

Analysis of the Present Situation and Governance Measures of Haze in Linyi City

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Abstract: With the acceleration of industrialization and urbanization in China, environmental pollution problems gradually appear, which is particularly prominent in the haze pollution. Becoming one of the most important factors affecting people's health, the air pollution has been widespread concern by the community. A case study of Linyi city in Shandong province is provided, starting from the current situation of haze pollution. The causes of fog and haze is detailed analyzed, including the plant distribution, traffic conditions, urban construction, green and so on. The main problems in the haze governance are discussed. Combined with the actual situation of haze pollution in Linyi, haze control measures, including government, enterprise, urban transportation and personal, are put forward.

Keywords Haze; Governance measures; Present Situation; Linyi

INTRODUCTION

In recent years, due to rapid economic development in China, the problem of haze pollution is more serious, which is not only harmful to people's health, but also the resistance of the city's economic development.

Linyi is a typical city in the north of China. In recent years, environmental pollution has become increasingly serious. The primary cause of air pollution is the factory fumes and vehicle exhaust. Meanwhile, the frequent haze is relevant to urban greening, weather conditions and other factors, but the impact of human factors is even more critical. Haze pollution governing effective need to start from the above point of view.

This paper takes Linyi as an example. The causes and current situation of haze pollution in Linyi City are analyzed from all aspects, the specific countermeasures and suggestions about haze pollution are put forward.

STATUS OF HAZE POLLUTION IN LINYI CITY

Linyi of Shandong Province repeatedly ranked first in the country's worst air quality rankings. In the December of 2014, a few days of fog and haze pollution had continuously appeared, the average AQI index had been more than 400, which was identified as a serious pollution. Monitoring data of environmental monitoring center in 2015 displayed that the primary pollutant is PM10, secondly for SO₂, NO₂. On the causes of pollutants, American scientists JC Chow and JG Watson carry out a chemical analysis of PM10 by using scanning electron microscopy (SEM-EDX), plasma (ICP-MS) and light (thermal) reflection method (TOR) and other technical

means [Euston, 2003]. In addition, Linyi's air pollution is mainly in the spring and winter seasons, less rain in spring and dry air in winter caused that air pollution is more serious. A few days of fog and haze often come out in the winter, and no signs of fog and haze dissipated from morning to night. The main impact factor about haze weather is pollution emissions and weather conditions, there are pollutants in the air, which result in haze possibly, but if the weather conditions are suitable for the pollutants spreading, it will not form the haze [Chen et al, 2014]. According to the survey, there are 220 days in the pollution in Linyi in full 2014. Statistics have been made on the number of days of air pollution and without pollution in Linyi in full 2014. The statistics are shown in Fig. 1.

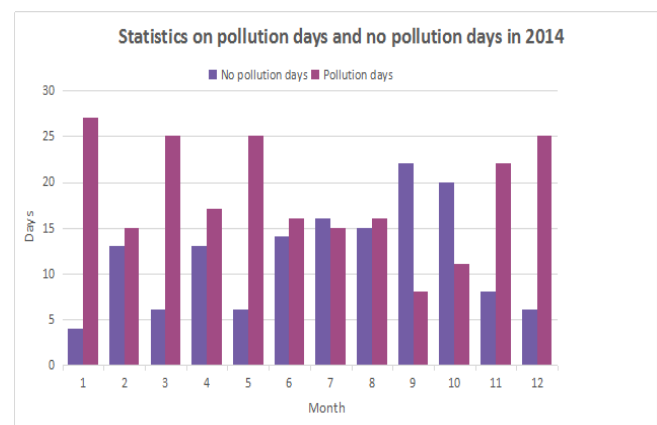


Figure 1. Statistics of air pollution days in Linyi

The graph shows the daily pollution degree and the number of days per month in Linyi in 2014. From the picture, the pollution days have reached more than 20

days in January, March, May, November, December of 2014, in which the mild and moderate pollution accounted for a large proportion. And there are 18 days of serious pollution in January, 10 days of heavily polluted days in December. The number of days about good air quality is very less, which data show that the air pollution is more serious in Linyi.

According to the air quality ranking in the 17 cities by Department of environmental protection of Shandong Province, April to June in 2014, the most "Blue sky and white clouds" days' city is Weihai, which is 64 days, the least is Linyi, only 26 days. The city with the highest concentrations of fine particulate matter (PM2.5) is Zibo, Linyi, Dezhou, for $82\mu\text{g}/\text{m}^3$, which is significantly higher than fine particulate matter (PM2.5) the average concentration of $68\mu\text{g}/\text{m}^3$.

From January to September in 2014, the "Blue sky and white clouds, stars twinkling" days are 70 days in Linyi, only next to Jining, while there is a great reduction. The fine particulate matter (PM2.5) concentration reached $85\mu\text{g}/\text{m}^3$ in Linyi, which is higher than the average of the whole province. The invaluable particles (PM10) concentration reached $160\mu\text{g}/\text{m}^3$ in Linyi, which is obviously over the average level of $139\mu\text{g}/\text{m}^3$ in whole province. From the above data, the overall air quality of Linyi ranked lower in Shandong Province, the concentration of various pollutants has been high. The research of scholar Delik Elson directly proved that PM10 and PM2.5 are harmful to human body, his research data showed that there was a positive correlation between the rise in the concentration of pollutants and the incidence of heart and lung diseases [Hung, 2006].

The document on governing haze in the air pollution in Linyi was issued one by one in 2014. At the same time, there are 2958 projects about

governing atmosphere depth being implemented. Haze governance must be carried out from the source, which devoted to improve air quality. It is visible that haze pollution has been to the stage of governance in Linyi, the central government's urging shows the seriousness of the haze disasters in Linyi.

ANALYSIS OF THE CAUSES OF HAZE IN LINYI

Haze pollution is mainly from two aspects in Linyi. Firstly industrial emissions accounted for the main, automobile exhaust is the main pollution channels. Secondly, the city's green area also affected the fog and haze pollution situation.

The impact of the production enterprise on haze in Linyi

The industrial production is rapid growth in Linyi. In 2014, the second industry has invested 151.54 billion, up 17.8%, of which the industrial investment is 147.74 billion, growth of 16.3%; the third industry has invested 128.26 billion, growth of 15.2%. In the industrial investment, high energy-intensive industries have invested 5.42 billion, growth of 21.1%. From the data, the second industry still occupies a large proportion, and the industrial investment and growth rate occupies the first place. When the high energy-consuming enterprises are increased, the pollution treatment measures have not been kept pace, which lead to the deterioration of air pollution in Linyi.

In March 31, 2015, Environmental Protection Agency issued a notice that the number of excessive emission of enterprises have 271 in Linyi. The following statistics have been done about the distribution of the various factories. The statistics are shown in Fig. 2.

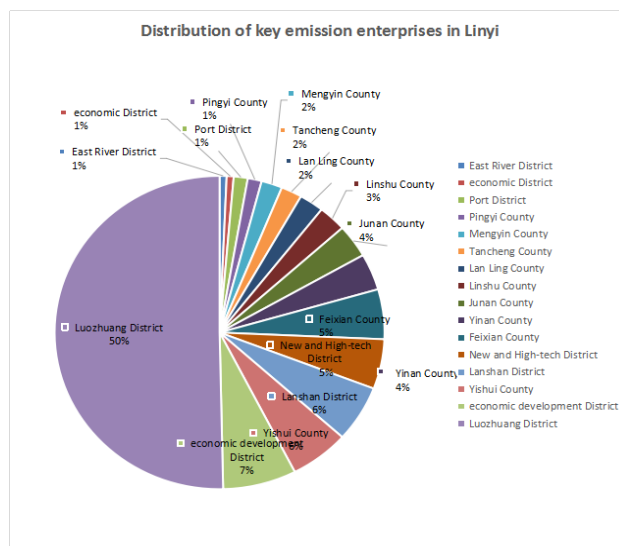


Figure 2. Distribution of waste pollution enterprises in Linyi City

According to the above picture the key emission enterprises accounted for 54% in Luozhuang, most of which are associated with chemical smelting, ceramics and heat industries, which produced a large number of toxic gases, dust. The distribution of pollution enterprises in other districts and counties is more uniform, but the distribution of economic development zone is relatively more.

According to the survey, there are more than 30 chemical enterprises in Luozhuang, of which distributes 6 chemical plants less than 5 km in the Ehuang road. There are more than 70 fertilizer plant in Linyi, of which has nearly thirty more in Linshu county. For example by each county environmental air quality ranking in Linyi in March in 2014, the worst air quality in the lowest ranked first in Luozhuang district. Thus, the high pollution enterprises is an important reason for local pollution.

The impact of the transportation on haze in Linyi

Linyi has now become the capital of trade and logistics in China. It is understood that the motor vehicle has more than 2.4 million, ranking second in Shandong Province, which is continuing to maintain rapid growth end of October 2014.

1) Effect of tail gas on the haze

Motor vehicle emissions of exhaust gas has become one of the most important causes of haze. Data show that the main pollution sources are the main factory emissions of 18% to 19%, construction site dust 25%, coal dust 30%, as well as automobile exhaust 20% [Yuan, 2015].

2) Effect of dust on the haze

The dust caused by the motor vehicle is one of the reasons for the formation of PM10 and other pollutants. Three are a lot of three wheeled taxi, which is as a common transportation in Linyi, the number of which is amazing. A large number three wheeled taxi caused a serious impact on the haze pollution.

The impact of urban construction on haze in Linyi

In the end of November 2012, the area of green coverage is 4957 hectares and the garden green area is 4783.344 hectares, urban green coverage 37.2%, the average per person green space area is reached 8.10 square meters. Compared with the same period of the whole country, the national average per person green space area is reached 12.6 square meters. The national urban construction green area coverage rate is 39.7%. It is obvious that there are still a lot of problem on green in Linyi. At the same time, there are some problems on urban greening in Linyi.

1) Uneven distribution

Urban garden green space distributed scattered, which mainly distributed along the river. Most of green concentrated in Yihe river, but a serious shortage of Binhe road. Street green space is narrow, the scale is small.

2) Area deficiency

Due to the lack of predictability of planning, the urban construction is intensive, the green reserved area is serious shortage, which resulted that the late green space can not be extended.

THE STATUS QUO OF HAZE GOVERNANCE AND EXISTING PROBLEMS IN LINYI

In recent years, Linyi has experienced serious haze pollution. The relevant measures which is to improve the air quality in the aspects of the enterprises, residents coal and straw burning, vehicle exhaust, fugitive dust and green of city have been taken. Through the analysis of the present situation of haze governance in Linyi, there are still some deficiencies in some aspects.

The formulation of government policy can not be improved

The corresponding policy formulation must be increased, the more comprehensive and detailed policy do good for enforcing the law strictly for government department. The method of management policy need to be improved, which the forbidden should gradually be changed to control the haze pollution actively for the enterprise and individual themselves. Since the beginning of 2014, a number of red headed documents about the governance haze pollution in Linyi have been promulgated by People's government of Linyi. The situation of air pollution in Linyi has been effectively improved, but there are still problems in government regulation, which make the haze pollution not be resolved at the source in Linyi.

Enterprise governance is not up to the standard

The economy will be declined because of the industrial governance. The "three batch" is implemented strongly in Linyi, pollution enterprises must be strictly controlled, meanwhile, the small enterprises should be fully cleared. There are so many small enterprises in Linyi, part of which belong to the private, which is difficult to govern. But the government may formulate corresponding policies to guide or regulate the management of small enterprises, the enterprise which have no ability to control the pollution or failed standard must be shut down.

Motor vehicle management is not strict

The number of the operational truck is about 114000 in Linyi[Zhu, 2013], part of which caused serious pollution of the tail gas emission. The management of this part of the motor vehicle is relatively short, which caused traffic jam.

Urban greening is not comprehensive

Greening is one of the most effective ways to purify the air and improve the air quality. It is particularly important to increase the urban green area. A lot of greening projects have been put into effect,

for example the green belt along the river, which increased the greening of the city. At the same time, the green on the both sides of road, the roof, the logistics parks and so on should be increased.

COUNTERMEASURES AND SUGGESTIONS OF HAZE CONTROL IN LINYI CITY

People's physical health and mental health is affected by Haze weather, which can reduce the solar radiation, result in crop production and lead to traffic accidents easily [Sun, 2012]. Through the research on the pollution situation and the treatment measures of Linyi, many corresponding treatment measures should be put forward according to the specific situation of Linyi, which can play a role in helping to improve the air quality and governance haze pollution for the government's governance haze pollution.

To clear the direction of government action

- 1) Changing the direction of legislation and improving the legal system

Legislation should be speed up and the relevant policies should be refined, which provides the legal basis for governance haze pollution, which the difficulty of law enforcement can be reduced. Law enforcement must be strictly and role in supervision should be done well, enterprises which do not comply with the law must be given severe punishment.

- 2) Clarifying the responsibilities of the relevant departments

Environmental management department and management function is refined, each department should distinguish the responsibility to prevent the phenomenon of nobody care or repeated management. The construction of pollution monitoring should be strengthened, the accuracy of determining the pollution area and pollution sources should be improved.

- 3) Increasing urban green space in many ways

With the existing park green space and along the river's green belt as the foundation, there is gradually expanding to the surrounding and linked the green space. The construction of green space should be speed up. The building of road green belt on both sides should be increased, which plant the tree with strong ability to take in dust. To improve the construction of new urban areas, the reserved area of green space should be increased. Under the premise of not affecting the flow of vehicles, the small plant could plant more appropriate around the logistics parks and the surrounding green belt.

- 4) Promoting the environmental protection in rural areas

The management of the whereabouts of crops and the farmers' awareness of environmental protection should be strengthened. The channel about straw recycling should be explored actively, for example straw crushing and returning, straw fermentation,

straw processing to product the arts and crafts and so on.

To govern pollution enterprises innovative

- 1) Enterprise transformation, to increase energy efficiency

Accelerating the transformation of enterprises, the small enterprise's pollution emissions management is generally powerless. The small businesses' consolidation or mergers should be encouraged, only by this way can we have enough strength and capital to carry on the pollution governance, which is better than force them to close. At the same time, large enterprises must be urged to rectify and reform in time, law enforcement must be strengthened, green industry must be promoted development, energy must be used fully. Only in this way can we achieve a double-win about haze control and economic acceleration.

- 2) Industrial parks planning, to set factory management standards

Location of the park should be fully considered, for example the relationship between the park and the city, the direction of the wind, the development space demand, the infrastructure and so no. The environmental costs which produced by the industrial parks must be evaluated in detail, at the same time, the reasonable disposal measures must be taken. The pollution emission standard for the check-in factory and enterprise must be constituted. Strictly screening mechanism should be established and to carry out strict management, the manager should carry out no regular emission inspection. In the light of present situation in Linyi, industry is relative concentration in Luozhuang, where the pollution is the most serious. Industrial area and living area of planning need to be improved to avoid pollution concentration and enhance the atmospheric diffusion, which is good for plant to absorb and purify the pollution.

To perfect the traffic management mechanism

Linyi is known as "Logistics capital". Logistics parks and wholesale market is huge, the number of small truck and cargo tricycles is amazing, it is reasonable to improve logistics and strengthen traffic management on governing haze in Linyi.

- 1) To strengthen the management about motor vehicles

Small truck and cargo tricycles can be seen everywhere around the logistics park and the wholesale market, it can not be ignored about the harm of tail gas and its influence on traffic. Strengthen logistics management and promote the electric motor tricycle instead of motor freight; improve the traffic situation, strengthen the management of cargo motor tricycle and passenger tricycle; it is one of the way to reduce the exhaust emissions that reducing the traffic jam.

- 2) To improve the oil and test the gas stations regularly

It is only in a certain period of time to improve the oil quality by shutting down the gas station which the oil is not qualified. Meanwhile, a set of management system must be established, which the gas quality in gas station be tested regularly and reported the relevant data, to let the citizens know about the real-time gas quality. Only in this way can the quality of the gas station oil be managed in a long term, and which can let gas station improve the oil quality consciously.

To advocate the citizen's environmental protection

- 1) Enhancing citizens' awareness of environmental protection

Enhance personal environmental awareness, and improve their own standard of behavior consciously. Protecting the environment and conserving resources should be started from our own personally.

- 2) Advocating green travel

Advocating green travel, reducing the number of driving and trying to do walk or riding a bike on short distance or by bus in far distance is not only help ourselves, for example: without traffic jams and finding park spaces, but also reduce emissions and protect the environment.

CONCLUSIONS

Sustainability of a wide range of fog haze will not only do serious harm to personal physical and mental health, but also affect the sustainable development of national economy. Many aspects must be taken into consideration about the haze of governance. There are many ways for the haze to govern. Based on the actual situation of Linyi, the paper puts forward some treatment measures. The government should perfect the legislation, change the function, strengthen the management and supervision of the enterprise, urban traffic, at the same time, the government must do a

good job of publicity and enhance the awareness of environmental protection for citizens.

The earth is our home. Haze pollution is becoming more and more serious in recent years, It is our duty to protect the environment. We are part of the earth, and we should also be part of protecting the earth. Everyone must have a sense of environmental protection, only in this way will the environment be better improved.

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