

Research on the Incentive Mechanism and Implementation Path of Resource Recycling from the Perspective of a Sustainable Economy

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ABSTRACT

With the advancement of the global sustainable development agenda, recycling resources has become an important strategy to promote sustainable economic development. This study examines the significance of resource recycling in fostering environmental conservation, conserving energy, and enhancing resource efficiency through a comprehensive analysis of sustainable economic theory. This paper thoroughly analyzes and examines the incentive mechanism and execution strategies for resource recycling, encompassing policy incentives, market dynamics, social responsibility, and technological innovation. Through comparative case analysis and theoretical construction, the paper aims to provide feasible strategies and operational suggestions for enterprises and policymakers to realize resource recycling, thereby promoting the green transformation of the economy. The research findings demonstrate that effective policy incentives such as tax reduction, subsidies, and environmental regulations are the core driving forces for promoting resource recycling. Additionally, innovative market mechanisms such as green labels and developing circular economy market platforms can enhance enterprises' engagement in resource recycling. The achievement of corporate social responsibility and the enhancement of consumers' awareness regarding environmental protection positively influence resource recycling. In conclusion, technological innovation and improvement are essential for efficient resource circulation. Intelligent and digital technology has greatly improved the recovery rate and resource reuse efficiency.

KEYWORDS

Sustainable economy; Resource recycling; Incentive mechanism; Implementation path

1. INTRODUCTION

Due to the challenge of global environmental pressure and resource shortage, it has become an urgent task for contemporary society to realize a sustainable economy. Resource recycling is a crucial method for achieving economic sustainability. It not only reduces dependence on natural resources and alleviates pressure on the ecological environment but also enhances economic benefits for both enterprises and society. However, the efficient recovery and reuse of resources are facing difficulties in technologies, policies, and market mechanisms. Consequently, it has become essential to advance resource recycling by creating and executing a successful incentive system to boost the motivation and practicality of resource recycling [1].

Based on the perspective of a sustainable economy, we discuss the incentive mechanism and implementation path of resource recycling. First, we explain recycling resources' importance and position in promoting sustainable economic development [2]. Second, we summarize the existing incentive mechanisms, analyze their positive role in promoting resource recycling, and, on this basis, discuss possible ways to improve these mechanisms. Moreover, this paper emphasizes the

significance of the implementation path in practice and how to integrate various efforts and innovations to advance the comprehensive development of resource recycling.

2. AN OVERVIEW OF SUSTAINABLE ECONOMY RESOURCE RECYCLING

2.1. Definition and Characteristics of Sustainable Economy

2.1.1. The Core Concept of Sustainable Development

Sustainable development aims to meet the needs of the present without compromising the ability of future generations to meet their own needs. Since The Brundtland Report in 1987 first put forward the concept of Sustainable Development, it has developed into a core concept leading global social and economic development. Sustainable development is centered on achieving a balance between environmental protection, social justice, and economic growth. Its goals include eliminating poverty, reducing inequality, promoting education and health, combating climate change, and protecting natural resources and biodiversity [3].

Sustainable development focuses not only on immediate benefits but also places greater emphasis on future outcomes. To achieve this goal, the government, enterprises, and all walks of life need to invest together and promote and practice through various means such as science, technology, policy, and education. On the economic front, it prompts us to consider developing an economic framework that fosters environmental sustainability while ensuring that economic actions and consumption behaviors do not inflict irreversible harm on natural resources [4]. Figure 1 illustrates the sustainable development goals.



Figure 1. Sustainable development goals

2.1.2. Characteristics of Sustainable Economy

A sustainable economy is an economic paradigm based on the philosophy of sustainable development. Its main features are responsible management of resources and environment and consideration of social equity and economic efficiency. A sustainable economy emphasizes the coordination between the environment and the economy, promotes the efficient use and recycling of resources, and reduces environmental pollution and ecological damage. Regarding energy policy, we advocate using renewable energy and clean energy, thus reducing dependence on fossil fuels and greenhouse gas emissions.

A sustainable economy attaches importance to social welfare and inclusive growth. It focuses on the fairness of different economic activities within society, particularly the effects on vulnerable populations, and is dedicated to minimizing social inequality and ensuring equal opportunities. In addition, the sustainable economic model focuses on long-term economic security and steady growth to avoid short-sightedness and over-exploitation of ecosystems.

A sustainable economy promotes open and transparent economic governance, encouraging citizen participation in economic decision-making. It encourages the government, enterprises, and the public to participate in formulating, implementing, and supervising policies on sustainable development to ensure the balance of the interests of all parties and the realization of long-term development strategies. By creating a consistent policy framework and incentive mechanism, a sustainable economy ensures economic resilience and fosters the development of an equitable and varied economic landscape.

2.2. The Connotation and Significance of Resource Recycling

2.2.1. The Definition of Resource Recycling

Recycling of resources, also known as circular economy, in the broadest sense, refers to minimizing the consumption of resources and the generation of waste in the process of production and consumption, and resources can be reused in the production cycle again after use. Recycling involves transforming waste into valuable resources. This includes the recycling and reprocessing of materials, as well as reusing waste as raw materials or energy. The core idea of recycling is to move away from the traditional linear economic model of "take-use-discard" and to establish a closed-loop economic system instead. Among them, resource use, regeneration efficiency, and sustainability are higher [5].

This concept focuses on conserving resources and minimizing environmental impact throughout the product life cycle, including efficient resource use in design and recycling at the product's end. Additionally, it involves using surplus materials or by-products as inputs to produce other products to maximize resource efficiency. Resource recycling is not only related to the recovery of physical resources but also involves the reuse of energy, such as capturing waste heat in industrial processes for heating or power generation. As shown in Figure 2:

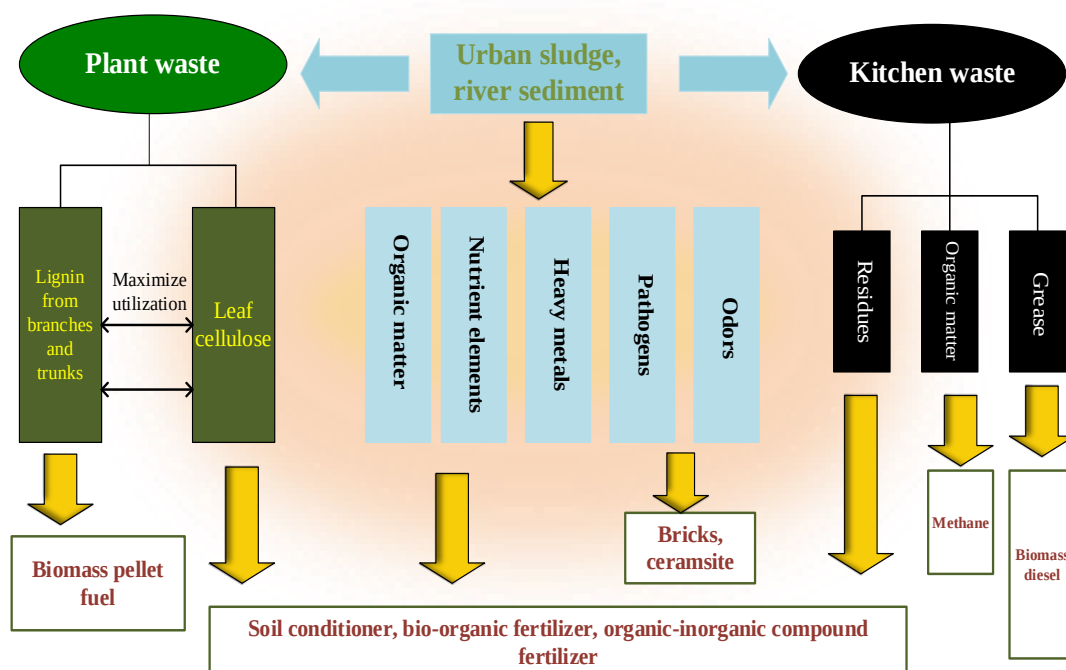


Figure 2. Diagram of resource utilization

2.2.2. The Contribution of Resource Recycling to Sustainable Economy

Resource recycling is one of the important strategies for achieving a sustainable economy, which directly contributes to the sustainability of the economic system and environmental protection [6]. From the perspective of resource efficiency, recycling reduces the call for raw materials, reduces the strain on the surroundings because of the exploitation and processing of resources, and facilitates the defense of ecosystems and biodiversity. Maximizing resource utilization in this process reduces energy consumption and greenhouse gas emissions, thereby helping mitigate global climate change's effects.

For economic development, resource recycling can create new industries and employment opportunities, including industries related to waste recovery, reuse technology, and related service businesses. Improving resource efficiency and reducing material costs enhance enterprise stability, particularly in markets with fluctuating resource prices, providing a competitive edge. In addition, the circular economy model fosters innovation, advances technological progress, and inspires modifications in business model design, such as green design and product service systems. This innovation not only introduces new opportunities for market growth but also motivates consumers to adopt sustainable consumption patterns.

For society, recycling resources strengthens the public's awareness of environmental protection, promotes investment in sustainable environmental education and the demand of consumers for environmental protection products, and helps to create a more just and responsible culture. As the international community strives to achieve the sustainable development goal of the United Nations, resource recycling becomes particularly important because it provides an effective way to promote sustainable development by integrating environmental, economic, and social dimensions.

3. INCENTIVE MECHANISM OF RESOURCE RECYCLING

3.1. Policy-related Incentive Mechanisms

Policy-related incentive mechanisms play a decisive role in promoting the recycling of resources. It is necessary for the government to encourage enterprises and individuals to participate in the circular economy through legislation, regulations, tax relief, subsidies, and financial support. For instance, the government has enacted favorable tax regulations to lessen the financial strain on businesses that engage in recycling or provide direct monetary grants to firms that create eco-friendly technologies and products to diminish their research and development expenses and market uncertainties.

Additionally, policies include setting recycling standards, a mandatory liability system for enterprises that produce waste, and laws and regulations to promote waste management and recycling product design. Moreover, the government can support the collection and treatment of recycling resources by investing in public infrastructure, such as recycling stations and treatment facilities. The government's efforts also include environmental education and raising public awareness. Due to information dissemination and training, individuals from diverse backgrounds can be informed about the significance of recycling resources.

The use and rational design of incentive policy are very important for avoiding over-exploitation of resources, reducing waste landfill and incineration, and promoting the development of a circular economy industry. To implement effective policies, we should promote collaboration across departments, ensure coherence and efficiency in policy-making, and avoid inconsistencies in formulation and implementation.

3.2. Incentive Mechanism in the Market

The incentive mechanism in the market encourages enterprises and consumers to choose resource recycling for economic benefits. The market provides demand for sustainable products and services, and the incentive mechanism in the market will regulate and raise the demand. On the one hand, Pricing for recycling products and services reflects their environmental value and social costs, which can enhance their competitiveness in the market. On the other hand, certification and labeling systems, such as green certification and environmental protection signs, enable consumers to easily identify and select products that use recycled resources.

Incentives also involve creating green procurement policies, urging governments and businesses to prioritize environmentally friendly and resource recovery products during purchasing, and promoting innovation and entrepreneurial efforts in recycling sectors through investment. Financial institutions offer green credit and other financial products and services for projects related to the circular economy, which helps reduce the capital requirements and costs of implementation. In addition, market incentives include creating a trading platform to improve recycled materials' transparency and trading efficiency.

An incentive mechanism in the market requires the private sector and financial market to exert their influence on resource recycling, including the green transformation of the supply chain and innovative business models for the recycling business.

3.3. Incentive Mechanisms for the Society

Incentive mechanisms for society refer to promoting the recycling of resources through non-market factors such as the public, consumer habits, education, and cultural communication. These mechanisms aim to raise public awareness about the significance of environmental protection and resource recycling while encouraging the public and businesses to participate actively. Social responsibility and moral pressure are essential, and enterprises and individuals are encouraged to take action to promote green development [7].

To effectively promote social incentives for recycling resources, we can widely disseminate the values of environmental protection and circular economy through education and the media. Environmental education is not limited to the school curriculum but includes vocational training, community workshops, and online publicity. These educational activities promote responsible consumption habits and lifestyles across various age and social groups. Non-governmental organizations, environmental protection groups, and volunteers can strengthen social participation and support for resource recycling by organizing various activities, such as community clean-up events, recycling initiatives, and green lifestyle-sharing meetings. Moreover, social recognition and rewards can positively incentivize individuals and groups, especially those individuals and institutions that have made outstanding contributions to resource recycling.

The success of the society's incentive mechanisms also depends on improving public participation. It is necessary for citizens to participate in the discussion, evaluation, and feedback process of circular economy-related decisions, which promote the transparency and fairness of policies and ensure that incentive measures are in line with public interests to be widely supported and effectively implemented.

4. IMPLEMENTATION PATH OF RESOURCE RECYCLING

4.1. Technological Innovation

Achieving the recycling of resources depends on technological innovation to a great extent. Advancements in technology will enhance resource recovery efficiency, lower recycling costs, and

create innovative recycling methods. First, technological innovation includes improving the design of materials to make products and packaging easier to disassemble, classify, and recycle after the end of their life cycle. Second, continuous research and development and deployment of advanced technologies, such as automatic disassembly, high-efficiency sorting, and purification technologies, provide strong technical support for material regeneration. Third, researching and popularizing cleaner production technology minimizes the waste of raw materials and the generation of by-products in the production process and lays a solid foundation for the maximum utilization of resources. Additionally, it is the key to realizing the sustainable utilization of resources to develop new materials to replace precious or difficult-to-recycle raw materials. For example, research and development of bio-based materials and biodegradable plastics can reduce our dependence on conventional plastics. Data-driven resource management technologies, such as the Internet of Things, big data analysis, and cloud computing, facilitate accurate monitoring and management for the use and recycling of resources. Intelligent monitoring and management systems will not only reduce the loss of resources but also optimize the allocation of resources and improve the efficiency of the whole circulation system. These technologies are essential for identifying and tracking logistics, predicting recovery rates, and evaluating the resource life cycle. Figure 3 is a path diagram of resource recycling.

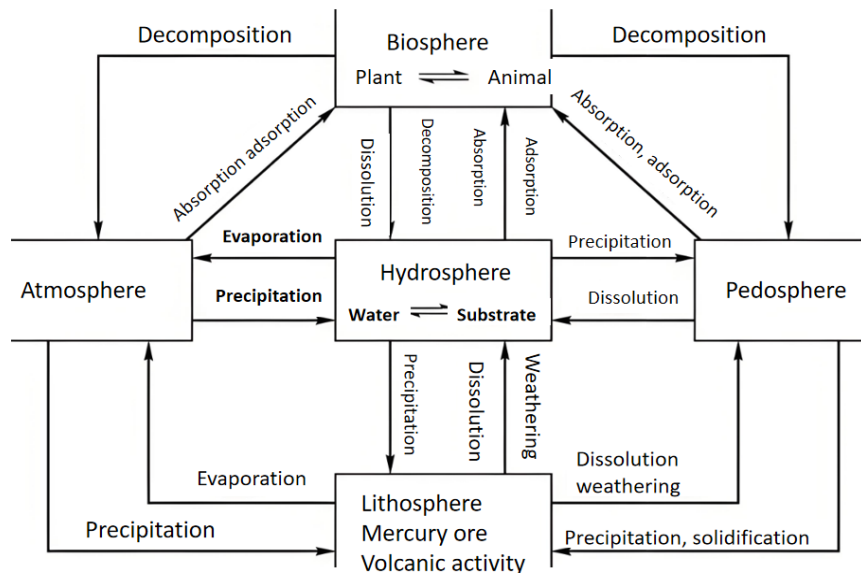


Figure 3. The diagram of resource recycling

4.2. The Optimization of Industrial Structure

The advancement of resource recycling requires an appropriate modification of the industrial structure to establish an industrial system that supports resource recycling. Improving industrial structure requires enhancing circular economy principles across various sectors. For example, we encourage the development of industries centered on recycling and remanufacturing and promote the transformation of traditional manufacturing industries to adopt more sustainable and resource-efficient production approaches.

In addition, optimizing industrial structure involves promoting synergy between industries to create a "circular chain." Industrial parks can serve as eco-industrial parks, and enterprises can exchange and use waste heat energy, materials, and water resources through "industrial symbiosis." Equally vital are the development service sectors associated with the circular economy, including recycling logistics, environmental protection technical services, and consulting, and offer expert assistance for the entire recycling chain.

Economic diversification is one of the keys to developing paths, as it reduces the risk caused by single-resource dependence. Policymakers and business decision-makers should make efforts to

promote "green industries" and actively support and invest in those industries that improve resource efficiency and rely on renewable resources. By optimizing the industrial structure, we can generate additional business opportunities linked to the circular economy, enhance job creation, and provide fresh momentum for economic transformation.

4.3. Institutional Innovation

Institutional innovation plays a decisive role in the implementation paths of resource recycling. Establishing and improving political frameworks and legal systems is the basis for promoting the implementation of various technical and industrial measures. Government departments need to enact relevant circular economy laws and regulations, formulate clear industry standards and guidelines to guide enterprises to standardize their operations and punish violations.

Institutional innovation involves efforts to promote cross-departmental coordination and integration. Resource recycling involves environmental protection departments and many departments such as economy, industry, science and technology, finance, and education. They work together to improve efficiency. Therefore, developing an inter-departmental working mechanism is necessary, forming a joint force to promote resource recycling and ensuring information sharing and policy consistency.

Implementing a comprehensive public procurement policy for green development is equally important. We leverage government procurement to enhance the market demand for recycled goods. Institutional innovation should focus on the enterprises, encourage the issuance of green securities (such as green bonds), implement mandatory disclosure of environmental protection information to improve the transparency of enterprise operations, and encourage enterprises to implement green transformation independently. Regarding public involvement, it is essential to establish a positive social setting. For instance, we should create a platform that facilitates public involvement in environmental governance, inspire organizations and volunteers to partake in initiatives related to resource recovery, oversight, and education, and promote the enactment of laws that safeguard the public's right to be informed and to participate in the decision-making process regarding environmental matters. In conclusion, institutional innovation raises the public's awareness and participation in the circular economy and motivates and supports resource recycling.

5. CONCLUSION

Resource recycling has become essential to achieving sustainable economic development globally. By analyzing a sustainable economy, this study discusses the concept of resource recycling and its contribution to economic sustainability. It examines the multiple incentive mechanisms and practical ways to promote its realization. Due to the increasingly urgent environmental problems, resource recycling is no longer a choice but an inevitable trend.

This study shows that a comprehensive incentive mechanism is necessary to accelerate the promotion of resource recycling and realize its wide application in the economic system. Incentive policies, incentive mechanisms in the market, and social incentive mechanisms will effectively motivate enterprises and the general public to reduce resource waste and promote resource recovery and reuse. Additionally, technological innovation, industrial structure optimization, and institutional innovation provide strategic guidance and concrete methods for effectively implementing resource recycling.

Developing the technologies is particularly critical, as it directly determines the cost, efficiency, and implementation possibility of resource recovery and reuse. Furthermore, adjusting and optimizing the industrial structure is necessary, especially in promoting the green transformation of traditional industries and the development of circular economy-related industries. Finally, institutional innovation provides essential policy support and social conditions, ensuring the institutional guarantee for the promotion of resource recycling.

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