

Research on the Development Measures for Returned Logistics Network System of Renewable Resources

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Abstract Recycling of renewable resources is not only an integral part of the development of circular economy, but also one of the most important ways for improvement its utilizing efficiency, protection local environment and favoring building of “two-style” society. The returned logistics network system of renewable resources is the premise and foundation of the recycling system of renewable resources as a whole. Combing with the main body composition of returned logistics network of renewable resources, the problems in returned logistics network system of renewable resources are analyzed completely in the paper. On basis of these, the development measures for returned logistics network system of renewable resources are put forward from three aspects including political, local law-regulations and management system, standard recycling logistics infrastructure and recycling logistics information platform of renewable resources.

Key words Renewable resources; Returned logistics; Network system; Problems and development measures

1 Introduction

In the paper, returned logistics of renewable resources refers to those logistics activities, whose subjects are the third-party recycling enterprises or individuals, during the recycling processes of social renewable resources such as waste electrical and mechanical equipments and parts, scrap iron and steel, paper, glass, etc. It has many unique features such as high degree of uncertainty and discreteness, wide ranges of sources, flexible construction fashions and high level of cooperation among different subjects and so on. At present, most of the recycling enterprises or individuals of renewable resources adopt the “purchasing, rudimentary processing and resale” mode in china. And its operations of returned logistics are mainly done by hands and the industry has not yet formed a sound and health system. So, it’s an urgent task for us to study the problem.

A.I.Barros, R.Dekker and V.Scholten (1998) studied a reverse network of recycling sand originating from construction wastes. And they held the opinion that different quality sands must be processed with various processes so as to be re-used. They also instructed a capacity-limited multi-level location model with LP relaxation and heuristic method to solve it. H. Min, H. J. Ko, and C. S. Ko (2006) studied the multi-echelon reverse logistics network system for product returns which is composed of initial recycling sites and recycling centers. Feng Du and Gerald W. Evans(2008) analyzed the reverse logistics network for post-sale service. They provided three-algorithm composition with division algorithm, constraint and dual simplex method to solve the model with bi-objective function of total cost and satisfied extend. Their results indicate that the former optimization prefers to centralized network architecture while the latter one prefers to decentralized network structure. All in all, although lots of relation models and algorithms of reverse or returned logistics have been studied, these have not yet formed a comprehensive and systematic theory for returned logistics network of renewable resources. From these researches, we can conclude that there are two styles of recycling system of renewable resources. One is the union recycling system and the other is the non- union one. The former refers to “major home appliances alliance” or similar union organization which takes “producer responsibility” as its regular and legal basis for the establishment. In the system, a foundation is constructed and funded by the union, which is composed of specialized agencies and recycling enterprises whose main job is to recycle and re-use all kinds of renewable resources, such as in Japan, Germany and other developed countries. The latter one is composed of varies recycling enterprise and “picking-up force” including all of the individual operators. In the system, it mainly adopts the treaty buy-back renewable resources and

random purchase them for businesses and communities and then make them re-entering the market to process, circulate and re-use. And many developing countries such as China fall into this category.

The 2009's *Circular Economy Promotion Law* provides a clear legal protection for China's recycling renewable resources. Returned logistics of renewable resource is relation to a wide range of economy, life, social and other fields. It's estimated roughly that in China, those renewable resources that are renewable ones but out of our recycling worth over ¥300 billion each year. And there are about 5 million tons of waste iron and steel, more than 0.2 million tons of nonferrous metals, more than 1 400 million tons of papers and lots of waste plastics, waste glass, waste electronic products which have not been effectively recycled or disposed in China. So, we should take various measures to construct a health and sound returned logistic network system of renewable resources and the most important thing to do is that on basis of analyzing the problems, development measures should be taken immediately in political, law and regulation and management system, technological system and the main body construction of returned logistics network system.

2 Problems in the Development of Returned Logistics Network System of Renewable Resources

As an elementary stage of the returned logistics development of renewable resources in China, the low level of logistics technology and its application, irregular management and disorder market competition make most recycling enterprises and personal buy-backers still only dismantle simply, sort and then distribute directly without deeper processing. So, it cannot exert the maximum benefits of renewable resources with given or minimum cost, and it is also likely to cause secondary pollution. According to some investigations, the reason why some regular enterprises haven't introduced advanced deep processing assembly is not because they have funds and technology problem but don't buy-back enough raw and processed materials or waste materials so that the advanced assembly is not in idle. Otherwise, the whole equipment capacity of new assembly will waste much. Of course, there are many factors for inadequate renewable resources taken as raw and processed materials, such as system and policy, unhealthy main body construction of returned logistics network system.

2.1 Unhealthy laws and regulations

Though laws and regulations with relation to returned logistics of renewable resources have been taken into effect, the sound and health regulation system has not formed. Especially, there is no local industry regulation and law for the industry. Besides, there is no special law and regulation for returned logistics of renewable resources. All of these make people know little about the returned logistics and its network system of renewable resources to stimulate its fast and efficient development. In 2002, China's government abolished "special industry license" management system for recycling industry of renewable resources. There is nearly no any restriction except for few special operations which reduces the entry-barrier greatly.

2.2 Cross management

There are so many management departments with relation to recycling industry of renewable resources such as business affairs, public security, industry and commerce, urban management, environment health, streets and neighborhood committee and so on that there are overlapping management and cross management in recycling enterprises of renewable resources, and also, there is no union, coordination and effective management system. Since the returned logistics enterprises of renewable resources fell into different management departments, it's likely to form a separated system with multi-leadership management system without coordination mechanism, which can lead to many malignant behaviors such as vicious competition, underground acquisition in recycling industry, pollution, etc. Also, it's difficult to form an effective management system and a coordination mechanism.

2.3 Unsound returned logistics network system

Returned logistics network system of renewable resources is the premise and foundation of renewable resources to be recycled and reused. Generally speaking, the system is mainly composed of three parts: modern returned logistic network with many recycling sites with full function, marketing vector of renewable resources and advanced utilization treatment center. But at present, there are many unfavorable factors such as mixed recycling memberships, high movement of salesmen without licenses and mixed buyers, which help not to construct a sound returned logistics network system of renewable resources in china. Also, neither recycling point/marketing nor treatment center in the returned logistic network forms a sound and health system.

2.4 Inadequate information flows

Although information technology has been adopted in recycling industry, its application still falls behind much, compared to the rapid development of returned logistics. Because of unfavorable uncertainty and complication of returned logistic management of renewable resources, accurate and enough information flows must be provided for the instruct consultation system of returned logistic network service of renewable resources. Without these adequate and accurate information flows, a standardization renewable resources network system is rather hard to be formed and constructed.

2.5 Poor infrastructure

At present, most enterprises and individuals engaging in recycling Industry of renewable resources load and unload these resources by hands and store them in the air. Also, there are many other poor basic returned logistics network infrastructures of renewable resources such as non-standard roadway transportation which make the recycling efficiency rather low and also often initiate many uncertainty unfavorable factors. During the recycling and reusing process in china, people often look for the total number of renewable resources too much but ignore optimization and integration of the whole recycling process which will have great influence on environment during these processes.

2.6 Poor acquaintance

Super-majority of employee in recycling industry is lack of modern logistic concept and they have not completely perceived the returned logistic network system of renewable resources. They haven't mastered the meaning and features of modern logistic such as quick response, function integration, system service, standard operation, systematical aim, network organization, marketing and e-information. And they only know the single function activity such as collection, sorting and processing castoffs, but not the whole system. Meanwhile, they are lack of much knowledge about characteristics, operation rules and so on for the returned logistics network system of renewable resources. What's more, from the system aspect, they can not construct a health and sound returned logistics system of renewable resources.

3 Measures to Perfect Renewable Resource Recycling Logistics Network System

To improve the returned logistics network system of renewable resources, local law-regulations and management system, standard recycling logistics infrastructure and recycling logistics information platform of renewable resources must be constructed in a sound and health way.

3.1 Healthy local law-regulations and management system of renewable resources

To improve returned logistics network system of renewable resources, some appropriate local laws and regulations must be made or remade. Also, existed management systems should be performed strictly. Moreover, the role of guild should be played sufficiently. With unified planning made by the Ministry of Commerce and Development and Reform Commission, and under lead of the provincial committee and government, each city should organize its returned logistics leader-team in recycling industry so as to coordinate and promote the development of local returned logistics network system of renewable resources, which is composed of provincial Development and Reform Commission, the provincial Department of Finance, Provincial Science and Technology Department, Land and Resources Office, Provincial Department of Construction, the Provincial Environmental Protection Bureau and other departments.

Government achievement assessment mechanism should be reformed quickly and the green economy calculation system should also be established. We should study on how to design and develop a renewable resources recycling information system in order to establish a whole calculation system and normative operation flow. Renewable resource recycling statistic, analyzing and gathering function and the entire planning function of recycling network should be taken consider to the system in order to master construction of recycling system of renewable resources in cities, such as the quantity of recycling sites, construction scheduling of distributing markets and management status. On basis of these, horizontal relations among different relevant departments should be enhanced in order to form a sound, health and authoritative recycling management system of renewable resources.

The returned logistics or third-party logistics enterprises engaging in recycling industry should be given special policies such as tax reduction and even exemption. While for those that failure to build a sound and health returned logistics network system of renewable resources, pollution taxes should be levied. Besides, trade licensing should be encouraged and enforced. For those that build a sound and health returned logistics network system of renewable resources successfully, some favorable credit policies, low-cost electricity, economic incentives provided by governments, government discounting,

and etc should be achieved to encourage its benign development .

3.2 Normalizing infrastructure construction of returned logistics network system of renewable resource

3.2.1 Construction of recycling sites

The rational arrangement of renewable resource returned logistics sites is the basis of constructing green community, protecting city environment and offering convenient living to people. The construction of renewable resource returned logistics sites are programmed by each district or county renewable resource management bureaux and community. The quantity of the sites should be assured and problems should be harmonized. There are some suggestions to be noted in renewable resource returned logistics sites construction.

(1)Standardizing recycling sites

The establishment of recycling sites should be in line with national standards, such as a simple recycling site should be equipped with the green cover fence, umbrellas and other necessary equipment, and should be marked internationally accepted renewable resource recycling logo. The renewable resource should be disposed before the second day. The area of recycling sites in communities should not be less than 10 square meters, and its architectural design and decoration should be in line with the community environment, highlight the green theme. Mobile recycling cars should be decorated by district or county renewable resource recycling and management office to get unified design and management.

(2)Purchasing categories

In addition to the categories which national, municipal laws and regulations specially forbid, the types of returned logistics should be carried out as many as possible. Expand the community of renewable resource recycling sites size, gradually increase the acquisition of categories, largely broaden the recovery of renewable resources channel.

3.2.2 Construction of recycling centers

The renewable resource should be collected by recycling centers which generally have not processing operations. Usually, one recycling center is established in a district which responsible for storage of goods, classification, packaging and other businesses of renewable resource from all recycling sites within the district. The renewable resource don't need to be processed before the second day. If there is some simple processing operations in recycling center, the sewage, oil and solid waste treatment system should be equipped correspondingly.

3.2.3 Construction of distributing markets

(1)Establishing distributing markets for resources

The establishment of renewable resources distributing markets should be consistent with the overall urban planning, its scale should not be too small, and the quantity must be appropriate. According to industry characteristics, the distributing markets should be convenient for transportation, and be consistent with functional and environmental requirements of cities, and isolated from the residential area, universities and colleges. The renewable resources distributing markets which fall short of the city planning should be moved as soon as possible. Application to operate a renewable resource market should be checked by relevant departments. It is necessary to register in administration departments for industry and commerce to obtain "market registration certificate" before its opening.

(2)Perfecting functions in distributing markets

Renewable resource distributing markets should have functions of storage, distribution, primary processing, and equipped with qualified, comprehensive fire safety facilities. Storage field should be relatively fixed, and have partition walls to avoid secondary pollution. In order to ensure smooth access to transport vehicles, the market should be planned reasonably and consistent with fire control requirements and barrier-free access. It is necessary to be equipped with primary processing equipments of distributing markets, and the area of each stall should not be too small. The service area and business area should be isolated in markets, and storage area and work area should be isolated in stalls. Service area, business area, work area must be consistent with facilities according to their respective functions.

(3)Processing renewable resource

The primary processing of renewable resources is completed in distributing markets. Each renewable resource market should take full advantage of this tache to enlarge its use extent to make the best use of renewable resources. The renewable resource market should have the right acquisition to classify and primarily process the renewable resource according to their different materials and uses. Quality renewable resource recycling enterprise should construct deep-processing base according to its specific condition, and use high technology to exploit and utilize different categories and qualities of

renewable resource to promote the final product into deep-processing. The industrialization of renewable resource returned logistics should be realized gradually.

3.2.4 Construction of deep-processing centers

Different types of renewable resource processing-utilizing industry park and circular economy zoology industrial park should be constructed in order to develop renewable resource returned logistics industry in cities. The deep-processing center should be set in circular economy zoology industrial park to centralize the dispersed enterprises in districts into the parks. The industrial centralization degree should be expedited. Make full use of industrial centralization economy effect to form a complete industrial chain of economy and trade matching system which can accelerating the development of circular economy.

3.3 Construction of information platform

Information platform of renewable resource reverse logistics, and information promulgating and consulting mechanism should be established to offer information of renewable resource returned logistics in cities. Firstly, accurate and quick information collection system should be established to track the product which entered the renewable resource returned logistics areas. Secondly, a renewable resources processing system should be established and improved which can track and dispose the information from the entrance to the final disposal of the entire process of processing, in order to shorten the recovery period. Finally, a reliable and effective information transmission network should be established to join up the effective logistics system and recycling system, to update information of supply and demand.

4 Conclusion

Returned logistics network system of renewable resources is the precondition and foundation of the whole recycling system. The comprehensive and systematic study on its problems and solving measures such as construction of healthy local law-regulations and management system of renewable resources recycling sites, and construction of information platform, can provide specific theoretical reference for the establishment of resource-saving and environment-friendly society.

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