People's Republic of China

FY2024 Ex-Post Evaluation Report of Technical Cooperation Project

"Promotion of Circular Economy" and "Project for Environment Friendly Society Building"

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0. Summary

The "Promotion of Circular Economy" and the "Project for Environment Friendly Society Building" (collectively referred to as "both projects") were implemented in order to promote circular economy policies in China from the perspective of environmental conservation, with the objectives of strengthening the capacity to execute various measures to enhance environmental considerations in each stage of material circulation (resource input, production, distribution, consumption, disposal, resource recovery, final treatment, etc.), developing the foundations for such efforts at the Sino-Japan Friendship Center for Environmental Protection with a view to nationwide dissemination, and ensuring that the foundations necessary for building an environmentally friendly society would be adopted as policy and utilized for institutional and legal development. The objectives of both projects are aligned with the policies and needs of the Chinese government, which faces a worsening situation of environmental pollution. In terms of coherence, the projects were consistent with Japan's official development assistance (ODA) policy. No concrete linkages or synergies were identified with other JICA projects, those of other donors, or international frameworks such as the Sustainable Development Goals (SDGs). Based on the above, the relevance and coherence of the projects are high. At the time of completion, both projects had mostly achieved their respective outputs and the project purposes. Subsequently, regarding the achievement of the overall goals up to the time of the ex-post evaluation, various measures, institutionalization, the development and utilization of implementation foundations, and dissemination are observed within China. Therefore, the effectiveness and impact of the projects are high. Although the project period slightly exceeded the initial plan, the project cost was within the initial plan; thus, the efficiency of the projects is high. No issues were identified with the policy and system, institutional/organizational, technical and financial aspects, or current status of operation and maintenance (O&M) in relation to both projects. Since the completion of the projects, the Sino-Japan Friendship Center for Environmental Protection has continued to expand its organizational structure and strengthen its functions, and it is expected to continue to play its role as a hub for Japan-China environmental cooperation. There are no major concerns regarding the sustainability of the effects generated by both projects; therefore, the sustainability of the project effects is very high.

In light of the above, both projects are evaluated to be highly satisfactory.

1. Project Description



Project Location (Source: Free map)



Sino-Japan Friendship Center for Environmental Protection
(Source: Taken by the Evaluator)

1.1 Background

Since the 1990s, the Chinese government had been advancing environmental legislation (such as the *Circular Economy Promotion Law* and the *Law on the Prevention and Control of Environmental Pollution by Solid Waste*) and institutional development (including green procurement, environmental certification, and corporate environmental information disclosure). However, compared with developed countries, particularly Japan, the establishment and operation of such systems were not yet sufficient, and there remained a significant gap relative to the environmental legislation and institutional frameworks of other developed nations. Among these areas, with respect to measures against environmental pollution centered on air pollution, the promotion of a green economy, social environmental management, and the environmental review system applied to foreign aid, the Chinese government strongly wished to learn from Japan's pioneering examples.[1] In the 1990s, Japan and China promoted technical cooperation in the environmental field, including capacity development for the Sino-Japan Friendship Center for Environmental Protection. The two countries' leaders had agreed that, in the future, environmental cooperation would be further promoted with the Center serving as a core base and partner. In addition, through the *11th Five-Year Plan for National Environmental Protection* (2006-2010), the Chinese government was undertaking various policy formulation efforts and activities related to the circular economy.[2] Both projects were implemented against this backdrop.

[1] Behind this situation was the fact that, although China had faced rapid economic growth accompanying its shift toward a market economy since the late 1970s, it had not yet been able to break away from an extensive pattern of economic development. Environmental problems became increasingly evident, and the relative scarcity of resources and the vulnerability of the ecological environment were recognized as major issues affecting China's growth. In addition, the country faced problems such as insufficient environmental consideration in corporate business activities, low public awareness of environmental protection, an underdeveloped industry for resource recycling, and inadequacies in waste management systems. It was therefore necessary to address these issues in a comprehensive manner.

[2] A circular economy refers to a set of activities aimed at "reduction, reuse, and recycling" throughout the processes of production, distribution, and consumption. Its objectives are to enhance resource-use efficiency, protect and improve the environment, and achieve sustainable development.

1.2 Project Outline

Overall Goal	<Promotion of Circular Economy> Circular-economy-related measures are promoted from the perspective of environmental conservation toward the realization of an environmentally friendly society with reduced pollutant emissions. <Project for Environment Friendly Society Building> The foundations necessary for building an environmentally friendly society are adopted as policy and utilized for institutional and legal development.
Project Purpose	<Promotion of Circular Economy> The capacity to implement various measures aimed at strengthening environmental considerations at each stage of material circulation (resource input, production, distribution, consumption, waste disposal, resource recovery, and final treatment, etc.) is enhanced in order to promote circular economy policies from the perspective of environmental conservation. <Project for Environment Friendly Society Building> The foundational framework for nationwide dissemination is established at the Sino-Japan Friendship Center for Environmental Protection to support the realization of an environmentally friendly society.
Outputs	<Promotion of Circular Economy>
	Subproject (Output[3]) 1: The capacity of environmental protection authorities is strengthened regarding the promotion of corporate environmental information disclosure through Corporate Environmental Information Disclosure Reports, the development of a Corporate Environmental Supervisor System, and the implementation of government green procurement.
	Subproject (Output) 2: A Japan-China Environmental Technology Information Plaza is established within the Sino-Japan Friendship Center for Environmental Protection, and the Center's capacity is strengthened to support the improvements of operations at environmental education bases nationwide, provide relevant information, and develop human resources for environmental education.
	Subproject (Output) 3: The capacity of the environmental protection authorities to formulate a national basic plan for the development of venous industry based eco-industrial parks is strengthened.
	Subproject (Output) 4: The capacity of the environmental protection authorities to improve waste management systems, particularly those related to industrial waste, is strengthened.
	Subproject (Output) 5: Japan-China cooperation to promote circular-economy policies from the perspective of environmental conservation is smoothly implemented.

[3] The relationship between subprojects and outputs is as follows. For both projects, multiple subprojects were planned, each with specific targets. The implementation of these subprojects resulted in the realization or achievement of outputs, and the assessment considers whether the accumulation of these outputs led to the achievement of the project purposes. Tables 1 and 2 summarize the status of the realization and achievement of each subproject (output).

Outputs	<Project for Environment Friendly Society Building> Subproject (Output) 1: Promote the building of an environmentally friendly society through the development of policies and legal systems and through cooperation on environmental pollution prevention technologies. Subproject (Output) 2: Promote the building of an environmentally friendly society through cooperation in developing foundations for environmental pollution control. Subproject (Output) 3: Promote the building of an environmentally friendly society through awareness raising, capacity development, and exchange activities for citizens, businesses, and local offices of the Ministry of Ecology and Environment.
Total cost (Japanese Side)	<Promotion of Circular Economy> 516 million yen <Project for Environment Friendly Society Building> 897 million yen
Period of Cooperation	<Promotion of Circular Economy> October 2008-October 2013 <Project for Environment Friendly Society Building> April 2016-December 2021 (of which the extended period: April-December 2021)
Target Area	<Promotion of Circular Economy> Beijing Municipality; target cities of Subproject (Output) 3 (venous industry based eco-industrial parks development plan): Shenyang City, Suzhou City, and Linyi City; etc. <Project for Environment Friendly Society Building> Beijing Municipality; nationwide
Implementing Agency	<Promotion of Circular Economy> Ministry of Environmental Protection; Sino-Japan Friendship Center for Environmental Protection <Project for Environment Friendly Society Building> Ministry of Ecology and Environment;[4] Sino-Japan Friendship Center for Environmental Protection
Other Relevant Agencies/ Organizations	<Promotion of Circular Economy> Ministry of Finance; Government Procurement Center; etc. <Project for Environment Friendly Society Building> From the mid-stage of the project, the School of Environment at Tsinghua University participated as a cooperating organization in the activities under Subproject 1, Output 1 (Air Pollution Monitoring and Analysis).
Organizations in Japan	<Promotion of Circular Economy> Ministry of the Environment; Ministry of Economy, Trade and Industry <Project for Environment Friendly Society Building> Ministry of the Environment; local governments (e.g., Kitakyushu City); National Institute for Environmental Studies; related project organizations and research institutes (e.g., Kawasaki Environment Research Institute)

[4] The Ministry of Environmental Protection was reorganized as the Ministry of Ecology and Environment in 2018.

Related Projects	[Technical Cooperation Projects] - "Sino-Japan Friendship Center for Environmental Protection Project" (1992-1995) - "Sino-Japan Friendship Center for Environmental Protection Project Phase II" (1996-2001; follow-up 2001-2002) - "Sino-Japan Friendship Center for Environmental Protection Project Phase III" (2002-2008) - "Promotion of Circular Economy Development (Dispatch of Individual Experts)" (2006-2008) - "Training for Promotion of Sound Material-Cycle Society (Country-focused Training)" (2006-2008) - "Policies, Strategies, and Practices for Promoting Circular Economy Development (In-country Training)" (2006-2008) - "Project for Promotion of Urban Waste Recycling" (2010-2015) [Grant Aid Projects] - "Sino-Japan Friendship Center for Environmental Protection Establishment Plan" (1990) [Other International Organizations and Donor Agencies] - In Phase 6 (2017-2021) of the "China Council for International Cooperation on Environment and Development (CCICED)," an environmental policy dialogue framework between the Chinese government and donors, participants included the European Union (EU), United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), Asian Development Bank (ADB), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the governments of Canada, the Netherlands, and Norway, the World Resources Institute (WRI), among others. - Ministry of the Environment, Japan: "Japan-China City-to-City Collaboration Project" (2014-2018)

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement Status of Project Purpose at the Terminal Evaluation

<Promotion of Circular Economy> (Terminal evaluation conducted from June to July 2013)

With regard to Subproject (Output) 2, Indicator 2-2, the construction of the Japan-China Environmental Technology Information Plaza had not been achieved at the time of the terminal evaluation but was completed in July 2015. All other indicators were achieved by the end of the project. Based on the achievement of each output, the project purpose was considered to have been accomplished.

<Project for Environment Friendly Society Building> (Terminal evaluation conducted from October 2021 to January 2022)

In order to realize the building of an environment-friendly society, a foundation for nationwide dissemination of initiatives has been established at the Sino-Japan Friendship Center for Environmental Protection. Therefore, the project purpose was considered to have been achieved.

1.3.2 Achievement Status of Overall Goal at the Terminal Evaluation (Including other impacts.)

<Promotion of Circular Economy>

Progress necessary for realizing the overall goal had been observed, and it was considered that the overall goal would be achieved through appropriate actions taken by the Ministry of Environmental Protection (Currently, Ministry of Ecology and Environment) and other relevant organizations in the future.

<Project for Environment Friendly Society Building>

The project's outputs are expected to be utilized to some extent for policy formulation and institutional/legal development at both the central and local government levels in the future. The overall goal was considered likely to be achieved.

1.3.3 Recommendations from the Terminal Evaluation

<Promotion of Circular Economy>

Regarding the unachieved construction of the Japan-China Environmental Technology Information Plaza under Subproject (Output) 2, it was recommended that the Chinese side take necessary actions toward relevant organizations. It was also recommended that the Sino-Japan Friendship Center for Environmental Protection continue to function as a platform for Japan-China environmental cooperation. (Reflecting this recommendation, the Japan-China Environmental Technology Information Plaza was completed in July 2015.)

<Project for Environment Friendly Society Building>

To promote policy adoption and institutional/legal development at both central and local levels, it was recommended that the Ministry of Ecology and Environment (MEE) and the Sino-Japan Friendship Center for Environmental Protection make use of the outputs derived from the project's activities and the networks established with central and local government officials who participated in training in Japan. Furthermore, regarding air pollution control, it was recommended that the National Center for Environmental Analysis and Testing take the lead in advancing research together with Tsinghua University and relevant experts so as to contribute to concrete policy recommendations. In addition, with respect to Japan-China environmental cooperation, it was recommended that the two countries continue their cooperative relationship even after project completion.

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Octavia Japan, Co., Ltd.

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: November 2025-February 2026
Duration of the Field Study: May 25-June 7, 2025, September 6-11, 2025

2.3 Constraints During the Evaluation Study

With regard to the "Relevance," "Coherence," and "Efficiency" of this ex-post evaluation, confirmation and assessment were conducted primarily based on the respective levels of achievement of each project at the time of completion. "Effectiveness" was assessed by examining the achievement status of the output indicators and the project purpose of each project at the time of completion. "Impact" was appraised by confirming and evaluating the achievement status of the overall goal of both projects at the time of the ex-post evaluation. Concerning "Sustainability," assessment was carried out mainly based on information and data related to the "Project for Environment Friendly Society Building," which was implemented after the "Promotion of Circular Economy," focusing on the situation after the terminal evaluation.

3. Results of the Evaluation (Overall Rating: A[5])

3.1 Relevance/Coherence (Rating: ③[6])

3.1.1 Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of China

At the time of the ex-ante evaluation of the "Promotion of Circular Economy," the Chinese government formulated the *11th Five-Year Plan* (2006-2010), with the objective of building a resource-conserving and environment-friendly society. Specifically, the plan gave priority to resource conservation and aimed to establish a system of circular resource utilization across all stages including resource extraction, production, consumption, and disposal, in accordance with the principles of reduction, reuse, and recycling. Furthermore, the government promulgated the *11th National Environmental Protection Five-Year Plan* in 2007, which explicitly stated the promotion of various measures related to the development of a circular economy. At the time of the ex-ante evaluation of the "Project for Environment Friendly Society Building," the *18th National Congress of the Communist Party of China* held in November 2012 positioned *Ecological Civilization Construction*, aimed at creating an environmentally harmonious society, as a national top priority on par with sustainable economic growth.

Meanwhile, at the completion of the "Promotion of Circular Economy" in 2013 and at the completion of the "Project for Environment Friendly Society Building" in 2021, the promotion of the circular economy and the advancement of an environment-friendly society continued to be regarded as important policy priorities. All subprojects (outputs) established under both projects were recognized by the Chinese side as priority areas for promoting the circular economy

[5] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[6] ④: Very High, ③: High, ②: Moderately Low, ①: Low

throughout the periods from project commencement through completion.

Moreover, in the 13th *Five-Year Plan for Ecological Environmental Protection*, formulated based on the *Outline of the 13th Five-Year Plan for National Economic and Social Development of the People's Republic of China* (2016–2020), the government emphasized and strengthened ecological environmental protection initiatives and declared a "war on pollution," clearly stipulating the promotion of countermeasures against air, water, and soil pollution. In addition, the government formulated the *14th Five-Year Plan for the Development of the Circular Economy* (2021-2025) in 2021, positioning the development of the circular economy as essential to national resource security and to the realization of carbon neutrality.

Based on the above, it can be concluded that both projects, which aimed at promoting the circular economy and strengthening environmental protection, were fully consistent with national development policies throughout the period from their initiation to completion. Accordingly, both projects are assessed as being aligned with China's national development policies.

3.1.1.2 Consistency with the Development Needs of China

At the time of the ex-ante evaluation of the "Promotion of Circular Economy" project, the *11th Five-Year National Environmental Protection Plan* (2006-2010) had been formulated, and progress in various policies related to the circular economy was anticipated. In the context of insufficient environmental consideration in corporate activities, low public environmental awareness, the absence of an established recycling industry, and inadequate waste management systems, expectations were rising for the implementation of these policies. At the time of the ex-ante evaluation of the "Project for Environment Friendly Society Building" (2016), the Chinese government also expressed its intention to learn from Japan's pioneering experience in areas such as measures against environmental pollution, particularly air pollution, promotion of the green economy, social environmental management, and environmental screening systems for international aid.

At the time of completion of both projects, the Chinese government continued to actively pursue legislation and policy implementation aimed at addressing environmental issues. This approach was driven by the fact that rapid economic growth had accelerated industrialization and urbanization, resulting in year-on-year increases in environmental burdens, such as greater emissions of air pollutants and CO_2, and deteriorating water quality due to industrial and domestic wastewater. In China, environmental problems are recognized not only as threats to public safety but also as factors that hinder stable economic growth, and thus promoting environmental protection is regarded as one of the nation's highest priorities.[7]

[7] In addition, through both projects, a mechanism for Japan-China High-Level Environmental Dialogue was established and gradually institutionalized. As one example, the Sino-Japan Friendship Center for Environmental Protection, in collaboration with JICA, opened new channels through the Japan-China High-Level Environmental

In light of the above, all subprojects (outputs) of both projects align with the efforts prioritized by the Chinese government and the implementing agencies to promote the circular economy and advance environmental legislation and institutionalization. They can be judged to have maintained consistency from project inception through completion. Accordingly, the coherence with the development needs is high.

3.1.1.3 Appropriateness of the Project Plan and Approach

Through interviews with and questionnaire surveys addressed to the Sino-Japan Friendship Center for Environmental Protection, it was confirmed that the plans of both projects as well as their policies and approaches were appropriately planned and designed, and that efforts toward the realization of effects and the securing of fairness were ensured. As an example, activities under Subproject (Output) 2, Indicator 2-2 of the "Project for Environment Friendly Society Building" were discontinued. With regard to this matter, the Sino-Japan Friendship Center for Environmental Protection stated that, "as a result of close discussions between the Center's project team and the Japanese experts, both sides confirmed that the national circumstances of China and Japan differ and that the related mechanisms do not exist in Japan; accordingly, the activities were terminated while continuing exchanges of views." It was established that this decision did not constitute a factor that hindered project effectiveness and that the judgment to discontinue the activities was appropriate. In addition, it was also affirmed that lessons learned from past similar and related projects, such as ensuring sufficient consultation and agreement in advance on the cooperation framework (including activity contents, division of roles, and cost-sharing arrangements) and confirming staffing arrangements, task assignments, and budget measures prior to the start of cooperation, were applied in the implementation of this project and that this contributed to preventing any negative impact on project progress.

3.1.2 Coherence (Rating:②)

3.1.2.1 Consistency with Japan's ODA Policy

Japan's cooperation in the environmental sector with China was initiated in 1988, marking the 10th anniversary of the *Treaty of Peace and Friendship between Japan and China*, when then Prime Minister Takeshita visited China and held talks with Premier Li Peng, during which the construction of a center facility to serve as a base for environmental cooperation was discussed under grant aid. As a result, the Sino-Japan Friendship Center for Environmental Protection was constructed in 1996. Around the same period, technical cooperation projects aimed at human resource development were launched. With the Sino-Japan Friendship Center for Environmental

Dialogue (2017-2019, First to Third Dialogue), thereby advancing efforts related to environmental cooperation both within China and internationally. This indicates that, under both projects, discussions and initiatives were undertaken to develop frameworks that contribute to addressing environmental issues.

Protection serving as the counterpart organization and the hub of Japan-China environmental cooperation, efforts to address bilateral environmental policy issues, including air pollution, commenced. Subsequently, based on the *3R Initiative*[8] proposed by then Prime Minister Koizumi at the 2004 G8 Summit, Japan undertook cooperation primarily targeting East Asia to promote the establishment of an international sound material-cycle society. In Japan-China cooperation, the environmental sector was positioned as one of the six priority areas under the *Economic Cooperation Program toward China* (2001). Furthermore, in the *Joint Statement on Further Strengthening of Environmental Protection Cooperation* and the *Joint Communiqué on Promoting Cooperation in the Environment and Energy Fields* (both in 2007), agreements were reached between the prime ministers of the two countries on issues such as "active promotion of the concept of a circular economy," "enhancement of public environmental awareness," "the Center's role as a contact point and bridge for Japan-China environmental cooperation," "implementation of training programs for a total of 10,000 personnel in the environment and energy fields over three years beginning in 2008," "establishment of the Japan-China Environmental Technology Information Plaza," and "promotion of the Corporate Environmental Supervisor System."

Both projects aimed to strengthen the capacity for implementing various measures to enhance environmental considerations throughout each stage of the material circulation process (resource input, production, distribution, consumption, disposal, recycling, final treatment, etc.), and, with the Sino-Japan Friendship Center for Environmental Protection as the core institution, to develop an implementation platform for achieving an environment-friendly society. Accordingly, the projects are considered to be consistent with Japan's development assistance policies.

3.1.2.2 Internal Coherence

Prior to the commencement of both projects, JICA had implemented several cooperation schemes with the "Sino-Japan Friendship Center for Environmental Protection Project," including the technical cooperation projects "Sino-Japan Friendship Center for Environmental Protection Project" (1992-1995), "Sino-Japan Friendship Center for Environmental Protection Project Phase II" (1996-2002), and "Sino-Japan Friendship Center for Environmental Protection Project Phase III" (2002-2008), as well as "Promotion of Circular Economy Development (Dispatch of Individual Experts)" (2006-2008), "Training on Promotion of a Sound Material-Cycle Society (Country-focused Training)" (2006-2008), and "Policies, Strategies and Practices for Promoting Circular Economy (In-country Training)" (2006-2008). In addition, the grant aid project "Sino-Japan Friendship Center for Environmental Protection Establishment Plan" (1990-1996) had also been implemented. However, the implementation periods of these projects did not overlap with

[8] Initiatives based on the "3Rs" that seek to achieve the coexistence of environmental protection and economic development through the effective use of resources, namely *reduce* (waste generation reduction), *reuse* (reuse), and *recycle* (recycling).

those of both projects covered by this evaluation. Moreover, all new approvals of Japan's ODA to China were concluded by FY2018, and there were no ongoing projects thereafter. Accordingly, there was no operational linkage among the projects, and it can be said that no mechanism existed to generate synergy between them.[9]

3.1.2.3 External Coherence

Before the implementation of the "Promotion of Circular Economy," the World Bank and the German Agency for Technical Cooperation (GTZ) had been supporting the Chinese government in developing legal and institutional frameworks related to the circular economy. The United Nations Development Programme (UNDP) had also supported environmental awareness-raising and the development of public communication materials through media. However, as these initiatives did not overlap in period with this project, which aimed at strengthening environmental education bases and human resource development, no synergy effects were observed.

Regarding the "Project for Environment Friendly Society Building," several international donors and organizations—including the European Union (EU), the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP), the Asian Development Bank (ADB), the German Agency for International Cooperation (GIZ), and the governments of Canada, the Netherlands, and Norway, as well as the World Resources Institute (WRI)—participated in Phase VI (2017-2021) of the China Council for International Cooperation on Environment and Development (CCICED). Nevertheless, no concrete collaboration or synergy effects were identified between this project and the CCICED's initiatives.

Regarding the alignment with international frameworks, both projects aimed to promote circular economy measures by strengthening the implementation capacity of various policies for enhanced environmental consideration at each stage of material circulation (resource input, production, distribution, consumption, disposal, recycling, and final treatment, etc.), and by contributing to the development of implementation platforms and realization of related policies for building an environment-friendly society. From this perspective, the projects are consistent with the SDGs, including "11. Sustainable Cities and Communities," "12. Responsible Consumption and Production," and "13. Climate Action." On the other hand, it was confirmed that there were no instances of specific coordination or collaboration with other international aid donors, nor any cases in which synergistic effects were generated.

Both projects were found to be "consistent with the development plan" and "consistent with

[9] During the same period as both projects, additional technical cooperation projects were implemented, including the "Project on Legal Development for Improvement of Market Economy and People's Wellbeing" (2014-2020) and the "Project for Promotion of Municipal Solid Waste Recycling" (2010-2015). Although these projects involved different counterpart organizations, the Sino-Japan Friendship Center for Environmental Protection confirmed that no particular cases of synergy or joint effects were generated among these initiatives.

the development needs" of China. They were also aligned with Japan's ODA policy. No concrete collaboration or synergy effects were identified with other JICA projects, donor initiatives, or broader international frameworks such as the SDGs. Therefore, its relevance and coherence are high.

3.2 Effectiveness and Impacts[10] (Rating:③)

3.2.1 Effectiveness

3.2.1.1 (Project Output)

Tables 1 and 2 show the level of achievement for the indicators set for each subproject (output). These tables provide the basis for assessing the achievement of the project purpose for both projects. At the time of project completion, the outputs were generally achieved as described below. Notably, any outputs for which there were significant changes in circumstances are explained in notes below each table.

Table 1: Subproject (Output) Indicators and Achievement at Project Completion for the "Promotion of Circular Economy"

Subproject (Output) 1: The capacity of environmental protection authorities is strengthened regarding the promotion of corporate environmental information disclosure through Corporate Environmental Information Disclosure Reports, the development of a Corporate Environmental Supervisor System, and the implementation of government green procurement.	
(Indicator 1-1) Draft guidelines for Corporate Environmental Information Disclosure Reports are submitted to the Ministry of Environmental Protection and widely recognized.	(Indicator achievement status: Achieved) Guidelines for Corporate Environmental Information Disclosure Reports (covering all enterprises) were drafted. It was promulgated in June 2011 as the *Guidelines for the Preparation of Corporate Environmental Reports* and implemented in October of the same year. Additionally, the *Environmental Information Guidelines for Listed Companies* (applicable to newly listed companies and those undertaking capital increases), which were designed for a more specific subset of companies, were also developed. A pilot program was conducted with one model company, and the results were compiled into a report.
(Indicator 1-2) The implementation of the Corporate Environmental Supervisor System is decided by the Ministry of Environmental Protection.	(Indicator achievement status: Achieved) All necessary materials for implementing the Corporate Environmental Supervisor System, such as (i) standard textbooks, (ii) exam/training manuals and question banks, and (iii) implementation manuals, were completed. Using these developed materials and systems, 42 trial trainings were conducted between FY2008 and FY2010, attended by a total of 6,678 participants, including environmental administration staff and representatives of key national and provincial polluting enterprises. Measures toward national certification, such as feasibility studies and interim regulations, were also developed.
(Indicator 1-3) The Ministry of Environmental Protection approves technical support plans for government green procurement, methods	(Indicator achievement status: Achieved) A "promotion plan" was developed at the start of cooperation to confirm procedures and approaches with both Chinese and Japanese sides. China compiled four reports: (i) a report on the legislative feasibility of government green procurement, (ii) a report on green procurement environmental performance of typical products, (iii) a technical support plan for government green procurement, and (iv) a survey report on government green procurement.

[10] When providing the sub-rating, Effectiveness and Impacts are to be considered together.

for evaluating their effectiveness, and a technical report on the legislative feasibility of government green procurement.	
Subproject (Output) 2: A Japan-China Environmental Technology Information Plaza is established within the Sino-Japan Friendship Center for Environmental Protection, and the Center's capacity is strengthened to support the improvements of operations at environmental education bases nationwide, provide relevant information, and develop human resources for environmental education.	
(Indicator 2-1) Evaluation indicator system and operational guidelines for environmental education bases are utilized by the Ministry of Environmental Protection.	(Indicator achievement status: Achieved) Based on nationwide data surveys of environmental education bases and the results of training programs in Japan, an evaluation indicator system and operational guidelines were developed. With regard to the appropriate form of the evaluation indicators, the Chinese side, including the Ministry of Environmental Protection, agreed to work on developing a draft evaluation indicator system, and from 2011 onward, activities were undertaken in accordance with that agreement. As a result, in September 2012, the Ministry of Environmental Protection and the Ministry of Education issued a "Notice on the Establishment of Environmental Education Social Practice Bases for Primary and Lower Secondary Schools," and applications were accepted for national-level base designation. Approximately 200 facilities applied, and, with the Sino-Japan Friendship Center for Environmental Protection taking the lead, a selection was conducted using the evaluation indicator system, resulting in 80 facilities being approved as national-level bases.
(Indicator 2-2) The Japan-China Environmental Technology Information Plaza Environmental Education Base is widely recognized as a model.	(Indicator achievement status: At the time of project completion, it had been partially achieved. Meanwhile, the Japan-China Environmental Technology Information Plaza was steadily progressing toward opening) The design plan for the Japan-China Environmental Technology Information Plaza is under review by the Sino-Japan Friendship Center for Environmental Protection and the Ministry of Environmental Protection. However, by the end of the "Promotion of Circular Economy," the Plaza had not been completed. At the time of the terminal evaluation, the design plan had been approved. Meanwhile, with respect to environmental education interpretation/explanation and human resource development, regarding the development of environmental education teaching materials and programs, and the formulation of non-governmental organization (NGO)/volunteer training plans, guidance on the content was provided through training in Japan and the dispatch of short-term experts. Environmental interpretation volunteer training related to the operation of the Plaza was conducted a total of 10 times, and the training of approximately 50 volunteers progressed smoothly.
(Indicator 2-3) The Center is highly regarded as an institution for providing information and developing human resources for environmental education bases nationwide.	(Indicator achievement status: Achieved) A website open to the general public was launched, providing introductions of environmental education facilities nationwide, data on environmental-related personnel nationwide, activities, and the latest news, and cooperating organizations and forms of cooperation. Through environmental education seminars (nine in total) and other activities, human resource development and information provision were provided to policymakers related to environmental education and to personnel of environmental education facilities in local areas, and the number of training participants exceeded 1,000. This initiative was highly regarded by local environmental administration departments and personnel of environmental education bases.
Subproject (Output) 3: The capacity of the environmental protection authorities to formulate a national basic plan for the development of venous industry-based eco-industrial parks is strengthened.	

(Indicator 3-1) The Basic Concept Plan is used by the Ministry of Environmental Protection in policy formulation and in review and approval procedures concerning eco-industrial parks.	(Indicator achievement status: Achieved) The Chinese side drafted the *National Basic Concept Plan for the Development of Eco-Industrial Parks of the Venous Industry Category*. The plan fully corresponded to the Ministry of Environmental Protection's need for the collection and organization of information serving as the policy basis for economically and institutionally rational development of venous industry-based eco-industrial parks, and it was subsequently utilized in policy formulation and in the review and approval processes.
(Indicator 3-2) The *Guidelines for the Development of Venous Industry-based Eco-industrial Parks* are approved by the Ministry of Environmental Protection and become available for use by local governments and other relevant stakeholders.	(Indicator achievement status: Achieved) Based on surveys conducted in the subproject target cities (Shenyang, Linyi, and Suzhou) and on the results of domestic information collection, the following were formulated: (1) *Eco-industrial Park Development Plan for Venous Industries* (for the target cities), (2) *Guidelines for the Development of Venous Industry-Based Eco-industrial Parks*, and (3) an inventory of environmental technologies and resource recycling technologies together with re-engineering proposals. The Sino-Japan Friendship Center for Environmental Protection and the Ministry of Environmental Protection gave high praise to these outputs, stating that "because central-level policies and institutional frameworks were thoroughly examined and Japan's experience was comprehensively summarized, the outcomes are highly reliable." For the purpose of widely disseminating the compiled results and related technologies, three seminars were held, with a total of 270 participants mainly from local governments. These activities contributed to enhancing and raising the capacity of local government officials.
Subproject (Output) 4: The capacity of the environmental protection authorities to improve waste management systems, particularly those related to industrial waste, is strengthened.	
(Indicator 4-1) A proposal for improvements to the classification standards and the management and treatment methods for solid waste is submitted to the Ministry of Environmental Protection.	(Indicator achievement status: Achieved) Through lectures, discussions, and site visits to Japan conducted jointly by Japanese and Chinese experts, information was provided to support the development of China's technology policies on hazardous waste, electronic waste, and related areas. As various issues requiring countermeasures emerged successively in China, the scope of solid waste covered by the cooperation was expanded. Based on this, the following were formulated: (1) classification standards for solid waste, (2) a proposal for improving solid waste management and treatment methods, (3) a research report on Japan's waste management systems, (4) a research for developing a solid waste management information system, (5) a preliminary research for preparing a hazardous waste pollution prevention plan, (6) a research on solid waste classification systems based on environmental management, and (7) a research on historical documents on hazardous waste pollution prevention and experiences domestically and internationally. These policy recommendations were submitted to the Ministry of Environmental Protection.
(Indicator 4-2) The standard method for simplified dioxin measurement and the guidelines for the use of measurement results are approved by the Ministry of Environmental Protection.	(Indicator achievement status: Achieved) Regarding the establishment of a standard method for simplified dioxin measurement, after comparing and examining the characteristics and advantages and disadvantages of various simplified measurement methods, studies were conducted on simplifying sample collection, pre-treatment methods for samples used in verification tests, rapid methods using bioassay techniques, item-by-item evaluation of the examination contents, improvement of quality control, and the preparation of manuals for simplified dioxin measurement. In addition, new technology transfer was carried out, including analytical methods for new types of persistent organic pollutants (POPs) centered on cell-based analytical techniques. Simplified dioxin measurement methods were also included as a cooperation target. The related manuals and guidelines were submitted to the Ministry of Environmental Protection in May 2013 together with laboratory management guidelines, and were approved.

Subproject (Output) 5: Japan-China cooperation to promote circular economy policies from the perspective of environmental conservation is smoothly implemented.	
(Indicator 5-1) The number of Japan-China environmental cooperation activities involved and their results.	(Indicator achievement status: Achieved) Although specific numbers regarding environmental cooperation are not indicated, a wide range of activities have been carried out as environmental cooperation, including participation in seminars, hosting visitors to the Center, providing indirect support for Japan-China policy dialogues, and collaborating with other projects.
(Indicator 5-2) Evaluation by relevant Japanese and Chinese institutions.	(Indicator achievement status: Achieved) Activities have been implemented to indirectly support the promotion of Japan-China cooperation within the scope of the "circular economy." Numerous inquiries have been received from external organizations in both countries, and responses have exceeded initial expectations. As various activities have been undertaken and the Center has fulfilled its role as a platform for Japan-China environmental cooperation, it is inferred that evaluations by relevant institutions are high.

Source: JICA-provided materials, questionnaire, and interviews

Regarding Subproject (Output) 2: Indicator 2-2 in Table 1, the Japan-China Environmental Technology Information Plaza had not been completed at the time of project completion. Although the actual work involved construction, a longer construction period had been anticipated from the outset of the project, as the process required time for budget approval procedures, design, bidding, coordination among relevant Chinese authorities, and approval processes. The facility was finished after project completion, in July 2015, and was opened to the public.

With respect to Subproject (Output) 3: Indicators 3-1 and 3-2, it was confirmed through the questionnaire and interviews that, under the "Promotion of Circular Economy," Japanese cases and experiences had been incorporated in each model region, contributing to the formation of industrial parks, and that the capacity of the environmental protection authorities had been strengthened. In this study, Shenyang City was visited to confirm the current situation. In the city, full-scale development of the venous industry-based eco-industrial parks began in 2010. Over the following approximately 10 years, the city developed the largest environmental industry base (venous industry) in Northeast China. In 2015, a total of 296 million yuan was invested to complete a large-scale industrial park. Cutting-edge systems, including blockchain-based traceability, have been introduced, enabling monitoring of the entire process of solid-waste generation, transportation, treatment, and recycling. Subsequently, companies engaged in recycling and related operations from both within and outside Shenyang have entered the industrial park, leading to the construction of an environmental industry base. A waste tire treatment facility is scheduled for completion at the end of December 2025, and the scale of the industrial zone continues to expand. This progress aligns with Shenyang's "Zero-Waste City Management Platform" and is considered important in the city's *14th Five-Year Plan* (2021-2025).

According to the city, the results of the "Promotion of Circular Economy" contributed to the formulation of these plans and related policies.[11]



Photo 1: View inside the Eco-Industrial Park for Venous Industries (1) (Shenyang suburban area)



Photo 2: View inside the Eco-Industrial Park for Venous Industries (2) (model of a recycling company, outskirts of Shenyang City)

Table 2: Subproject (Output) Indicators and Achievement at Project Completion for the "Project for Environment Friendly Society Building"

Subproject (Output) 1: Promote the building of an environmentally friendly society through the development of policies and legal systems and through cooperation on environmental pollution prevention technologies.	
(Indicator 1-1) The establishment and enhancement of monitoring, analysis, and evaluation capacity regarding air pollution, and the promotion of research on air	(Indicator achievement status: Achieved) (i) Studies and research, (ii) seminars and on-site training, and (iii) training in Japan were implemented. The matrix-assisted laser desorption/ionization time-of-flight mass spectrometer[12] (hereinafter referred to as the "MALDI-TOF-MS") provided under the project was also utilized, and numerous study and research activities were carried out, including: "Joint analysis of PM2.5 organic components with Tsinghua University and Kimoto Electric Co., Ltd.," "Air pollution analysis and related studies using samples," and "Study on the

[11] For the other model regions, confirmation was obtained through the questionnaire and interviews. The situation is as follows. In Linyi City, the Linyi Ecological Circular Industrial Park was constructed in 2013. The treatment of solid waste, including household waste, municipal sludge, and dead livestock and poultry, was streamlined. In 2017, the industrial park was certified as a National Resource Recycling Base and became one of the nine national model cases for ecological solid-waste treatment within circular economy industrial parks. The park is included in the "Linyi City 14th Five-Year Plan" (2021-2025) for circular economy development, which sets a goal of establishing a resource recycling system covering the entire city by the end of 2025. In particular, the city has expressed a policy focus on promoting and strengthening a diversified energy system combining "waste-to-energy incineration + heat supply + industrial steam supply." According to the city, the outcomes of the "Promotion of Circular Economy" contributed to the formulation of the above circular economy development plan and other related policies. In Suzhou City, in 2013, the Wuzhong Venous Industry Park was approved as the first venous industry eco-district in Jiangsu Province, where Suzhou is located. A full-process traceability system for solid waste was established, and the park was integrated with the city's "General Industrial Solid Waste Management System," enabling networking among waste-generating enterprises, logistics companies, and the industrial park. In 2019, the city formulated the "Suzhou Venous Industrial Park Detailed Management Plan," envisioning an ecological zone integrating venous industries (waste-to-energy incineration, solid-waste recycling), environmental restoration (eco-green spaces and a botanical garden), and circular economy science education. According to the city, the outcomes of the project were applied to management and improvement within the industrial park and contributed to the formulation of the plan.

[12] A matrix (mainly an ionization-promoting compound) is mixed with the sample, and laser light is irradiated to ionize the sample. The time required for the ionized sample to travel a fixed distance is measured, and the molecular weight is determined by using the difference in flight time based on the mass differences.

environmental conservation policies, are advanced.	content of macromolecular organic matter and polycyclic aromatic hydrocarbons (PAHs) in PM2.5 in the atmosphere of Beijing," as well as "VOC measurement," "air pollution simulation," and "accuracy control, analysis of ozone-depleting substances (ODS) and new pollutants," among others. A large number of research meetings, technical exchange meetings, lectures, and seminars were conducted, including the "Japan-China Joint Research Meeting on Air Pollution Analysis." As a result, monitoring, analysis, and evaluation capacity for air pollution increased, and research on air environmental conservation policies progressed.
(Indicator 1-2) Research on water environmental conservation policies is promoted.	(Indicator achievement status: Achieved) (i) Seminars and on-site training and (ii) training in Japan were implemented. Information collection and research concerning water environmental conservation were conducted and compiled into numerous policy proposals and reports. These included specific content necessary for the establishment of water pollution prevention technology evaluation, such as the "Detailed Rules for Implementation of Evaluation Work." The "Detailed Rules" have been utilized within the Sino-Japan Friendship Center for Environmental Protection. These outcomes are expected to contribute to qualitative improvement in environmental pollution prevention in the future.
(Indicator 1-3) Proposals for promoting the management of solid waste (such as electronic waste and end-of-life vehicles) are made.	(Indicator achievement status: Achieved) (i) Seminars and on-site training and (ii) training in Japan were implemented. Training in Japan was conducted on themes such as "Learning and observing waste melting treatment in Japan" and "Advanced experiences in building a sound material-cycle society and in the reduction, recycling, and detoxification of various types of solid waste." Utilizing the training outcomes, the Solid Waste and Chemical Management Technology Center under Ministry of Ecology and Environment. improved the training content for electronic waste managers. There were 31 participants in training in Japan, and approximately 600 participants annually in the city-level and enterprise-level electronic waste manager training conducted in China. Policy proposals and reports based on research results were also prepared.
(Indicator 1-4) Research on environmental conservation management and technologies in rural residential areas is promoted.	(Indicator achievement status: Achieved) (i) Seminars and on-site training and (ii) training in Japan were implemented. Policy proposals and reports were prepared, actively incorporating Japanese experience. Based on the content and practical application of Japan's *Johkasou (on-site wastewater treatment system) Act*, the following were compiled: (1) a special report on scientific and orderly promotion of rural household wastewater treatment learned from Japan's *Johkasou Act*, (2) a Japan-China comparison of rural environmental management and implications for China, (3) strengthening the system through which the industry leads the advancement of standardized and professional responses to rural domestic wastewater, and (4) bottleneck elimination for long-term stable operation of septic tanks through the simultaneous implementation of multiple measures. In addition, the research report "Study on Rural Environmental Conservation Management under Rural Revitalization" was submitted to the Ministry of Ecology and Environment and received a high evaluation.
(Indicator 1-5) Research on environmental protection policies and legal systems that promote the building of an environment-friendly society is advanced.	(Indicator achievement status: Achieved) The policy proposal "Japan's Experience in Green Structural Transformation and Implications for China" was prepared, and research on environmental protection policy systems and legal systems progressed through the proposal.
Subproject (Output) 2: Promote the building of an environmentally friendly society through cooperation in developing foundations for environmental pollution control.	
(Indicator 2-1) The improvement of	(Indicator achievement status: Achieved) (i) Seminars and on-site training, and (ii) training in Japan were implemented.

corporate environmental management capacity is promoted through the study and dissemination of green supply chains (GSC).	Improvements were made in the technologies and methods related to the green supply chain (hereinafter "GSC"), and policy proposals and reports were prepared based on the research results. The reports also included the "Guidelines" and the "Detailed Rules for Implementation of Evaluation" for the practical introduction of GSC.
(Indicator 2-2) Research on the utilization status of the marketization of Chinese environmental technologies and on the related financing support systems is promoted.	(Indicator achievement status: Activities involving inputs were discontinued, and results were limited) (i) Studies and research, (ii) seminars and on-site training, and (iii) training in Japan were implemented. In the first half of the project, certain results were achieved, including the preparation of the report "Japan's Successful Experience in Change and Its Implications for China." However, the February 2019 Joint Coordination Committee confirmed that this was not a priority issue to be addressed under the "Project for Environment Friendly Society Building," and activities involving inputs were discontinued.
(Indicator 2-3) Proposals are made concerning approaches to environmental information disclosure that align with China's actual circumstances.	(Indicator achievement status: Activities involving inputs were discontinued, and results were limited) In 2018, training in Japan funded by the Chinese side was conducted. The training content included: (i) forecasting greenhouse gas emissions based on the AIM model[13], (ii) Japan's air pollution situation and forecasting system, and (iii) global-scale greenhouse gas observation, among others. In the first half of the project, some activities related to environmental information disclosure (training in Japan) were implemented. However, the February 2019 Joint Coordination Committee confirmed that this was not a priority issue to be addressed under the "Project for Environment Friendly Society Building," and activities involving inputs were discontinued.
Subproject (Output) 3: Promote the building of an environmentally friendly society through awareness-raising, capacity development, and exchange activities for citizens, businesses, and local offices of the Ministry of Ecology and Environment.	
(Indicator 3-1) Awareness of citizens and others regarding the environment is promoted.	(Indicator achievement status: Achieved) (i) Seminars and on-site training, and (ii) training in Japan were implemented. Under "seminars and on-site training," workshops were held for persons engaged in environmental education, such as environmental educators and staff of nature schools, who work in the field of environmental education. These workshops were held in Wuhan, Kunming, and Shenzhen, and included the introduction of Japan's current situation and case examples. Training in Japan included a program on the theme of "environmental education," and one long-term participant undertook study at the Graduate School of Environmental and Information Studies, Tokyo City University, where systematic learning of environmental information science and Japanese experience was conducted.
(Indicator 3-2) Proposals and pilot activities concerning the application of household eco-diagnostics are implemented.	(Indicator achievement status: Activities involving inputs were discontinued, and results were limited) Study and research activities were carried out. Specifically, some activities related to the realization of the application of household eco-diagnostics were implemented, such as surveys of household carbon emission data in six model cities including Hengshui and Xi'an. However, at the mid-term review and Joint Coordination Committee conducted in February 2019, it was confirmed that this was not a priority issue to be addressed under the "Project for Environment Friendly Society Building," and activities involving inputs were discontinued.

[13] Asia-Pacific Integrated Model. This refers to a computer simulation model used to analyze projections of greenhouse gas emissions resulting from social and economic activities, their accumulation, environmental changes such as temperature increases, and the impacts of climate change. (Source: National Institute for Environmental Studies.)

(Indicator 3-3) The environmental management capacity of local environmental protection officials, such as in air pollution prevention, is improved.	(Indicator achievement status: Achieved) (i) Seminars and on-site training, and (ii) training in Japan were implemented. Under "seminars and on-site training," meetings and seminars were held for local environmental protection officials, in which Japan's experiences in environmental conservation and pollution control were introduced. As part of the "training in Japan," senior local environmental protection officials visited Japanese local governments and associated facilities to observe ecological and environmental protection policies and exchange views with relevant stakeholders.
(Indicator 3-4) A network for environmental technology exchange between Japanese and Chinese companies is established.	(Indicator achievement status: Achieved) Through exchange meetings and seminars targeting business representatives, the promotion of technology exchange between Japanese and Chinese companies was advanced. Events included: (i) the Japan-China Soil Environmental Improvement Policy and Technology Exchange Meeting, and (ii) Japan-China Wastewater Treatment Technology Seminars (held in Guangzhou and Beijing). The Japan-China Soil Environmental Improvement Policy and Technology Exchange Meeting was attended by 120 participants from both countries, including representatives from governmental environmental departments, experts, and related enterprises, representing 40 companies, of which 17 were Japanese.

Source: JICA-provided materials, questionnaire, and interviews

Regarding Subproject (Output) 2: Indicator 2-2 in Table 2, when the project team of the Sino-Japan Friendship Center for Environmental Protection and the Japanese experts conducted detailed discussions after the start of the project, it became clear that, since there were few practical examples of the related mechanisms in Japan, it was highly likely that the sharing of knowledge and technologies with the Chinese side was unlikely to be realized. Furthermore, it was revealed that the situation in China and Japan regarding the market introduction of environmental technologies and the related financing guarantee systems (for example, financial activities that support activities leading to the reduction of environmental burdens, specifically green finance, such as investment in renewable energy, energy conservation, pollution control, and sustainable resource use, and the market introduction of such financial activities and related guarantee systems) was different, and therefore these practices were not applicable as references for the Chinese side. Both sides agreed to suspend this activity, and decided that, as necessary, the two sides would continue exchanging views.

Regarding Subproject (Output) 2: Indicator 2-3, while the Chinese side deepened its understanding of Japan's environmental information measures through the holding of meetings, due to the reorganization of the operational functions of the Sino-Japan Friendship Center for Environmental Protection, this field was no longer a priority area, and it was determined that its effectiveness would be limited. Both sides agreed to discontinue the activity while maintaining dialogue as needed.

Regarding Subproject (Output) 3: Indicator 3-2, cities such as Hengshui City and Xi'an City were selected as pilot cities, and surveys concerning household carbon emission data were conducted. Through this, it became clear that, in local cities, the active participation of

environmental protection departments, either governmental or grassroots organizations, was important. At the same time, it also became evident that, in local cities, the securing of funds for activities was a bottleneck, and that this could affect project implementation. As an alternative, the Publicity and Education Center of the Ministry of Ecology and Environment promoted the dissemination of household environmental protection diagnostic methods and provided policy guidance to local organizations to encourage residents to participate in low-carbon emission reduction activities. Then, at the time of the mid-term evaluation, it was concluded that this was not a priority issue, and the activity was discontinued.

Regarding these modifications and discontinuations, according to the Sino-Japan Friendship Center for Environmental Protection, "In light of the remarkable progress and changes in China's environmental field, after conducting sufficient consultation with the Japanese side, the adjustments were made appropriately based on the Chinese side's priorities, the necessity of cooperation, and the actual situation on the ground. Resources of Japanese experts were allocated rationally, allowing the project to fully demonstrate flexibility and proactiveness. It was realistic and meaningful for completing the original project purpose as planned." Therefore, it is judged that the appropriateness of project implementation was ensured, as both sides identified the needs and, when modifications were made, reached agreement each time.

3.2.1.2 Achievement of Project Purpose

Table 3 and Table 4 show the achievement status of the project purposes at the time of completion of both projects.

Table 3: Project Purpose Achievement Status for the "Promotion of Circular Economy"

Project Purpose	The capacity to implement various measures aimed at strengthening environmental considerations at each stage of material circulation (resource input, production, distribution, consumption, waste disposal, resource recovery, and final treatment, etc.) is enhanced in order to promote circular economy policies from the perspective of environmental conservation.
Indicators and Actual Results	Indicator 1: Promotion of environmentally responsible business practices (support for the implementation or strengthening of three institutional mechanisms that enhance environmental considerations in corporate business activities: the "Corporate Environmental Information Disclosure Reports," used for public disclosure of corporate environmental measures, the "Corporate Environmental Supervisors," who are responsible for voluntary environmental management within companies, and "Green Government Procurement," which promotes the production of environmentally friendly products through government purchasing).
	(Achievement status of Indicator 1: Largely achieved) With regard to the promotion of environmentally responsible business practices, all issues had been largely achieved at the time of the terminal evaluation.
	Indicator 2: Raising public awareness of the environment (establishment of the Japan-China Environmental Technology Information Plaza as a model for "environmental education bases" nationwide, and bases for environmental education intended to raise public awareness of the circular economy, together with the

	preparation of evaluation criteria and operation guidelines contributing to the improvement of base operations, provision of information through a database, and development of human resources engaged in environmental education).
	(Achievement status of Indicator 2: Partially achieved) Regarding the raising of public environmental awareness, at the time of the terminal evaluation the Japan-China Environmental Technology Information Plaza was still in the preparation stage, and therefore the project purpose was only partially achieved.
	Indicator 3: Promotion of the development of venous industry-based eco-industrial parks (formulation of a national concept clarifying how venous industry-based eco-industrial parks—industrial parks that serve as bases for recycling—should be located and developed across regions, and preparation of development guidelines indicating methods for developing each industrial park).
	(Achievement status of Indicator 3: Largely achieved) Regarding the promotion of the development of venous industry-based eco-industrial parks, the project purpose was substantively achieved at the time of the terminal evaluation.
	Indicator 4: Promotion of appropriate waste management (improvement of solid-waste classification standards that do not align with actual conditions, and establishment of simplified dioxin measurement methods enabling rapid identification of contamination in wide-area incinerators and soils).
	(Achievement status of Indicator 4: Largely achieved) Regarding the promotion of appropriate waste management, the project purpose has been largely achieved across all identified issues.
	Indicator 5: Promotion of Japan-China cooperation on the circular economy (based on the Center's role as a contact point for Japan-China environmental cooperation, implementation of Japan-China cooperation and ancillary support contributing to the promotion of the circular economy).
	(Achievement status of Indicator 5: Largely achieved) Regarding the promotion of Japan-China cooperation on the circular economy, the project purpose had been substantively achieved at the time of the terminal evaluation.

Source: JICA-provided materials (terminal evaluation report, etc.), questionnaire, and interviews

Regarding Table 3, through interviews and questionnaires with project stakeholders, it was confirmed that, at the time of completion, all indicators except Indicator 2) had been achieved. Although Indicator 2), "the establishment of the Japan-China Environmental Technology Information Plaza," had not yet commenced at the time of project completion, the facility was completed in July 2015 and opened to the public. Up to the time of the ex-post evaluation, the Plaza has served as a venue for exhibiting practical examples related to environmental protection technologies, introducing training programs, and providing opportunities to acquire knowledge related to environmental education from both Japan and China.[14] It is judged that the project purpose was achieved.

Table 4: Project Purpose Achievement Status for the "Project for Environment Friendly Society Building"

Project Purpose	The foundational framework for nationwide dissemination is established at the Sino-Japan Friendship Center for Environmental Protection to support the realization of

[14] As a result of this initiative, in 2016 the Plaza was awarded the title of "National Environmental Protection Science Popularization Base" by the former Ministry of Environmental Protection and the Ministry of Science and Technology. In 2018, it was further awarded the title of "National Primary and Secondary School Study and Practice Education Base" by the Ministry of Education.

	an environmentally friendly society.
Indicators and Actual Results	Indicator 1: Promotion of the building of an environment-friendly society through the development of policies and legal systems and cooperation on environmental pollution prevention technologies 1-1 Research on the establishment and improvement of monitoring, analysis, and assessment capacities related to air pollution, and on air environmental conservation policies, is promoted. 1-2 Research on water environmental conservation policies is promoted. 1-3 Proposals for promoting the management of solid waste (electronic waste, end-of-life vehicles, etc.) are made. 1-4 Research on environmental conservation policies in rural areas is promoted. 1-5 Research on environmental protection policy systems and legal systems that promote the building of an environment-friendly society is promoted.
	(Achievement status of Indicator 1: Largely achieved) The promotion of the building of an environment-friendly society through the development of policies and legal systems and cooperation on environmental pollution prevention technologies has progressed. With respect to Indicators 1-1 to 1-5, for example, the proposals concerning "rural domestic wastewater measures" were partially reflected in the formulation of the Ministry of Ecology and Environment's *Action Plan for the Campaign to Tackle Agricultural and Rural Pollution*. Examples in which policy proposals and reports formulated under the project served as reference for the development of policies and systems by the Ministry of Ecology and Environment include: "Formulation of policies and technical evaluation systems for China's water environmental management" and "Preparation of documents on solid waste measures in promoting zero-waste initiatives by the Ministry of Ecology and Environment." Examples in which assessment and improvement proposals related to environmental conservation measures were applied to environmental policy and project development include: exchanges and presentations on Japan's experiences concerning VOC measures and air pollution countermeasures received high evaluation from the Ministry of Ecology and Environment and played an active role in advancing China's VOC measures, and based on policy proposals related to water environmental conservation, an environmental pollution control company in an industrial park in Jiangxi Province implemented water environmental measures (introduction of comprehensive management methods), which produced significant improvements in water quality. As an example of the dissemination of environmental pollution prevention technologies, the equipment provided under the project was utilized, contributing to the establishment and subsequent dissemination of "comprehensive analysis and measurement methods for air pollutants" and "monitoring methods for ODS and HFCs in the atmosphere." The research results concerning environmental conservation management and technologies in rural residential areas were posted on the website "China Governance," and the number of accesses is large, indicating that they have been viewed and used by relevant stakeholders.
	Indicator 2: Promotion of the building of an environment-friendly society through cooperation in establishing the foundations for environmental pollution prevention 2-1 The enhancement of enterprises' capacities related to environmental management is promoted through research and dissemination of GSC. 2-2 Research on the utilization status of the marketization of Chinese environmental technologies and its related financial guarantee systems is promoted. 2-3 Proposals are made related to approaches to environmental information disclosure appropriate to China's circumstances.
	(Achievement status of Indicator 2: Although activities involving inputs were discontinued and achievements were limited, the project purpose related to some outputs was largely achieved) As stated above, activities related to Indicators 2-2 and 2-3 were discontinued. Regarding the achievement of the project purpose related to Indicator 2-1, the necessary tools for practically promoting GSC under the project, namely the *Guidelines for the Implementation of Corporate GSC Management* and the *Detailed Rules for the Evaluation of GSC Management*

	for Five Industries, were developed. Using these tools, GSC evaluations and improvement activities based on the evaluation results were implemented for 66 companies across five sectors (furniture, manufacturing, electronics, machinery, retail) in Dongguan City, Guangdong Province. Positive outcomes were observed, including improvements in environmental management, capacity enhancement among companies and stakeholders, and cost-reduction effects. Based on these achievements, other cities expressing interest in GSC have emerged, and the potential for the expansion of GSC has increased.
	Indicator 3: Promotion of the building of an environment-friendly society through awareness-raising, capacity development, and exchange activities among citizens, enterprises, and local offices of the Ministry of Ecology and Environment 3-1 Awareness-raising among citizens and others regarding the environment is promoted. 3-2 Proposals and pilot activities related to the application of household eco-diagnosis are conducted. 3-3 The environmental management capacity of local environmental protection officials, such as in air pollution prevention, is improved. 3-4 A network for environmental technology exchange between Japanese and Chinese enterprises is established. 3-5 Japan-China cooperation, such as environmental cooperation between Japanese and Chinese local governments and municipalities, promoting the building of an environment-friendly society, is smoothly implemented.
	(Achievement status of Indicator 3: Although activities involving inputs were discontinued and achievements were limited, the project purpose related to some outputs was largely achieved) As noted above, activities related to Indicator 3-2 were discontinued. Concerning the achievement of the project purpose for the other indicators, high-level Japan-China exchanges in the environmental field advanced through the Japan-China High-Level Environmental Roundtable and the 20th anniversary event of the Sino-Japan Friendship Center for Environmental Protection. A foundation for such exchanges was also established. Various teaching materials, such as the *Casebook of Environmental Education Bases* and books introducing Japan's environmental pollution countermeasure technologies, were prepared, creating tools for providing information to Chinese environmental stakeholders, as well as for environmental education and capacity building. A large number of local officials participated in training programs in Japan; human resource development was achieved through learning from Japan's experience. The development of Chinese environmental personnel, including high-level local officials, was realized, broadening understanding of Japanese environmental policies and technologies, which was of significant value. Regarding Japan-China corporate exchanges, improvements in the service content of the *National Eco-environmental Science and Technology Achievement Commercialization Service Platform* and the establishment of a Japanese-language version for Japanese companies led to increased interest among Japanese enterprises.

Source: JICA-provided materials (including the terminal evaluation report), questionnaire, and interviews

Regarding Table 4, through interviews and questionnaires with project stakeholders, it was confirmed that, although there were some results despite the termination of activities involving inputs, Indicators 1) through 3) were largely achieved at completion. Therefore, it is judged that the project purpose was achieved.

Based on the above, the project mostly achieved its purpose at the time of project completion.

3.2.2 Impacts

3.2.2.1 Achievement of Overall Goal

Tables 5 and 6 present the degree of achievement of the overall goals of both projects at the time of the ex-post evaluation.

Overall Goal of the Promotion of Circular Economy: Circular economy-related measures are promoted from the perspective of environmental conservation toward the realization of an environmentally friendly society with reduced pollutant emissions.

Table 5: Overall Goal Achievement Status for the Promotion of Circular Economy

Goal	Indicator	Achievement
Circular economy-related measures are promoted from the perspective of environmental conservation toward the realization of an environmentally friendly society with reduced pollutant emissions.	(Indicator 1) The number of Corporate Environmental Information Disclosure Reports prepared by companies increases significantly.	(Achievement status: High) Up to the time of the ex-post evaluation, the number of Corporate Environmental Information Disclosure Reports prepared by companies has continued to increase. A contributing factor is that the Ministry of Ecology and Environment (MEE) issued a notification in December 2021 concerning the administrative methods for corporate environmental communication, which helped institutionalize the preparation of such reports. As an example of achievements after the issuance of the notification, in 2022 a total of 1,675 listed companies (approximately 30% of all listed companies in China) prepared Corporate Environmental Information Disclosure Reports, an increase of 378 companies from the previous year. The Sino-Japan Friendship Center for Environmental Protection anticipates further increases.
	(Indicator 2) The Corporate Environmental Supervisor System is implemented.	(Achievement status: High) By the time of the ex-post evaluation, most pilot enterprises in China have already established the Corporate Environmental Supervisor System. They have clarified their environmental management systems and developed plans on corporate environmental protection and internal environmental management systems. Their capacity for environmental risk prevention and management, as well as awareness of environmental issues and related laws and regulations, has improved. The Sino-Japan Friendship Center for Environmental Protection is also engaged in research related to the standardization and institutionalization of environmental protection.
	(Indicator 3) The environmental impact-reduction effects of government green purchasing become evident, and the scale of procurement is expanded.	(Achievement status: High) From project completion to 2018, the Ministry of Finance and MEE jointly issued the "Government Procurement List of Environmental-Label Products", for several times. The environmental-label product procurement system contributes to CO_2 reduction, pollution reduction, green and low-carbon progress, and sustainable societal development. In February 2019, for the government procurement management system for environmental label products, the Ministry of Finance, National Development and Reform Commission, MEE, and State Administration for Market Regulation jointly replaced the product list system with the item-based management system and issued a notification to strengthen government green procurement. As a result, the scope of green procurement further expanded and its effectiveness increased. The number of

		environmental-label products eligible for government procurement increased from the initial 14 major categories to over 90 major categories as of 2025. The eligible product models have reached millions. More than 4,000 companies have been certified as government green procurement suppliers. Going forward, based on this procurement system, efforts will be made to enhance policy research, institutional design, and green procurement standards, contributing to the development of the green consumer market and achievement of the dual-carbon goals.[15]
	(Indicator 4) The human resources, facilities, and operations of environmental education bases are improved.	(Achievement status: High) In July 2015, after project completion, the Japan-China Environmental Technology Information Plaza was completed and opened to the public. The capacities of the staff of the Sino-Japan Friendship Center for Environmental Protection, environmental education volunteers, and personnel at regional environmental education bases were strengthened. The soft aspects of strengthening the basic functions of the environmental education hub, centered on the development of guidelines and databases, have been established, and the initial plans were achieved. Events marking key occasions, such as Science and Technology Week, World Environment Day (June 5), and National Science Popularization Day were also conducted.
	(Indicator 5) Appropriate siting and planning of venous industry-based eco-industrial parks are carried out.	(Achievement status: High) Regarding progress in venous industry-based eco-industrial parks, the policy for constructing "Zero-Waste Cities" was incorporated into the *14th Five-Year Plan* in 2021. Consequently, approximately 100 pilot cities are planned to be established by the end of 2025, aiming to reduce solid-waste generation at the source and promote resource utilization. The *14th Five-Year Plan* also explicitly promotes a "resource-circulation-based industrial system," targeting an increase in the comprehensive utilization rate of bulky waste to 60% by the end of 2025. Future plans include improving technologies within the eco-industrial parks (e.g., technological innovation, digitalization, integrated information-sharing platforms for whole-process management).
	(Indicator 6) Waste management is improved through the dissemination of the new waste classification standards.	(Achievement status: High) In January 2024, MEE issued the *Catalogue of Classification and Codes for Solid Waste*, for which the Sino-Japan Friendship Center for Environmental Protection provided operational support. Through industry studies and data collection, a "three-tier, five-category" classification framework for solid waste was established. Specifically, the names and codes of 34 secondary classifications and 221 tertiary classifications were clarified. Classification was conducted in accordance with two methods—by waste properties and by source—and basic information necessary for solid-waste management systems was organized. Solid-waste classification and coding were standardized nationwide. MEE and the Center plan to continue efforts toward the construction of zero-waste cities.
	(Indicator 7) The simplified dioxin analytical method	(Achievement status: High) By the time of the ex-post evaluation, new environmental standards had been formulated in China for enterprises, such as "screening of dioxins in fly ash" and "screening of dioxins in

[15] It aims to simultaneously reduce carbon dioxide emissions and achieve net-zero emissions.

	becomes widely disseminated.	soil." According to the Sino-Japan Friendship Center for Environmental Protection, in the near future the application of these methods will be expanded to dioxin screening in food and biological samples, along with the development of high-throughput, high-sensitivity, low-cost bioassay systems and humanized reporter-gene dioxin-based bioassay systems. The aim is to provide a technological foundation for environmental health risk assessment of dioxins.

Source: JICA materials (terminal evaluation reports, etc.), questionnaire, and interviews.

Overall Goal of the Project for Environment Friendly Society Building: The foundations necessary for building an environmentally friendly society are adopted as policy and utilized for institutional and legal development.

Table 6: Overall Goal Achievement Status for the "Environment Friendly Society Building"

Goal	Indicator	Achievement
The foundations necessary for building an environmentally friendly society are adopted as policy and utilized for institutional and legal development.	(Indicator 1) Status of policy adoption and institutional/legal application of the outputs produced under the project within the Ministry of Ecology and Environment and other central government bodies.	(Achievement status: High) Reflecting the content of the "Project for Environment Friendly Society Building," the Ministry of Ecology and Environment, among other central government bodies, formulated the *Guidelines for the Evaluation of Environmental Protection Technologies*. Preparatory work began during the implementation of the project, and the guidelines were published in December 2024. These guidelines set forth methods for water environment management, indicators for pollution reduction rates, and standards related to sewage and wastewater treatment in rural areas, thereby functioning as an environmental evaluation guideline. According to the Ministry of Ecology and Environment and the Center, they intend to continue working on the establishment of an environmental technology evaluation system, aligning it with international standards, and, as necessary, optimizing the guidelines while proceeding with policy formulation and legal and regulatory development.
	(Indicator 2) Utilization and implementation status of the outputs produced under the project among local governments in major Chinese cities, (policy adoption, institutional and legal formalization, and engagement by companies, citizens, and other stakeholders).	(Achievement status: High) In the *Opinions of the Central Committee of the Communist Party of China and the State Council on Accelerating the Comprehensive Green Transformation of Economic and Social Development*, issued in 2024, guidance is provided to increase the supply of green products [16] and to direct enterprises to implement green design, select green materials, conduct green manufacturing, adopt green packaging, implement green transportation, and recycle resources. Regarding green supply chain management, the Center commented that "it is shifting from a cost burden to a strategic asset. It is increasingly recognized as an important process for enterprises to reduce costs, avoid risks, expand markets, and gain consumer trust. Going forward, the 'greening' of supply chains will become a watershed that determines corporate competitiveness. Enterprises that actively engage in this

[16] This refers to products that make effective use of waste and other materials as resources, that meet certain standards in terms of quality and safety, and that are sufficiently considerate of the environment.

		transition will not only avoid compliance-related risks but also seize opportunities in emerging markets and lead changes within their industries." At the time of the ex-post evaluation, the Center was engaged, through participation in international seminars and on-site observations, in further improving technology evaluation methods and advancing the industrialization of environmental protection technologies as well as their alignment with international standards.

Source: JICA materials (terminal evaluation reports, etc.), questionnaire, and interviews

As shown in Tables 5 and 6, various policy measures, institutionalization efforts, and the establishment, utilization, and dissemination of implementation foundations were observed from the time of project completion through the ex-post evaluation. At the time of completion of both projects, the level of achievement of the overall goals was high. Accordingly, the effects and impacts of both projects materialized as envisaged, and the logic whereby the achievement of the outputs led to the achievement of the project purposes, and the achievement of the project purposes led to the attainment of the overall goals, can be considered appropriate. Based on the above, the project has achieved its overall goal.

3.2.2.2 Other Positive and Negative Impacts

1) Impacts on the Environment

As a technical cooperation project with characteristics that involve no significant adverse environmental impacts, the "Project for Environment Friendly Society Building" was classified as Category C under the *JICA Guidelines for Environmental and Social Considerations* (April 2010) at the time of appraisal.[17] In this survey, through questionnaires, interviews, and a review of existing project documents, it was confirmed that neither of both projects generated any negative environmental impacts.

2) Resettlement and Land Acquisition

Through the review of questionnaires, interviews, and existing documentation, it was confirmed that no resettlement or land acquisition occurred under either project.

3) Gender Equality, Marginalized People, Social Systems and Norms, People's Well-being and Human Rights

Through the questionnaire, interviews, and review of existing documents, no specific instances were identified in which both projects were directly affecting gender equality, people whose equal social participation is constrained, social systems or norms, people's well-being, or human rights. At the same time, as of the ex-post evaluation, China has been steadily developing a range of

[17] The category of "Promotion of Circular Economy" could not be confirmed from existing documents such as the ex-ante evaluation sheet, and therefore remains unknown.

systems related to the promotion of the circular economy as well as the standardization and institutionalization of environmental protection, and efforts toward realizing an environment-friendly society continue. These efforts and their advancement are considered to generate benefits broadly and equally for people (including the vulnerable), enterprises, and local industry and society. In other words, people and enterprises are likely to see an expansion in their choices related to their livelihoods, which in turn is expected to generate positive effects for well-being. Both projects are considered to have contributed to such improvements.

Before the start of the "Promotion of Circular Economy" (2008), it had been pointed out that "as many people engaged in waste collection and treatment are from rural areas or belong to low-income groups, it is necessary, in formulating development plans for venous industry-based eco-industrial parks (model regions), to take into account potential impacts on employment and working conditions arising from changes in existing waste collection and treatment processes and methods." Regarding the situation of low-income groups in the three subproject target cities (Shenyang, Linyi, and Suzhou), the questionnaire and interviews confirmed that, after project completion, waste collection and treatment processes in all three cities had undergone significant changes. Prior to 2008, landfilling was the mainstream disposal method, and frontline workers were often obliged to carry out waste disposal operations under harsh conditions, including exposure to methane gas generated underground and pervasive foul odors. At the time of the ex-post evaluation, waste treatment facilities have been developed in all of the industrial parks, and workers are no longer exposed to offensive odors or methane gas. It was confirmed that workers' safety is secured and that waste is being processed steadily and appropriately.

4) Unintended Positive/Negative Impacts

The contribution of both projects, together with broader Japan-China environmental cooperation, received high recognition from the Chinese government, and the Japanese expert who served as Chief Advisor was awarded the 2020 China Friendship Award. According to interviews, the reasons behind the award included: (1) the establishment of a Japan-China high-level dialogue mechanism on environmental protection, which enabled smooth communication between the two sides, (2) the expert's efforts that significantly contributed to strengthening the capacity development of environmental protection personnel on the Chinese side, (3) the fact that many outputs were generated through the projects, and (4) research outputs on air pollution monitoring and analysis were published in international academic journals, and numerous environmental protection-related reports were approved by the Ministry of Ecology and Environment, and various other contributing factors. The project outputs and their influence are considered to have been made possible through many years of Japan-China cooperation. According to the Sino-Japan Friendship Center for Environmental Protection, this series of outputs has become a model and represents a valuable asset in Japan-China environmental

cooperation. The achievements and impacts produced by many project stakeholders are likely to serve as a foundation for future initiatives, and new relationships and platforms for Japan-China environmental cooperation may be developed going forward.

Overall, through the implementation of the project, the project purposes, namely, "strengthening the capacity to implement various measures for enhancing environmental considerations in each stage of the material cycle (resource input, production, distribution, consumption, disposal, recycling, and final treatment) in order to promote circular economy policies from the perspective of environmental conservation" and "establishing a foundational platform at the Sino-Japan Friendship Center for Environmental Protection, premised on nationwide dissemination, in order to realize the building of an environment-friendly society," were achieved. Furthermore, with respect to the overall goal, the realization of various measures and institutionalization, as well as the development, utilization, and dissemination of the operational foundation, have been confirmed within China. The expected effects have materialized in line with the plan. Therefore, effectiveness and impacts of the project are high.

3.3 Efficiency (Rating:③)

3.3.1 Inputs

Inputs	Plan	Actual
(1) Experts	Promotion of Circular Economy: - Long-term experts: Chief Advisor, Circular Economy Advisor, Project Coordinator (total: 3 persons). - Short-term experts: Experts in environmental reporting, Corporate Environmental Supervisor System, green procurement system, environmental education facility planning, material flow analysis, waste treatment facilities, waste management systems, dioxin measurement technology, etc. (multiple persons).	Promotion of Circular Economy: - Long-term experts: Chief Advisor, Circular Economy Advisor, Project Coordinator (total: 3 persons, cumulative total: 4 persons dispatched). - Short-term experts: A total of 233 short-term experts in the fields of environmental reporting, the Corporate Environmental Supervisor System, the green procurement system, environmental education facility planning, material flow analysis, waste treatment facilities, the waste management system, and dioxin measurement technologies were dispatched, and they provided advice, activities, and technical guidance that contributed to the enhancement of the Chinese side's capacities, the establishment of systems, and the promotion of policies.
	Project for Environment Friendly Society Building: - Long-term experts: Chief Advisor, Project Coordinator (total: 2 persons). - Short-term experts: Experts in atmospheric pollution monitoring	Project for Environment Friendly Society Building: - Long-term experts: Chief Advisor, Project Coordinator (total: 2 persons). - Short-term experts: From FY2016 to FY2021, experts (cumulative total: 108 persons) were dispatched in the

	and analysis, volatile organic compound (VOC) pollution prevention, household eco-diagnosis, e-waste treatment, Japan-China corporate environmental technology exchange networks, water environment management, green supply chains, rural environmental management, etc. (number not specified).	fields of atmospheric pollution monitoring and analysis, volatile organic compound (VOC) pollution prevention, household eco-diagnosis, e-waste treatment, Japan-China corporate environmental technology exchange networks, water environment management, green supply chains, rural environmental management, etc.
(2) Trainees Received	Promotion of Circular Economy: Training on corporate environmental reports, the Corporate Environmental Supervisor System, the green procurement system, planning for environmental education facilities, and waste management systems.	Promotion of Circular Economy: From FY2008 to FY2013, a total of 172 persons participated in training in Japan (breakdown: 4 persons in FY2008, 47 in FY2009, 39 in FY2010, 38 in FY2011, 36 in FY2012, and 8 in FY2013). Training themes included corporate environmental reports, the Corporate Environmental Supervisor System, the green procurement system, planning for environmental education facilities, environmental education, eco-towns, waste management systems, and rapid dioxin measurement methods.
	Project for Environment Friendly Society Building: - Country-focused training: Atmospheric pollution monitoring and analysis, VOC pollution prevention, environmental awareness and household eco-diagnosis, rural environmental countermeasures, water environment management, electronic waste treatment, capacity development for local environmental administrators, green supply chain management, application of environmental technology to market mechanisms and financial guarantees, Japan-China corporate environmental technology exchange networks, and environmental information. - Long-term training: Atmospheric pollution monitoring and analysis, international cooperation studies and global environmental studies, and international environmental conservation management.	Project for Environment Friendly Society Building: - Training in Japan: A total of 17 rounds of training were conducted, with 135 participants. (Training themes included atmospheric pollution monitoring and analysis, VOC pollution prevention, environmental awareness and household eco-diagnosis, rural environmental countermeasures, water environment management, electronic waste treatment, capacity development for local environmental administrators, green supply chain management, application of environmental technology to market mechanisms and financial guarantees, Japan-China corporate environmental technology exchange networks, and environmental information.) - Long-term training: From FY2016 to FY2019, three rounds of long-term training were conducted, with three participants. (Their specializations included atmospheric pollution monitoring and analysis, international cooperation studies and global environmental studies, and environmental information science.) - Invitations to Japan: Five rounds of invitational programs were conducted, with 13 participants. (Training themes included study of

		Japan's experience with environmental countermeasures, atmospheric pollution monitoring and analysis, and atmospheric pollution analysis.)
(3) Equipment	Promotion of Circular Economy: Part of the facility improvement and equipment procurement costs required for the establishment of the Japan-China Environmental Technology Information Plaza.	Promotion of Circular Economy: In relation to Subproject (Output) 2, equipment was procured for the establishment of the Japan-China Environmental Technology Information Plaza. The main equipment included RFID visitor cards, a statistical analysis system, facility navigation devices, and large display units.
	Project for Environment Friendly Society Building: A mass spectrometer.	Project for Environment Friendly Society Building: A MALDI-TOF-MS was provided. It was installed in the department responsible for Subproject (Output) 1 (air pollution monitoring and analysis), namely the National Center for Environmental Analysis and Measurement Testing.
(4) (Others: Overseas Project Enhancement Fund)	Promotion of Circular Economy: Local activity expenses, including costs for local training and seminars, and part of the expenses for engaging external experts.	Promotion of Circular Economy: A total of approximately 180 million yen was disbursed for seminar implementation costs, part of the expenses for engaging external experts, and Center operating expenses.
	Project for Environment Friendly Society Building: N/A.	Project for Environment Friendly Society Building: Approximately 58 million yen (3.57 million yuan) was disbursed for expenses related to the engagement of external experts and for costs associated with conducting seminars and training in China.
Japanese Side Total Project Cost	Promotion of Circular Economy: A total of 880 million yen.	Promotion of Circular Economy: A total of 897 million yen.
	Project for Environment Friendly Society Building: A total of 569 million yen.	Project for Environment Friendly Society Building: A total of 516 million yen.
Chinese Side Total Project Cost	Promotion of Circular Economy: - Counterparts and administrative staff were assigned. - Land, buildings, and associated facilities were provided. - Operating expenses (facility and equipment maintenance costs, personnel expenses, research expenses) were covered.	Promotion of Circular Economy: - A total of 86 personnel were assigned to the Sino-Japan Friendship Center for Environmental Protection. - Facilities and equipment necessary for project activities, including offices for experts, were provided. - Regarding the establishment of the Sino-Japan Environment Technology Information Plaza, 7.7 million yuan was approved by the National Development and Reform Commission, and the Plaza opened in July 2015. For simplified dioxin analysis, appropriate support was provided, including the construction of laboratories and the installation of

		measurement instruments necessary for implementing various testing methods. Additionally, project operating expenses were covered, with the Japan-China Cooperation Project Office within the Center and the subproject implementing departments paying the required operating costs. By the endline evaluation, approximately 8.9 million yuan in operating and other costs had been borne by the Chinese side. These costs were allocated to seminar expenses, partial costs for engaging external experts, Center operating expenses, and related items.
	Project for Environment Friendly Society Building: - Counterparts were assigned. - Office space was provided. - Local costs related to project implementation were borne.	Project for Environment Friendly Society Building: - More than 100 personnel were assigned from five agencies directly under the Ministry of Ecology and Environment: the Sino-Japan Friendship Center for Environmental Protection, the Solid Waste and Chemical Management Technology Center, the Economic Policy Research Center, the Information Center, and the Publicity and Education Center. - A project office was established within the Sino-Japan Friendship Center for Environmental Protection. Laboratory environments for installing and operating the provided equipment were also prepared and managed. - Project activity costs were covered, including personnel expenses for the Sino-Japan Friendship Center for Environmental Protection, facility and equipment maintenance costs, research expenses, costs for engaging external experts, domestic seminar and training implementation expenses, and domestic travel and accommodation expenses for participants traveling to Japan. Among the trainings conducted in Japan, five were fully financed by the Chinese side, although the total cost is unknown.

Source: JICA-provided materials (terminal evaluation report, etc.), questionnaire, and interviews

3.3.1.1 Elements of Inputs

According to interviews with project stakeholders including the Sino-Japan Friendship Center for Environmental Protection, comments were obtained stating that the areas of expertise and

timing of deployment of the Japanese experts were appropriate. Regarding the deployed experts, comments were made such as: “They exchanged views with the Chinese side on various issues including air pollution and waste treatment, and played an active role in helping Chinese counterparts to understand Japan’s solid waste management system and environmentally sound management models for electronic waste.” In light of these comments, it is considered that the resources of the Japanese experts were rationally allocated, enabling the flexibility and proactiveness of the project to be fully demonstrated. In addition, comments were received stating: “The Sino-Japan Friendship Center for Environmental Protection, which is responsible for environmental projects, worked energetically as the coordination window, and its long-term participation made a significant contribution. On the Chinese side, experience in policy research and international cooperation was gained, creating prospects for the steady advancement of future initiatives.” Regarding the acceptance of trainees, feedback was provided such as: “The training was practical and based on Japan’s experience. Participation was extremely meaningful. Opportunities exist at the Sino-Japan Friendship Center for Environmental Protection to apply what was learned.” With respect to the provision of equipment, it was confirmed at the time of the ex-post evaluation that the supplied equipment was being effectively utilized.[18]

Therefore, the inputs under both projects were assessed to have been appropriate.

3.3.1.2 Project Cost

The project cost of the “Promotion of Circular Economy” was planned at 880 million yen, while the actual cost amounted to 897 million yen (approximately 102% of the plan). The project cost of the “Project for Environment Friendly Society Building” was planned at 560 million yen, while the actual cost amounted to 516 million yen (approximately 92% of the plan). Comparing the total planned amount for both projects (1,440 million yen) with the total actual amount (1,413 million yen), the costs were within the plan (98% of the plan).

3.3.1.3 Project Period

The planned project period for the “Promotion of Circular Economy” was from October 2008 to October 2013 (approximately five years according to JICA documents), whereas the actual period was nearly the same: from October 2008 to September 2013 (approximately five years), corresponding to about 100% of the plan. For the “Project for Environment Friendly Society Building,” the planned period was from April 2016 to April 2021 (approximately five years according to JICA documents), while the actual period was extended to approximately five years

[18] Regarding the MALDI-TOF-MS, the Sino-Japan Friendship Center for Environmental Protection has stated that it is necessary for conducting analyses of high-molecular organic clusters contained in particulate matter in the atmosphere. In 2025, the Center, in collaboration with researchers from Tsinghua University and a Japanese company, is working to identify the pollution characteristics of high-molecular clusters contained in particulate matter in Beijing. The degree of utilization of the equipment is high.

and eight months, from April 2016 to December 2021, due to the impact of COVID-19; this represents an extension of about eight months (approximately 113% of the plan). Although the project periods can be considered generally in line with the plan, taking into account that the Japan-China Environmental Technology Information Plaza, which had originally been planned under the "Promotion of Circular Economy," was actually completed in July 2015, it may be judged that, overall, the project period slightly exceeded the plan.

In light of the above, although the project period slightly exceeded the plan, the project cost remained within the plan. Therefore, efficiency of the project is high.



Photo 3: Inside the Japan-China Environmental Technology Information Plaza (exhibits for visitors)



Photo 4: The MALDI-TOF-MS provided under the project, installed at the Sino-Japan Friendship Center for Environmental Protection

3.4 Sustainability (Rating: ④)

Given that both projects set as their objectives the realization of an environment-friendly society in which pollution emissions are restrained, as well as the promotion of various circular economy-related measures from the perspective of environmental conservation and the policy adoption (institutionalization and legal codification) of the necessary implementation bases, the following examines whether the required policy frameworks, institutional arrangements, technical capacity, and financial conditions for their continuation are secured, or are likely to be secured.

3.4.1 Policy and System

At the time of the ex-post evaluation, the government of China has been implementing the *14th Five-Year Plan for the Development of the Circular Economy* (2021-2025). In relation to the promotion of the circular economy and the building of an environment-friendly society, the government has strengthened implementation through the *Policy on Large-Scale Equipment Renewal* and the *Policy on the Trade-in of Consumer Goods*. In the first quarter of 2025, as a

result of the promotion of the *Policy on Large-Scale Equipment Renewal*, the amount of machinery and equipment purchased by enterprises nationwide increased by 11% compared to the same period of the previous year. In addition, as a result of the promotion of the *Policy on the Trade-in of Consumer Goods*, the retail sales of household audiovisual appliances such as televisions grew by 29.3% year on year, the retail sales of household electrical appliances such as refrigerators by 38.4%, the retail sales of household furniture by 15.9%, and the retail sales of communications equipment such as mobile phones by 27.3%. These outcomes suggest that the establishment of a resource-circulating industrial system is progressing, and the comprehensive utilization of resources is also increasing.

3.4.2 Institutional/Organizational Aspect

At the time of the ex-post evaluation, in China it was expected that the Sino-Japan Friendship Center for Environmental Protection would continue to fulfill its role and function as a hub for Japan-China environmental cooperation, coordinate relevant resources; provide technical support services in fields such as private-sector environmental technology cooperation, policy research, and human resource development, and consolidate national scientific research capacities to serve as a cooperative base for academic research in environmental conservation. The Center is a directly affiliated organization of the Ministry of Ecology and Environment[19] and plays a central role and function in the environmental sector as the hub for Japan-China environmental cooperation, and its continued operation is expected. At the time of the ex-post evaluation, the Center was providing environmental management support within China, focusing on seven priority areas: “green and low-carbon development,” “management of emerging pollutants,” “management of ecological and environmental science and technology and achievement transfer,” “research and development of environmental standards and samples,” “environmental management and applications of big data,” “trading of wastewater discharge rights,” and “management of environmental labeling.”[20] In addition, expansion of environmental cooperation beyond the ODA framework is expected to continue. Specifically, future activities include promoting exchanges among younger generations of environmental officials, and the fourth

[19] The Sino-Japan Friendship Center for Environmental Protection and the Ministry of Ecology and Environment have established a framework that enables constant communication. The Center reports and shares information with the ministry on the progress of related activities in a timely manner, and the ministry provides advice and supervision as necessary. The respective responsibilities of both parties are clear, and it was confirmed through interviews that the framework for sustaining the effects generated by the project is fully in place.

[20] Some of the personnel of the Sino-Japan Friendship Center for Environmental Protection who participated in the implementation of both projects and in related training and who became engaged in the work have, in certain cases, enhanced their functions within each department and have come to undertake research and operational tasks. It was also confirmed that the trained personnel, in order to further expand operational functions and enhance research outputs, have been separated and become independent from the Center while establishing cooperative relationships with it. Examples include the Publicity and Education Center, the ASEAN Center, the Solid Waste Center, and the Policy Research Center. At the time of the ex-post evaluation, all of these organizations were under the umbrella of the Ministry of Ecology and Environment and were contributing to the multifaceted strengthening of the environmental platform. These developments can be regarded as phenomena that are linked to the further development of the project effects.

Japan-China High-Level Environmental Roundtable, which serves as the bilateral environmental dialogue mechanism, is scheduled to be held in September 2025. Under these circumstances, it is inferred that the Center will continue to play a significant role as the hub of Japan-China environmental cooperation going forward.

At the time of the ex-post evaluation, the Sino-Japan Friendship Center for Environmental Protection has 113 full-time staff members. It was confirmed that this staffing level is necessary and sufficient to carry out routine operations and to advance initiatives related to the promotion of the circular economy and the construction of an environment-friendly society.

Based on the above, the institutional and organizational sustainability of both projects is assessed as high.

3.4.3 Technical Aspect

According to the Sino-Japan Friendship Center for Environmental Protection, the knowledge and technologies cultivated through both projects have continued to be strengthened through practical activities after project completion, and ample training opportunities are provided for the staff. As one example, youth academic conferences on environmental development are held regularly. Until the time of the ex-post evaluation, young staff members took the lead in discussions held regularly on priority themes such as management of new pollutants, reduction of pollution and carbon emissions, synergistic reduction of multiple pollutants, and responses to climate change, thereby striving to enhance scientific research capacity. In the testing departments, training has been conducted on analytical methods for perfluorocarbons (PFCs) in April 2022, on analytical testing technologies for investigating and monitoring new pollutants in June 2022, on internal exchanges on analytical technologies for new pollutants in March 2024, and on monitoring technologies and case analyses of pollutants for stakeholders in the Inner Mongolia Autonomous Region in October 2024. It was also confirmed that the Center conducts practical on-the-job training (OJT) to transfer techniques from experienced staff members to new staff members.

Regarding the maintenance and management of the provided MALDI-TOF-MS, questionnaires, interviews, and field observations confirmed that there are no particular technical issues. The Center’s staff regularly check its operating status and conduct maintenance.

Based on the above, no particular problems are observed regarding the technical sustainability of both projects.

3.4.4 Financial Aspect

Table 7 shows the project budget of the Sino-Japan Friendship Center for Environmental Protection at the time of the ex-post evaluation.

Table 7: Project Budget of the Sino-Japan Friendship Center for Environmental Protection (Most Recent Three Years)

(Unit: 1,000 yuan)

2022	2023	2024
200	1,526	830

Source: Sino-Japan Friendship Center for Environmental Protection

Regarding Table 7, after the completion of the "Project for Environment Friendly Society Building," the allocation of activity and project budgets temporarily settled in 2022, whereas from 2023 onward, budgets for continued activities were secured. Although the amount decreased in 2024 compared with the previous year, interviews with the Sino-Japan Friendship Center for Environmental Protection confirmed that this was due to annual variations in the size and content of activities, and it does not pose a threat to project continuity. According to the Center, "the allocation varies by year depending on new research and the needs for monitoring and measurement of air pollution and persistent organic pollutants, but the necessary and sufficient budget is being allocated." It was also confirmed that maintenance budgets required for the provided equipment have been duly approved and allocated.

In addition to the budget shown in Table 7, the Sino-Japan Friendship Center for Environmental Protection received funding from the Japan-China Science and Technology Cooperation Fund for the study "Research on the Applicability of Green Supply Chains for Synergistic Effects of Pollution Reduction and Carbon Reduction and Management Mechanisms" (2022-2023) after the completion of the Project for Environment Friendly Society Building. With a focus on Japan-China environmental cooperation, following the completion of this project, the "Japan-China Environmental Cooperation Demonstration Base Project" (2023-2027) has been implemented. It has been implemented by the Sino-Japan Friendship Center for Environmental Protection using funds applied for from China's Ministry of Human Resources and Social Security. It is not an ODA project. Through this project, the Center continues collaborative research and human resource development between Japan and China, focusing on the measurement and research of air pollution monitoring, the promotion of low-carbon technologies, and wastewater treatment and resource utilization in the regional areas.[21]

Based on the above, it is considered that there are no major issues regarding the financial aspects related to the O&M of both projects.

3.4.5 Environmental and Social Aspect

As confirmed through the questionnaire, site observations, and interviews with the Sino-Japan Friendship Center for Environmental Protection, no specific environmental or social mitigation

[21] Since 2023, the Center has applied for its project budget to the Ministry of Ecology and Environment, and allocations have been made accordingly. A total of 1.3 million yuan was approved and allocated for 2023 and 2024. At the time of the ex-post evaluation, the budget for 2025 is in the process of being approved.

measures had been required up to the time of the ex-post evaluation in relation to both projects. No immediate adverse environmental impacts are expected. Any potential future impacts are considered to be limited.

3.4.6 Preventative Measures to Risks

As confirmed through the questionnaire and interviews with the Sino-Japan Friendship Center for Environmental Protection, there were no particular risks, external conditions, or matters requiring control in either project.

3.4.7 Status of Operation and Maintenance

As noted earlier, no issues were observed with the operation, maintenance, or functioning of the provided MALDI-TOF-MS.[22] There are no problems with the procurement system or the availability of spare parts. In the event of a malfunction that cannot be addressed internally, a system is in place to contact the Japanese manufacturer and request repair services.

Based on the above, no particular issues were identified in the O&M of both projects.

In sum, no issues have been observed in the policy/system, institutional/organizational, technical, and financial aspects, including current status of the O&M system related to both projects. Considering that the Sino-Japan Friendship Center for Environmental Protection will continue efforts to strengthen its organizational structure and serve as an institution undertaking academic research on environmental conservation, institutional/organizational sustainability is assessed to be high. Environmental and social considerations and risks have also been addressed through appropriate preventive measures. No issues were observed regarding the sustainability of the realized effects. Therefore, sustainability of the project effects is very high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

Both projects were implemented in order to promote circular economy policies in China from the perspective of environmental conservation, with the objectives of strengthening the capacity to execute various measures to enhance environmental considerations in each stage of material circulation (resource input, production, distribution, consumption, disposal, resource recovery, final treatment, etc.), developing the foundations for such efforts at the Sino-Japan Friendship Center for Environmental Protection with a view to nationwide dissemination, and ensuring that the foundations necessary for building an environmentally friendly society would be adopted as

[22] (Reference information) At the time of the ex-post evaluation, the Sino-Japan Friendship Center for Environmental Protection was conducting joint research with researchers from Tsinghua University and Japanese companies on the pollution characteristics of organic constituents in particulate matter in Beijing. According to the Center, it aims to establish a semi-quantitative detection method for characteristic components, including polycyclic aromatic hydrocarbons (PAHs), using the MALDI-TOF-MS.

policy and utilized for institutional and legal development. The objectives of both projects are aligned with the policies and needs of the Chinese government, which faces a worsening situation of environmental pollution. In terms of coherence, the projects were consistent with Japan's ODA policy. No concrete linkages or synergies were identified with other JICA projects, those of other donors, or international frameworks such as the SDGs. Based on the above, the relevance and coherence of the projects are high. At the time of completion, both projects had mostly achieved their respective outputs and the project purposes. Subsequently, regarding the achievement of the overall goals up to the time of the ex-post evaluation, various measures, institutionalization, the development and utilization of implementation foundations, and dissemination are observed within China. Therefore, the effectiveness and impact of the projects are high. Although the project period slightly exceeded the initial plan, the project cost was within the initial plan; thus, the efficiency of the projects is high. No issues were identified with the policy and system, institutional/organizational, technical and financial aspects, or current status of O&M in relation to both projects. Since the completion of the projects, the Sino-Japan Friendship Center for Environmental Protection has continued to expand its organizational structure and strengthen its functions, and it is expected to continue to play its role as a hub for Japan-China environmental cooperation. There are no major concerns regarding the sustainability of the effects generated by both projects; therefore, the sustainability of the project effects is very high.

In light of the above, both projects are evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

None

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

The Significance of Enhancing Post-Completion Effects and Impacts by Fully Taking into Account Beneficiary Needs and Focusing on Strengthening the Functions of the Counterpart Organization

Before the start of the "Promotion of Circular Economy," the establishment of environmental protection technologies was an urgent issue in China. There was a strong need for countermeasures against environmental pollution, promotion of the green economy, improvement of social environmental management, institutional reforms such as environmental review systems for external assistance, and nationwide dissemination and promotion of environmental standards and guidelines. Amid rapid economic growth, systems for resource reuse and waste management had not yet been established, and transforming corporate awareness toward environmental

protection was also an urgent challenge. Under these circumstances, both the donor country and the recipient country steadily identified the needs related to pollution prevention measures at the time of project commencement, strengthened the functions of the Sino-Japan Friendship Center for Environmental Protection as the platform for disseminating environmental protection policies, and provided support for pollution prevention efforts by central and local governments and private enterprises, mainly through the dispatch of experts and the implementation of training programs. As a result, through the implementation of both projects, Japanese knowledge and experience were introduced into China, and high-level exchanges on environmental protection between Japan and China were realized. Cooperative relationships were successfully built across many environmental issues including air, water, and rural environmental protection, which can be regarded as remarkable achievements. In addition, the projects were operated while flexibly responding to changes in China's needs, with adjustments made to activity content and input levels as appropriate. Although certain subprojects (outputs) were canceled or added during implementation, these changes did not hinder the achievement of project objectives. Instead, the continuation of activities enhanced the overall effects and impacts. At the time of the ex-post evaluation, China was continuing proactive efforts, centered on the Sino-Japan Friendship Center for Environmental Protection, to sustain project effects and further promote and strengthen institutionalization and legal frameworks related to environmental protection. This provides clear evidence that project outcomes are being sustained. Looking ahead, when formulating similar future projects, it is considered that both donor and recipient sides can further enhance post-completion effects and impacts by fully taking into account beneficiary needs at the project formulation stage and placing priority on strengthening the functions of potential counterpart organizations.

5. Non-Score Criteria

5.1 Performance

5.1.1 Objective Perspective

Through both projects, high-level exchanges between Japan and China on environmental protection were conducted, and cooperation was established on many issues, including air, water, and rural environmental protection, which generated tangible outputs. As a result, the government of China, including the Ministry of Ecology and Environment, has highly evaluated the activities and contributions of the Japanese experts, including official commendations. While China's dedicated efforts and training achievements are notable, the Japanese side accurately grasped China's needs related to environmental protection and provided necessary support, making a significant contribution to establishing the foundation for initiatives related to environmental protection and relevant systems. It is considered that these project outputs and impacts were made possible by many years of cooperation between both countries. Consequently, the relationship for

Japan-China environmental cooperation has been further strengthened, and it is highly likely to serve as a foundation for future collaboration. (This also corresponds to the perspective of "Additionality" in Section 5.2.)

5.2 Additionality

As described above.

(End)