

# Quantitative Study on Environmental Pollution of Green Logistics Development in Beijing

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**Abstract.** It takes Beijing city as an example, makes quantitative research on the environment pollution factors of green logistics, including five aspects of logistics industry solid waste, traffic noise pollution, carbon emissions, wastewater discharge amount exhaust emissions of logistics industry. It compares the green logistics environment development level of Beijing with the country, and gets analysis and comparison of the development level of Beijing in the national position. It analyzes the causes and development trend of current environmental pollution, which is the basis for the quantitative evaluation of follow-up study of green logistics development.

## Introduction

With the rapid development of the logistics industry, its impact on the ecological environment is more and more obvious. The implementation of green logistics is an important driving force for the sustainable development of economy. Ilsuk Kim(2011)<sup>[1]</sup> through the establishment of the green logistics performance index (GLPI) and environmental performance system (EPI) to evaluate whether some countries to realize the distribution function at the expense of the environment, in order to prove the importance of green logistics. Maria Bjorklund(2012)<sup>[2]</sup> puts forward the significance of performance evaluation of green supply chain, and points out that the lack of practice and theory in this field. His article puts forward a new evaluation framework, and proves that these indicators is effective on environmental performance measurement by examples. Karin Isaksson(2013)<sup>[3]</sup> deeply studies green service performance of the logistics service provider. His article points out that in order to turn the environment problem into economic opportunities, many companies have begun to consider the green environmental protection into their service. Yan Jun (2006)<sup>[4]</sup> analyzes the connotation of green logistics, proposes the significance of green logistics to sustainable development. His paper expounds the significance of sustainable development of green logistics from the green procurement, green transportation, green packaging and green storage of these four aspects, and put forward the green logistics strategy. Chen Yaping (2014)<sup>[5]</sup> studies the implications of the development of reverse logistics in developed countries to China, focus on the environmental pollution and analyzes the problem of reducing the energy consumption and pollution emissions.

In order to do the quantitative evaluation of the environment pollution factors in the development of green logistics, the following statistics from five aspects are described, including aspects of logistics industry solid waste, traffic noise pollution, carbon emissions, wastewaterdischarge amount, exhaust emissions of logistics industry.

## The present development situation of environmental pollution

In the study of green logistics development level, environment pollution is an important assessment indicators, including logistics industry solid waste, traffic noise pollution, carbon emissions, wastewater discharge amount, exhaust emissions of logistics industry. By finding the statistical yearbook and related information, we can get a series of results, and compared with the national average level, as shown in figure 1.

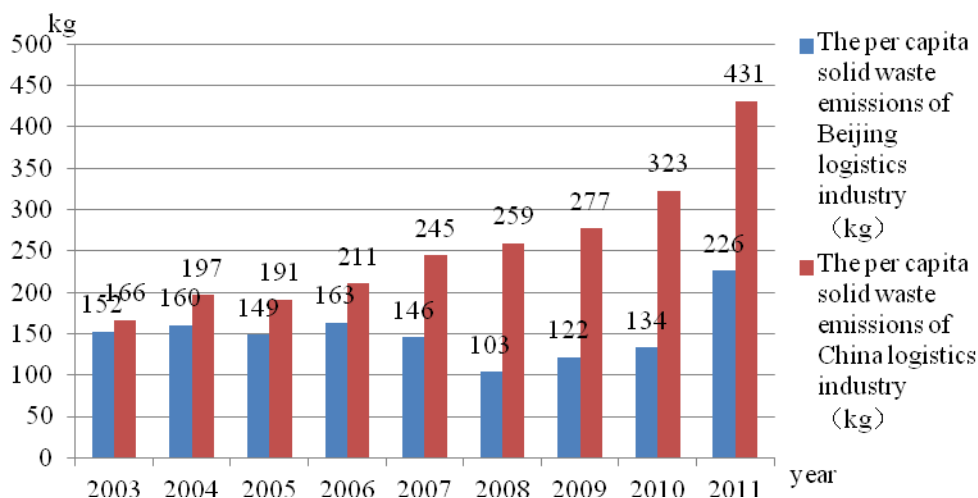


Fig. 1 Per capita solid waste emissions annual comparison between Beijing and the national logistics industry

Figure 1 is per capita solid waste emissions annual comparison between Beijing and the national logistics industry. We can see from figure 1 that the per capita emissions of logistics industry in Beijing city solid waste floating is in a certain range from 2003 to 2006, sometimes increased, sometimes dropping. It began to decline from 2007 to 2008, then have an increase in 2011, suddenly. As for the down in 2007~2008, we are not difficult to guess what is due to the 2008 Olympic Games held in Beijing. All of the relevant departments of environmental pollution make a certain control in this piece. But in the years 2003~2011, the national per capita logistics industry solid waste emissions is rising, and the per capita emissions is higher than Beijing. So that in this respect Beijing is in leading position. But Beijing and nation all need to make an effort in the solid waste reduction and recycling in the future.

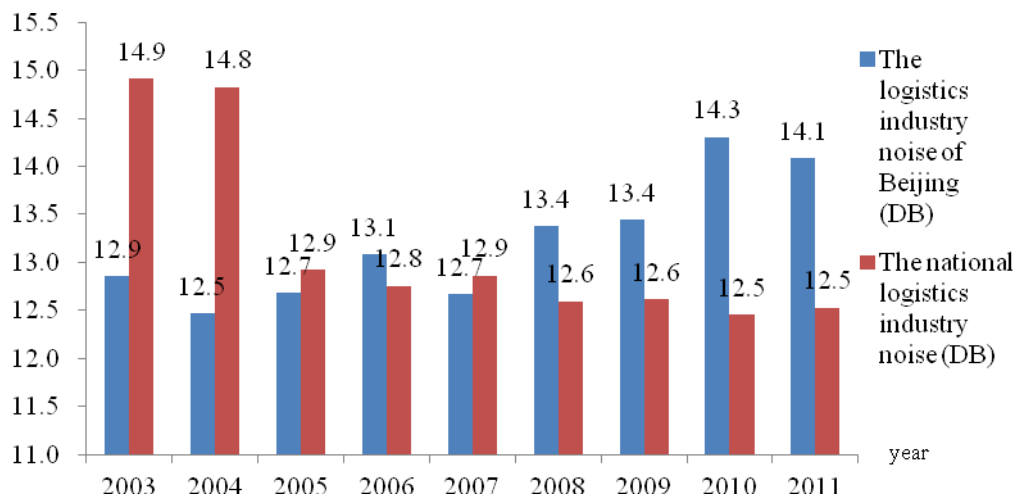


Fig. 2 Noise decibels comparison between Beijing and the nation logistics industry over years

Figure 2 lists in 2003 ~2011 years, logistics industry noise pollution in comparison between Beijing and the national, can be seen that the noise of the logistics industry in Beijing generally

showed a rising trend in the past few years, but logistics industry noise pollution in of the nation continues to decline. So, there is still a lack of noise control in Beijing city logistics industry. Noise pollution has a great influence on people's production, life, and body. So the implementation of the green logistics, it is necessary to strengthen noise pollution in control on the one hand.

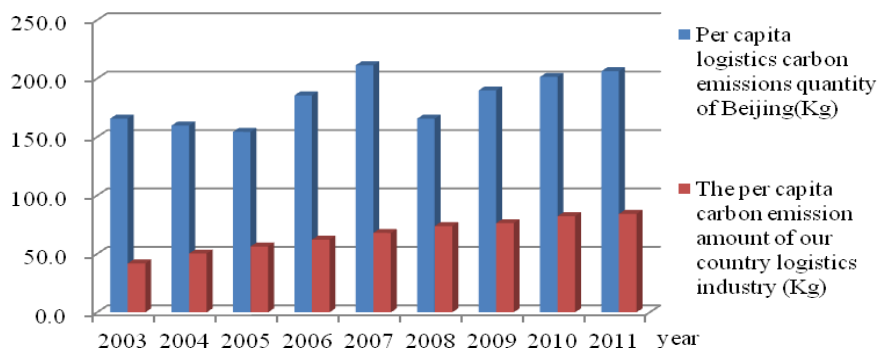


Fig. 3 annual per capita logistics carbon emissions comparison between Beijing and the nation

Figure 3 lists annual per capita logistics carbon emissions comparison between Beijing and the nation. It is a group of very sharp contrast diagram. It is not difficult to see from figure 3 that per capita carbon emissions of the logistics industry in Beijing was significantly higher than the national average level. Carbon emissions is a very important index to evaluate the green logistics, it directly reflects the level of development of green logistics. After the Beijing logistics industry carbon emissions per capita reached a peak in 2007, decreased in 2008, then continues to grow, but the growth trend is gradually reduced. This shows that Beijing makes efforts in recent years for carbon emissions reduction control, but still need to continue to pay attention. It should take green environmental protection as the goal, strive to build a resource-saving, environment-friendly society, achieve the national average level in terms of carbon emissions. The calculation reference of carbon emission coefficient is shown in Table 1.

Tab. 1 The energy carbon emission coefficient

Energy	Raw coal	Coke	Crude oil	Fuel oil	Gasoline	Kerosene	Diesel engine	Natural gas
coefficient	0.7599	0.855	0.5857	0.6135	0.5538	0.5714	0.5921	0.4483

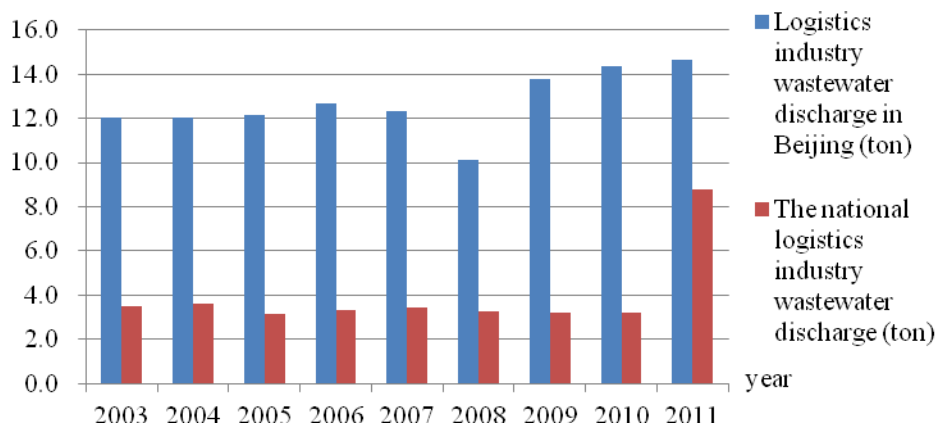


Fig. 4 The logistics industry wastewater emissions comparison between Beijing and the nation

Figure 4 is the logistics industry wastewater emissions comparison between Beijing and the nation. We can see from figure 4 that the Beijing logistics industry wastewater emissions per capita from 2009 began to increase significantly, then rise slowly. Sadly, the per capita wastewater

emissions amount of logistics industry in Beijing is far greater than the national average level. This shows that Beijing has rapid development of economy at the same time brought tremendous pressure on the environment. Look at the national logistics industry wastewater discharge, we found per capita emissions basically unchanged, stable in 2003~2010, but in 2011 suddenly increases. Appearing with the development of the logistics industry all over the country, the wastewater discharge is increasing gradually. It is necessary for us to pay attention. Wastewater emission is an important measurement indicator to green logistics development. In order to realize the green logistics, waste reduction and clean work needs further enlarge.

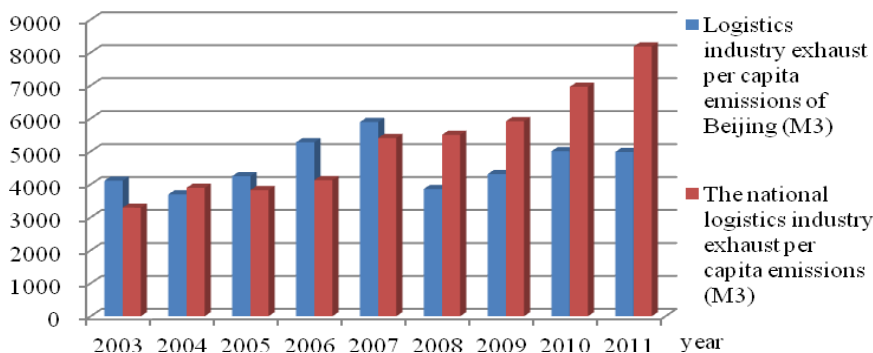


Fig. 5 Comparison of Logistics industry exhaust per capita emissions between Beijing and the nation

Figure 5 shows the comparison of Logistics industry exhaust per capita emissions between Beijing and the nation. As everyone knows, with the continuous development of the economy, the atmospheric pollution is more and more serious; it is one of the most important problems in today's society. We can see from the figure 5 that per capita exhaust emissions of the logistics industry in Beijing city is divided into two stages. The first stage is 2003~2007, per capita emissions during this period of the logistics industry are gradually increased, reached a peak in 2007, and then began to fall in 2008. The second stage is 2008~2011. At this stage, the overall trend is continued to increase, but the per capita emissions did not exceed the 2007's peak. It can be seen that the beginning of 2008 exhaust emissions of the Beijing logistics industry has been controlled. There is a certain effect.

Look at the national logistics industry per capita exhaust emissions; during 2003~2011 is rising. In 2007, the per capita quantity of Beijing is higher than the national average, and then lowers than the national average level beginning in 2008. It further proof that there is a certain effect to control and regulatory emissions beginning from 2008 in Beijing. But with the continuous development of the economy, which has been far from enough, people are faced with serious air pollution problems, light rely on motor vehicle limit line and some policy is not enough. It should fundamentally solve the problem.

By the above five charts we can see many environmental pollution in Beijing has exceeded the national average, which shows that the rapid economic development has brought environmental pollution. Of course, this is not just about the problems in Beijing, but a common problem in current society faces. We must act to change the status quo, not for short-term economic growth at the expense of the environment, should have a long-term consciousness, and must understand that the earth is our home, our living environment. We cannot damage it. We must actively research countermeasures to deal with more and more serious environmental problems.

## A comprehensive comparison of the environmental pollution

In order to evaluate the environmental pollution of green logistics, first carries on the quantitative indicators of statistical data analysis. According to the statistics of Beijing and the data of national during 2003~2011, the state of development of calculated annually, development level of a sequence diagram to show Beijing and the nation environmental pollution. Since each index data units are not the same, in order to be able to compute unified, we first standardize data, get the results as shown in table 2~3.

Tab. 2 the environmental pollution of Beijing evaluation index standardization results

The standardized score	Q11	Q12	Q13	Q14	Q15	Comprehensive score
2003	-0.636	-0.945	-1.425	-1.105	-1.322	-5.433
2004	-0.374	-1.59	-1.467	-1.001	-1.614	-6.046
2005	-0.527	-1.239	-1.484	-0.843	-0.977	-5.07
2006	-0.086	-0.577	-0.618	-0.549	0.148	-1.682
2007	-0.389	-1.251	0.182	-0.513	0.945	-1.026
2008	-0.53	-0.086	0.515	0.001	0.274	0.174
2009	-0.367	0.025	0.634	1.08	0.25	1.622
2010	-0.023	1.442	0.953	1.315	1.07	4.757
2011	2.933	1.075	1.285	1.615	1.224	8.132

Tab. 3 the national environmental pollution evaluation standard results

The standardized score	Q11	Q12	Q13	Q14	Q15	Comprehensive score
2003	-1.159	1.897	-1.744	-0.29	-1.27	-2.566
2004	-0.776	1.799	-7.978	-0.218	-0.887	-8.06
2005	-0.829	-0.258	-0.723	-0.723	-0.915	-3.448
2006	-0.573	-0.444	-0.299	-0.299	-0.714	-2.329
2007	-0.142	-0.329	0.121	-0.291	0.101	-0.54
2008	0.055	-0.615	0.552	-0.361	0.181	-0.188
2009	0.29	-0.595	0.75	-0.417	0.458	0.486
2010	0.852	-0.764	1.137	-0.424	1.099	1.9
2011	2.282	-0.69	1.358	2.821	1.947	7.718

According to the above standardization results of table2~3, respectively, the comparison between Beijing and the national environmental pollution as shown in figure 6.

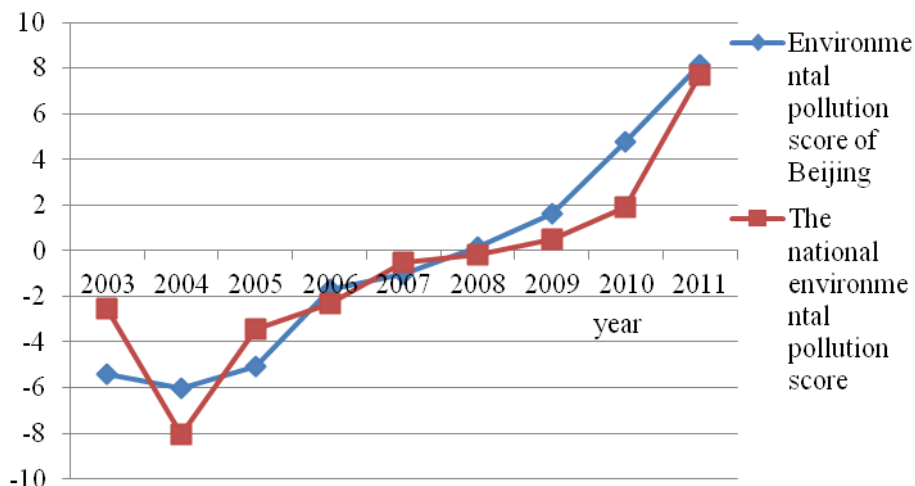


Fig.6 comparison between Beijing and the national environmental pollution.

As Figure 6 shows, both Beijing and the whole country, the environmental pollution is very serious in the early. After 2007 the situation had improved, the national various provinces and cities gradually realized the need to strictly control the pollution of the environment, and take effective measures to improve the results. And the overall situation of Beijing after 2007 is better than the nation.

## Conclusion

In this paper, it takes Beijing as an example, carries on the statistical analysis of the environment development of green logistics, established evaluation index system from environmental pollution aspect in evaluating the development of green logistics. The aim of the study is to make quantitative research on the development of green logistics, points out the insufficiency in the green logistics in our country. There is great significance for the development of green logistics, but also the important impetus to realize sustainable development of economy.

## Acknowledgments

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