Progress of the Shenyang-Kawasaki Inter-city Atmospheric Environment Improvement Project

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2 Advantages of Shenyang City for the Project

3 Project Progress

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1 Background of the Project

History of inter-city exchanges

1981 — The two cities became sister cities.

1997 — Shenyang-Kawasaki Environmental Technology Exchange Agreement (19 ecological improvement technology workshops have been held to date since its implementation, with 38 men-times in total)

2009 — Shenyang-Kawasaki Cooperative Agreement on Circular Economy Development

Memorandum between the Ministry of Environmental Protection of the People's Republic of China and the Ministry of the Environment of Japan on Building Shenyang City in China and Kawasaki City in Japan into Environment-friendly Cities

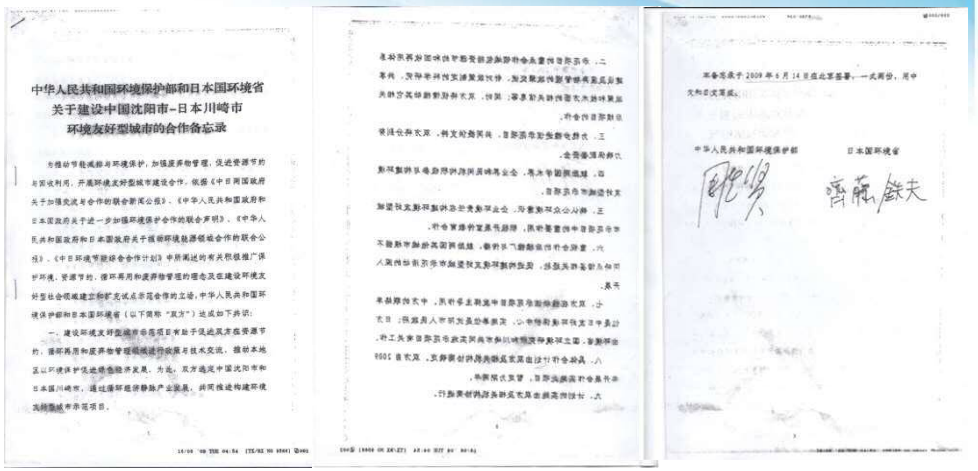
2011 — The mayor of Shenyang City entered into a memorandum on deepening cooperation in environmental protection with Kawasaki City.

2012 — The Shenyang Academy of Environmental Sciences and Environmental Monitoring Center reached a common understanding on further promoting the building of environmental model cities, and entered into a memorandum with the Kawasaki Environmental IT Center, Nuisance Research Institute and Nuisance Monitoring Center.

2013 — Inter-city Cooperative Project on Improving China's Atmospheric Environment

Environment-friendly City Cooperative Project between Shenyang City in China and Kawasaki City in Japan

Under the framework of the Memorandum between the Ministry of Environmental Protection of the People's Republic of China and the Ministry of the Environment of Japan on Building Shenyang City in China and Kawasaki City in Japan into Environment-friendly Cities, the China-Japan International Seminar on Environment-friendly Cities has been held, the Shenyang-Kawasaki international exchange platform of environmental cooperation established, advanced Japanese technologies drawn on for model city building, the JICA Venous Industry Circular Economy Construction Guide Project implemented, and Shenyang-Kawasaki environmental technology training and research conducted to promote China-Japan cooperation in environmental projects.

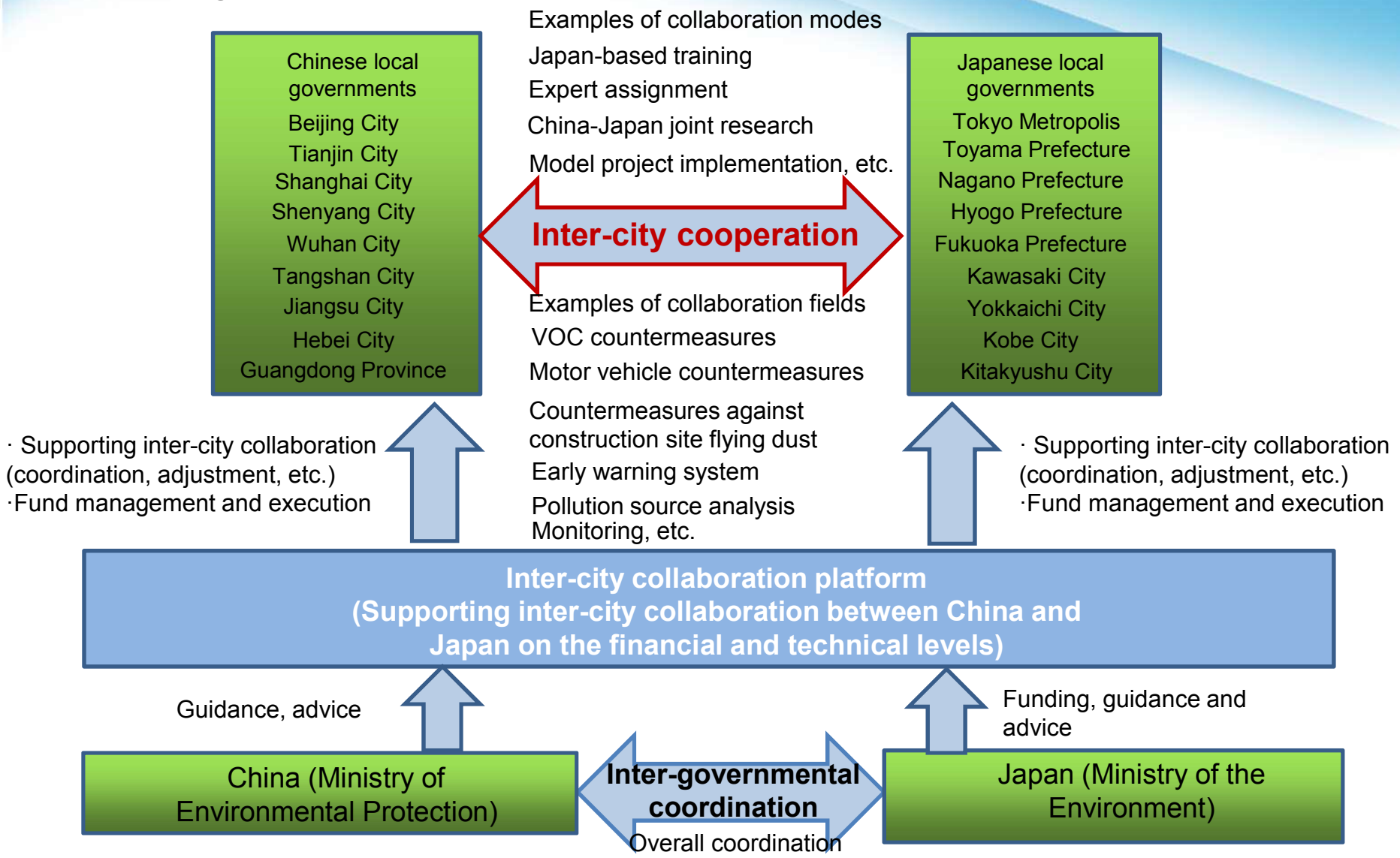

中华人民共和国环境保护部和日本国环境省
关于建设中国沈阳市-日本川崎市
环境友好型城市的合作备忘录

Shenyang-Kawasaki International Seminar on Environment-friendly Cities:
The Shenyang-Kawasaki International Seminar on Environment-friendly Cities has been held successfully three times in Shenyang since 2010. The Chinese and Japanese sides have conducted in-depth, practical exploration on building Shenyang and Kawasaki into environment-friendly cities in terms of policy, management and technology, promoting the environment-friendly city building of both cities effectively.

Environment-friendly City Cooperative Project between Shenyang City in China and Kawasaki City in Japan

The JICA (Japan International Cooperation Agency) Circular Economy Project – Venous Industry Eco-industrial Park Pilot Demonstration Planning and Construction Guide – has been implemented Shenyang is a pilot city of this project. Under the direction of the project experts from the Japan-China Friendship Environmental Protection Center, Ministry of Environmental Protection, and the JICA, the technical route, research methodology, scope and expected results of the project in our city have been planned, and the investigation on waste home appliances, waste tires, waste oils, emulsions, and contaminated land remediation completed.

Framework of the Inter-city Cooperative Project on Improving China's Atmospheric Environment



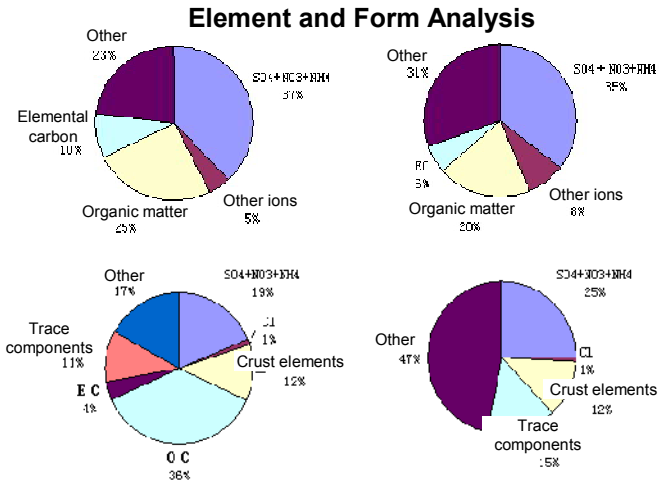
2 Advantages of Shenyang City for the Project

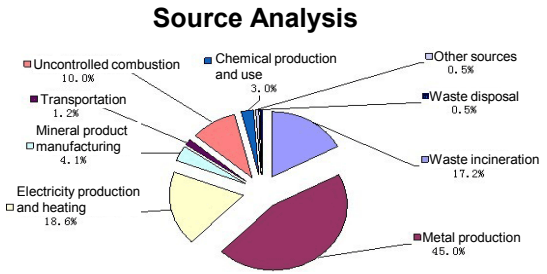
PM2.5 research

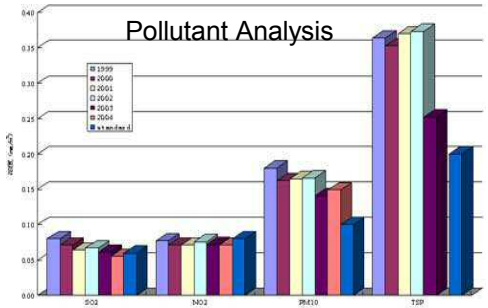
PM2.5 studies in Shenyang are led by the environmental protection bureau, and technically supported by the Shenyang Academy of Environmental Sciences, and the Shenyang Environmental Monitoring Center.

Shenyang Academy of Environmental Sciences

Founded in 1963, and affiliated to both the Ministry of Environmental Protection and the Shenyang Municipal Government, the academy has developed a sound organizational structure, a sound management system and a sound scientific research system over the past four decades. In particular, the academy has made remarkable achievements in integrated regional environmental management, ecological protection, hazardous waste disposal, etc. in recent years. Shenyang City has been engaged in the research of atmospheric pollution prevention and control technologies since the 1980s as one of the pioneering Chinese cities in this field.







2 Advantages of Shenyang City for the Project

PM2.5 research

Shenyang Environmental Monitoring Center

Founded in 1975, the center is responsible for the monitoring of water, gases, sounds, electromagnetic waves, radioactivity, biology, ecology, coal, solid waste, pollution sources, interior spaces and building materials in Shenyang, as well as the emergency monitoring of environmental pollution accidents. Since 2008, the center has undertaken the national pilot projects on ozone, sandstorm and greenhouse gases successively. The center has State Key Laboratory for the Monitoring and Analysis of Atmospheric Organic Pollutants.

The Shenyang Academy of Environmental Sciences and the Shenyang Environmental Monitoring Center are studying regional characteristic particulate matter source analysis, and countermeasures for pollution prevention and control; and fine particulate matter PM2.5 source analysis for ambient air, and countermeasures for pollution prevention and control.

2 Advantages of Shenyang City for the Project

Progress of haze prevention and control in Shenyang City

This task is led by the Shenyang Municipal Government, which issued the Implementation Plan for the Blue Sky Action of Shenyang City (2015-2017) in 2015. In addition, the environmental protection bureau has developed the Implementation Plan for the Anti-haze Action of Shenyang City for comprehensive atmospheric pollution prevention and control. In 2016, the Contingency Plan for Heavily Polluted Weather of Shenyang City (Amended) was amended to improve response to heavily polluted weather, and include emergency response to heavily polluted weather in the emergency management system.

1. In 2016, the Contingency Plan for Heavily Polluted Weather of Shenyang City (Amended) was amended to improve response to heavily polluted weather, and include emergency response to heavily polluted weather in the emergency management system.

2. The emergency warning release, file management, supervision and inspection, and accountability systems for heavily polluted weather have been established and improved.

3. Coal-fired boiler dismantling and improvement has been organized. In 2016, over 1,000 coal-fired boilers were dismantled throughout the city, in which 73.2% were industrial and tertiary-industry boilers, and 26.8% public heating ones.

4. Cooking fume control has been conducted intensively.

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沈阳市人民政府文件

沈政发〔2015〕19号

沈阳市人民政府关于印发沈阳市蓝天行动实施方案（2015－2017年）的通知

各区、县（市）人民政府，市政府各部门、各直属单位：

现将《沈阳市蓝天行动实施方案（2015－2017年）》印发给你们，请结合实际，认真贯彻落实。

2015年5月18日

（此件可公开发布）

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沈阳市人民政府办公厅文件

沈政办发〔2016〕28号

沈阳市人民政府办公厅关于印发沈阳市重污染天气应急预案（修订）的通知

各区、县（市）人民政府，市政府各部门、各直属单位：

经市政府同意，现将《沈阳市重污染天气应急预案（修订）》印发给你们，请结合实际，认真贯彻执行。

沈阳市人民政府办公厅

2016年2月14日

（此件公开发布）

2 Advantages of Shenyang City for the Project

Progress of haze prevention and control in Shenyang City

5. Oil and gas recovery and control has been conducted. The Notice on Issuing the Enforcement Plan of Oil and Gas Recovery Transformation for Gas Stations, Oil Depots and Oil Tank Trucks of Shenyang City has been issued.

6. Volatile organic matter control in the petrochemical industry has been conducted. An investigation was conducted on enterprises involving volatile organic matter in our city, and questionable enterprises corrected according to the Pollutant Emission Standard for the Petroleum Refining Industry, the Pollutant Emission Standard for the Petrochemical Industry, and the Pollutant Emission Standard for the Synthetic Resin Industry.

7. Upgrading for efficient dust removal and desulfurization has been conducted to control pollutant emission strictly. In 2016, non-electric coal-fired boilers of 20 steam tons or above with a total capacity of 4,400 steam tons were upgraded for efficient dust removal, and those with a total capacity of 6,500 steam tons for efficient desulfurization.

8. Straw burning banning: For straw burning in autumn and winter, the Notice of the Shenyang Municipal Government on Banning the Open-air Burning of Crop Straws, and Some Policy Measures for Integrated Crop Straw Utilization of Shenyang City have been issued, and the network management responsibility system on the district (county/city), township (sub-district), village (community) and group levels implemented to ban straw burning.

2 Advantages of Shenyang City for the Project

Strengthening the control over automobile exhaust pollution

In recent years, Shenyang City has strengthened the elimination of yellow label vehicles, motor vehicle environmental testing, law enforcement and publicity for more effective automobile exhaust pollution.

1) The Notice on Strengthening the Management of Yellow Label Vehicles, and the Notice on Adding the Green Environmental Label Zone have been developed, and the Interim Measures of Shenyang City for Subsidies for Eliminated Yellow Label Vehicles promulgated together with competent authorities.

2) Environmental testing of motor vehicles: The 2016 Work Plan for the Law Enforcement Inspection and Supervision of Motor Vehicle Environmental Testing Agencies of Shenyang City, and the Notice on Strengthening the Environmental Testing and Management of Motor Vehicles have been developed.

3) The standard document for law enforcement on environmental testing agencies has been prepared, and joint law enforcement and inspection conducted with the environmental safety branch of the municipal public security bureau.

4) Information disclosure channels have been broadened to communicate motor vehicle pollution prevention and control actively, and a smooth channel for citizen complaints and reports established, covering joint law enforcement of the environmental protection and public security departments, cracking down falsification in exhaust gas testing, yellow label vehicle management, green label zone addition, new national V emission standard, etc.

Tip: Yellow label vehicle is the short form of high pollution and high emission vehicles, including gasoline vehicles below the national I emission standard, or diesel vehicles below the national III emission standard. Generally, such vehicles' emissions are 5-10 times of those of vehicles, and they are named for the yellow environmental label.

2 Advantages of Shenyang City for the Project

—— Efforts in resource recycling

1) Establishing the system of laws and regulations

The Regulations for the Management of Renewable Resource Recycling of Shenyang City have been developed to manage the resource recycling industry of Shenyang City from the perspective of market regulation.

The Regulations for Domestic Waste Management of Shenyang City have been developed, covering domestic waste classification, charging and measurement, landfill construction, etc.

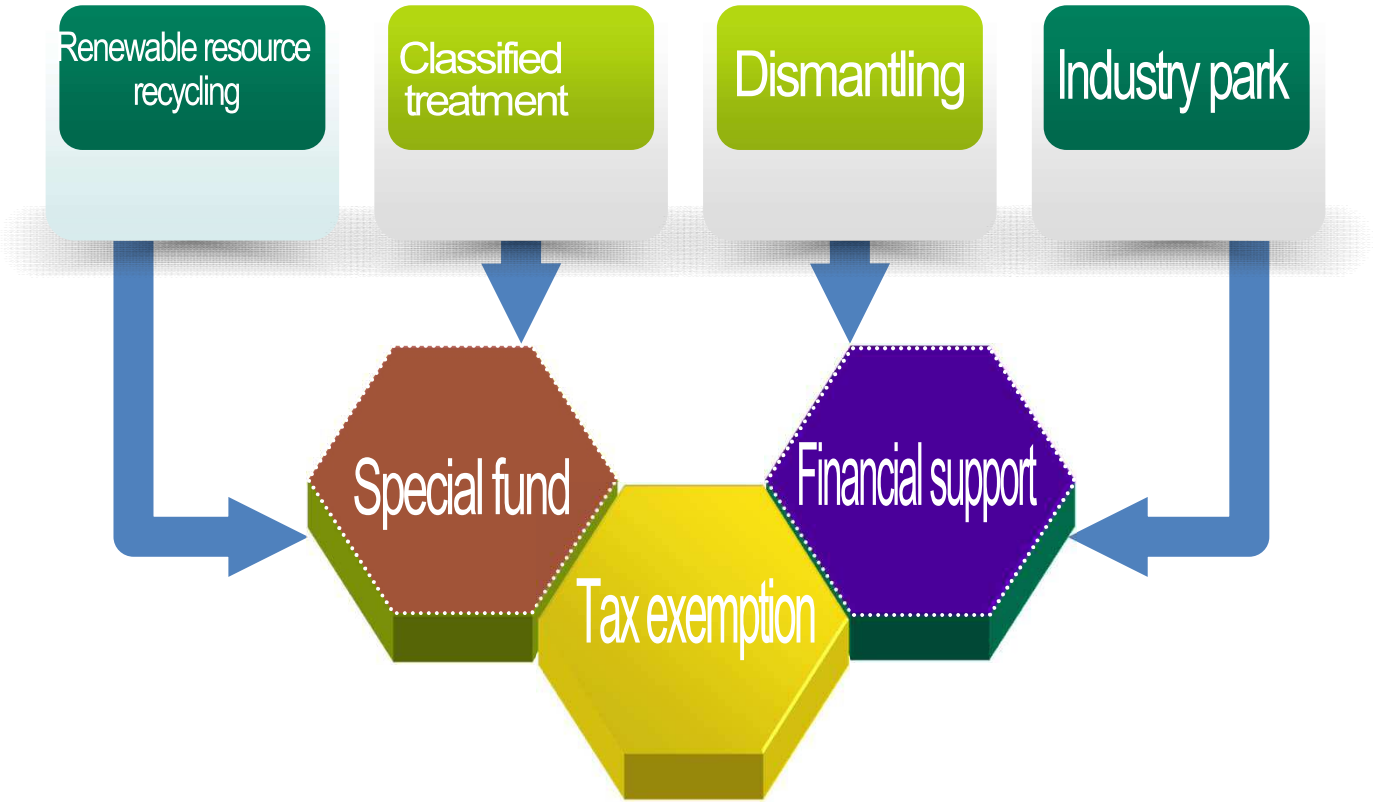
The Regulations for the Recycling of Scrapped Vehicles of Shenyang City have been developed to strengthen the control over illegally assembled vehicles, and the Interim Measures for Trials on the Recycling and Disposal of Waste Home Appliances and Electronics have been developed to regulate the production, marketing, use and repair of home appliances and electronics, and recycling and disposal of waste home appliances.

2 Advantages of Shenyang City for the Project

—— Efforts in resource recycling

2) Developing economic policies to promote renewable resource recycling

Preferential national and local policies are in place for renewable resource recycling, classification and disposal, dismantling, renewable resource industrial park construction, etc., including establishing special funds, exempting taxes, strengthening financial support, etc.



2 Advantages of Shenyang City for the Project

—— Efforts in resource recycling

3) Establishing an effective public participation mechanism

Give play to the Renewable Resources Association to guide consumers, and advocate green consumption to purchase environmentally certified products. Support the community-level “green shopping” initiative, where residents are encouraged to replace frequently used plastic bags with self-made food baskets and shopping bags.

- Offer policy, economic, technical, product and market information on renewable resources, and relevant consulting services to members.
- Carry out economic, technical, trade and academic exchanges and cooperation with international peers, and assist members in introducing foreign capital and advanced technologies.
- Organize or take part in the organization of various exhibitions, shows, ordering meetings, and waste material trading fairs held by circulation and manufacturing enterprises.

Renewable Resources Association

3 Project Progress — Project activities and performance in 2014

2014 was the starting year of the project, where both sides agreed on the scope of the project, with focus on learning advanced concepts and drawing on valuable experience from Japan in terms of atmospheric environment improvement technologies and policy management.

Project activities in 2014:
September 2014: A project consultation meeting was held in Shenyang City.
January 2015: Shenyang staff members (5) visited Kawasaki for technical training
March 2015: A project seminar was held in Shenyang City.

Project performance in 2014:

1. Visiting the National Institute for Environmental Studies to learn advanced analytics in Kawasaki City;
2. Defining the research topic and agreeing on the direction of subsequent cooperation at the project seminar

3 Project Progress — Project activities and performance in 2015

2015 was the second year of project implementation, with efforts focused on learning analytical techniques and policy management patterns. Staff was assigned to Japan for training twice, and an international seminar held.

Project activities in 2015:
November 2015: Shenyang staff members (5) visited Kawasaki for technical training on fine particulate matter pollution source analysis
January 2016: Shenyang staff members (6) visited Kawasaki for administrative training
March 2016: A project seminar was held in Shenyang City.

Project performance in 2015:

1. Mastering the source analysis method of atmospheric fine particulate matter, and the sample collection and analysis method of atmospheric volatile and semi-volatile organic matter;
2. Learning countermeasures against fixed source nuisance, environmental policies, educational environment, countermeasures against global warming, preliminary measures taken, and introduction of renewable energy sources into public facilities in Kawasaki City;
3. Agreeing on the implementation plan of PM2.5 source analysis – the joint research topic of 2016

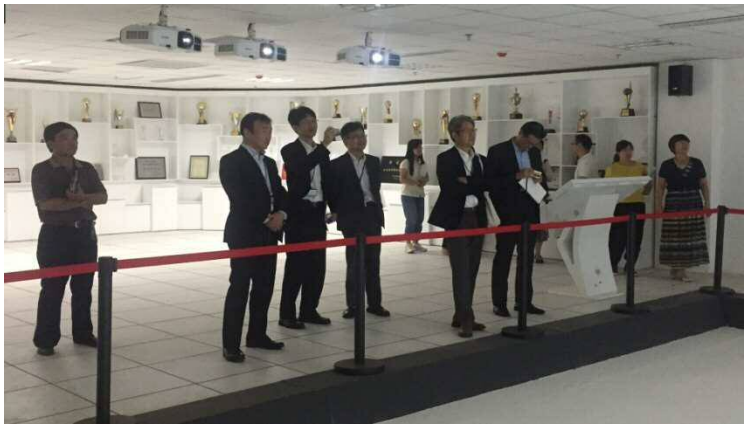
3 Project Progress —— Project activities and performance in 2016

In 2016, PM2.5 source analysis was the joint research topic of the project, including conducting source analysis systematically and learning application techniques of the source analysis software, thereby laying a foundation for proposing PM2.5 control measures.

Project activities in 2016:
August 2016: Japanese experts visited Shenyang to explain how to operate the PM2.5 source analysis software.
October 2016: Shenyang staff members (3) visited Kawasaki for the joint research topic of PM2.5 source analysis.
January 2017: Shenyang staff members (3) visited Kawasaki to follow up the joint research topic of PM2.5 source analysis.
February 2017: A project seminar will be held in Shenyang City (planned).

Project performance in 2016:

1. Basically mastering the operation and application techniques of the PM2.5 source analysis software PMF3.0 and CMB8J
2. Learning how to determine levoglucosan, providing an important basis for solving the straw burning problem
3. Learning the analysis and testing method of carbon fraction in particulate matter (thermal optical reflection method
4. Learning the analysis and testing method of inorganic elements in particulate matter (thermal optical reflection (acidolysis-ICP-MS method)
5. Defining the source analysis sampling and testing plan



4 Subsequent Project Plan —— 2017 Project Plan

In 2017, the joint study on PM2.5 source analysis will continue, where both sides will obtain analytics of PM2.5 sources in their respective cities through sampling to provide a basis for finalizing a PM2.5 control plan.

2017 project plan:
Whole year: PM2.5 sampling and composition analysis
August 2017: Japanese experts will visit Shenyang for sampling and data validation.
October 2017: Shenyang staff members (3) will visit Kawasaki for the follow-up of sampling and data validation.
February 2018: A project seminar will be held in Shenyang City (result reporting).

Developing the annual PM2.5 source analysis sampling and determination plan, and completing annual sampling and analysis

4 Subsequent Project Plan —— 2018 Project Plan

In 2018, the joint study on PM2.5 source analysis will continue, where both sides will explore countermeasures against PM2.5 pollution prevention and control, complete a PM2.5 source analysis research report, and propose effective countermeasures against.

2018 project plan:
Whole year: PM2.5 sampling, composition analysis, report preparation, countermeasure discussion
August 2018: discussing the preparation of the research report based on the analysis results
October 2018: following up the preparation of the research report based on the analysis results
January 2019: A project seminar will be held in Shenyang City (result reporting).
February 2019: A project seminar will be held in Kawasaki City (result reporting).

Completing annual PM2.5 analysis, preparing the PM2.5 Source Analysis Research Report, and proposing effective countermeasures against PM2.5 pollution prevention and control

Thanks for listening!

~~Thank Kawasaki City for the ongoing great support for Shenyang City's environmental protection efforts~~