assessment of environmental pressure and sense of crisis, to actively carry out environmental cost accounting, Conduct environmental cost control.

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3.3.2. Design environmental cost assessment index based on product life cycle

Public welfare snack box enterprises design different environmental cost assessment indicators according to the different life cycles and specific conditions of each product. By evaluating the environmental cost assessment indicators, they can find the deficiencies in environmental cost control and make improvements and improvements according to the actual situation, so as to determine the optimal assessment scheme repeatedly.Comparing the actual results of environmental cost control evaluation index with the established development goals of enterprise environmental cost control, it can feedback the performance of environmental control, promote the enterprise to reasonably optimize the allocation of resources, improve the utilization rate of resources, and reduce environmental losses.

3.3.3. Conduct environmental cost audits

Environmental cost auditing focuses on public welfare enterprises determine the production and operation of small boxes related strategy and management to make corresponding decision, so that can make the enterprise management to realize the relationship between environment and economy, actively treat environmental pollution, in the enterprise actively considering environmental factors in the investment and management decisions, from a long-term point of view the enterprise environment cost, Sets up the concept of green manufacturing, and management to every important decision making in environmental performance evaluation system, encourage to estimate of possible environmental cost, the reason is to take corresponding measures to control environmental costs, so as to improve enterprise's production and operating activities of the environmental impact, realize the coordinated development of the enterprise economy.

4. Conclusion

With the continuous improvement of laws related to environmental protection, the country has higher and higher requirements for enterprises to save resources and protect the environment. The "double carbon" goal is formulated for this purpose.The public welfare snack box studied in this paper takes into account the environmental cost in the later stage at the very beginning. All policies, procedures and technologies that are subject to environmental cost management are environmental management tools and methods that make effective decisions and obtain useful information from different entry points.Combined with the research of the environmental cost control of public welfare small meal boxes may encounter some problems, and put forward some corresponding improvement methods.

The harmonious development of economy and ecological civilization is the mainstream demand of contemporary social development.The public welfare lunchbox was originally produced for the post-processing of takeout lunchboxes. The purpose of studying its environmental cost control is to combine environmental protection and cost saving, further improve the ability of environmental cost control, and finally realize the optimization of environmental benefits and economic benefits, so as to realize the sustainable development of resources.

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