"Project Formulation Survey" under the Governmental Commission on the Projects for ODA Overseas Economic Cooperation in FY2013

Summary Report

Indonesia
Dissemination of Industrial Waste Water Treatment with the Use of Automatically Regenerating Activated Carbon Effluents Purification System

March, 2014

Joint Venture of JTOP Co., Ltd. and

Mitsubishi UFJ research & consulting Co., Ltd.

Chapter 1 Description of the current situation and development needs of the concerned development issues in the surveyed country

1-1 Outline of politics and economy of the surveyed country

- Form of government: Presidential system, Republican institutions
- Head of State: Susilo Bambang Yudhoyono
- Macro economy: The economic growth rate has been about 6% a year in the past five years except for 2009 just after the Lehman shock.

1-2 Current situation of the development issues in the surveyed field in the surveyed country

- Increasingly serious environmental pollution of Citarum River
- Decreasing groundwater level and continuing ground settlement associated with excessive groundwater withdrawal

1-3 Related plans, policies, and legal systems in the surveyed field in the surveyed country

- West Java: Promotion of the Upper Citarum River Basin recovery program
- BAPPENAS, etc.: Development and promotion of the Citarum River environmental improvement roadmap
- Bandung City: Environmental rating of the companies in the city and provision of incentives
- Bandung Regency: Treated water use obligation imposed at the effluent discharge license issuance stage
- Bandung Regency: Determination of the permissive effluent volume corresponding to the production volume
- The State Ministry of Environment: Development of treated water usage guidelines (under study)
- The State Ministry of Environment: Reinforcement of industrial effluent monitoring (under study)

Chapter 2 Possible applicability of the proposing company's technology, and prospects for future business development

2-1 Strength of the proposing company and the proposed product/technology expected to be utilized

(1) Technology/product to be utilized

The "automatic adsorbent/activated carbon regeneration technology" independently developed by

JTOP Co., Ltd. is the core of this project.

(2) Automatic adsorbent/activated carbon regeneration technology

The automatic adsorbent/activated carbon regeneration technology is a technology to vaporize and desorb organic matters and moisture having been absorbed by the absorbent/activated carbon using superheated steam.

The conventional absorbent/activated carbon regeneration treatment (activation treatment) technology has never been used widely, because this technology requires significant labor, time, and costs whereas the automatic regeneration technology has realized inexpensive and automatic treatment that does not require the absorbent/activated carbon to be removed from the plant.

This automatic regeneration technology has thus made it possible to inexpensively and easily perform advanced treatment and remove hardly-decomposable substances. This automatic regeneration technology allows highly concentrated effluent water to be reused or recycled, which otherwise could be reused only in some limited facilities.

As an advanced treatment technology, this technology not only makes it possible to supply treated water as measures to limit the withdrawal of groundwater currently used in many factories and commercial facilities but also can be utilized to supply drinking water in the area where it is difficult to build a water purification plant or in the case of disaster, and light truck-installed portable-type drinking water production equipment is already commercialized.

(3) Specification/price of the product/technology

The manufacturing cost of this equipment is slightly over ¥50,000 per ton of treatment volume in Japan; however, it can be reduced to less than ¥20,000 if manufactured in Indonesia. For installation, since large facilities, such as biological treatment tanks, are not required, civil engineering and construction costs can be significantly saved, making this technology the one with a low initial cost.

(4) Comparative advantages over competing equipment

The conventional-type activated carbon treatment can be a direct competition with this technology, whose advantage lies in its advanced treatment. As compared with the conventional-type activated carbon treatment equipment, this equipment is extremely superior not only in operating costs but also in the continuity of functions and the ease of maintenance.

The ozone treatment method, one of other advanced treatment methods, may also potentially be another competing technology from the perspective of the functions; However, since the ozone treatment method requires extremely high electricity costs for discharge and ancillary facilities costs, it is practically impossible to introduce it in developing countries and thus it cannot be

considered a competitive technology for this project.

Furthermore, since this technology is an equipment-type technology, which does not require civil engineering work, and allows standardized production and introduction, it is suitable to create a new market. In this survey, the demands of a new market will be also surveyed.

2-2 Position of the overseas market entry of the proposing company in its business development

2-2-1 Motivation for overseas market entry

The JS circulating-type effluent purification system has already received a high evaluation with a proven track record of use in Japan and offers for tie-up have been also received from various countries, such as advanced countries, Korea, and Taiwan. In the developing countries, however, the introduction is delayed, as this system does not match their technical needs and people tend to believe that there will be adverse impacts on the environment and health. So it has been decided to conduct a study to promote the dissemination of this technology.

2-3 Assumed project mechanism and schedule

2-3-1 Project implementation system (local partner)

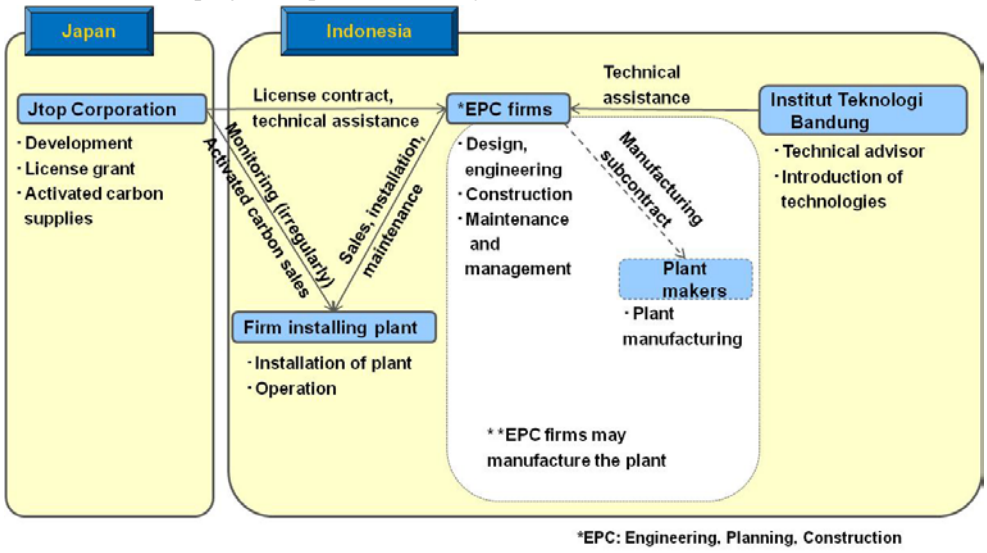
The equipment is relatively simple in structure and can be locally manufactured and assembled so long as metallic processing and equipment assembly technologies have been accumulated. Thanks to this relatively simple structure, the construction work, operation, and maintenance can also be performed so long as a company has an experience of the introduction and maintenance of a general water treatment plant. Consequently, in order to promote this project, a system will be established whereby a license agreement is concluded with the local EPC company (water treatment company engaged in engineering, design, and construction work) to grant a series of licenses to the company for manufacturing, sales, and maintenance in the country and the equipment is manufactured either by the company or its local subcontractor.

Sales promotion activities will be conducted mainly by the local EPC company knowledgeable of the needs for local industrial effluent treatment; however, technology introduction sessions, seminars, etc. by, for example, Institut Teknologi Bandung and the BPPT will also be held to increase the recognition rate.

For such cases where designing or engineering is required for each company that has introduced the equipment, a system will be established whereby Institut Teknologi Bandung can provide support; however, JTOP Co., Ltd. will provide support as appropriate.

JTOP Co., Ltd. provides technical guidance to the local EPC company and also engages in non-periodic monitoring of the companies that have introduced the equipment, as well as the sales of activated carbon.

The outline of the project implementation system is as shown bellow.



2-3-2 Investment plan and distribution and sales plan

With regard to the investment plan, since the local EPC company or its subcontract plant manufacturer bears the investment costs to improve the manufacturing facilities, no additional investment costs are incurred on the Japanese side. It is already confirmed with Indonesia that some companies that can bear the costs to improve the manufacturing facilities have been found.

As mentioned before, the distribution and sales plan will be mainly developed by the EPC company knowledgeable of the needs for local industrial effluent treatment and having a high incentive in sales promotion.

■ Business development schedule

The business development schedule as of now is as follows:

	FY 2013	FY 2014		FY 2015		FY 2016	
	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half
Market research	→						
ODA project (textile)		→	→	→	→	→	
ODA sub-project (SMEs)		- - →	→	→	→	→	→
Selection of partners	- - →	→					
License contract negotiation		→	→				
Technology transfer, installation of manufacturing facilities				→	→		
Sales Promotion				→	→	→	→
Business base Installation						→	→

Chapter 3 Introduction and trial use of the product/technology, or local adaptability verification activities including various tests (demonstration/pilot survey)

- A small-sized test unit of the automatically regenerating activated carbon effluent purification system of JTOP Co., Ltd. was lent to Institut Teknologi Bandung to conduct the treatment test for dye effluent, batik liquid waste, and laundry liquid waste. Water quality tests were conducted before and after treatment and the penetration test was also conducted to measure the period until activated coal was saturated and to verify the subsequent activated carbon regeneration effect.
- Particularly for dye effluent and laundry effluent, good treatment results were obtained. For batik effluent, since the COD concentration was extremely high, the COD concentration in the effluent could not meet the criterion value; however, it was confirmed that it is decolored and could be reused through regeneration.

→ Now, the treatment experiment is performed under the conditions planned for the next fiscal year (use of effluent after primary treatment).

- At the mini-seminar at 2 Dec 2013, many participants from various industries such as textile, hotel, shopping mall, health care facilities, and public organization attended. The participants expressed the positive interest in the JTOP technology.

Chapter 4 Expected development impact and effect on business development of the proposing company in the surveyed country through proposed ODA projects

4-1 Consistency of the proposed product/technology and the development issues

- Since the proposed technology meets the needs for treated water, effluent treatment, and decolorization and is less expensive and easier for maintenance as compared to the conventional technology, it is expected to be widely used at the private sector level, if the technology is locally demonstrated and widely recognized, thus contributing to resolving the environmental issues.

4-1-1 Surveyed country/region/city names and the reasons for their selection

- Surveyed country/regions/cities: Republic of Indonesia, West Java, Bandung City and its suburbs
- Reasons for selection: West Java and Bandung City, selected as the ODA project implementation areas, are textile industry areas in Indonesia. At the textile facilities in the city and its suburbs, there are various issues, such as the undeveloped effluent treatment, the low operating rate of the facilities, and the deteriorating water quality of Citarum River, or the water source of West Java,

and other rivers in the city. It is also an issue at Bandung City to take measures to deal with the water pollution caused by effluent from small and medium-sized enterprises, such as laundry and batik (ethnic dyed goods) factories.

Under such circumstances, since JTOP Co., Ltd. has developed an extremely low-cost technology with low maintenance labor to treat dye effluent and hardly decomposable substances produced in large volume in the textile industry as well as a mobile effluent treatment vehicle, a water environment improvement project has been proposed through the introduction of the technology this time.

4-1-2 Socioeconomic development issues faced by the surveyed country

In Indonesia, while industrial activities are increasingly active backed by the economic growth, effective treatment of factory and other effluents is delayed, causing the deterioration of tap water source and groundwater quality. The Indonesian Government put together the water quality items, criteria, etc. for 21 major industrial categories in accordance with the Ordinance of the State Ministry of Environment Concerning the Industrial Effluent Standards in 1995 and individual states and industrial complexes have also established more stringent standards of their own. However, since it is difficult for the regulatory authority to propose the treatment technology economically feasible for companies to introduce, the regulatory authority does not provide stringent supervision or instructions, which leads to the increasing deterioration of the environment. The explanation of the necessity of the relevant inexpensive technology and the introduction thereof are often requested by the local governmental agencies and research institutes.

4-1-3 Solutions to the above issues that can be provided by the proposing company and the company's stance and motivation to contribute to developing country

As measures to break through such a situation, it is necessary to introduce and disseminate the treatment technology through the dissemination of highly-functional and inexpensive purification systems that can be introduced even by local companies. Through this project, the proposing company will introduce the technology that meets the local needs and continuously support the dissemination activities through the production and introduction by the local companies, thus aspiring to contribute to the improvement of the water environment in Indonesia.

In addition, as ODA projects utilizing this technology, various activities, such as the development and institutional design of the industrial effluent management system and the human resource development, will be conducted at a time to contribute to the capacity building. Thus, the proposing company will contribute to strengthening the government's regulatory and supervisory capability, promoting the introduction of effluent purification systems to companies, and improving the quality of surrounding waters as well as daily life water and drinking water.

4-2 Expected development impact through the application/utilization/dissemination of the product/technology, etc. in the surveyed country by formulating ODA projects

Ultimate objective	Project (ODA) Objective	Activities (will be added)
Enforcement of the guidance for industrial wastewater regulations	Raising awareness of affordable treatment tecs.	Demonstration experiment of Jtop's tech. to dyeing wastewater treatment plants
	Building local government capacity	Capacity-building activities of local governments
	Monitoring industrial effluent	Enhancing monitoring industrial effluent
	Constructing wastewater treatment schemes for SMEs	Examination and discussion for wastewater treatment schemes for SMEs
Improving water quality of the Citarum River	Improving wastewater effluent quality in upstream and tributary sites	Visit survey/instructions in the model areas
		Support to the environmental commitment program (Upper Citarum River Basin recovery programs)in West Java
		Support to the incentive program for environmentally conscious companies in Bandung City
		Establish the standard of the volume of effluent permit according to the amount of the production
Subsidence prevention	Raising awareness and improving understanding of the need for water recycle	Development of the treated water usage guidelines (textile industry)
	Tightening administrative guidance of the use treated water in Bandung Regency	Support to the initiative to obligate the use of treated water in Bandung Regency

Chapter 5 Proposals for formulating ODA projects

Proposals for formulating ODA projects are as indicated bellow.

【3 Main Projects】

(1) Test use and introduction of the technology of JTOP Co., Ltd. to the factories discharging dye effluent (pilot survey)

(2) Study and Discussion of effluent treatment scheme of small and medium sized enterprises(laundry, and batik industry)

(3) Visit survey/instructions in the model areas

【5 Complementary Approaches】

1) Local government (instruction staff) capacity building activities

2) Support to the environmental commitment program (Upper Citarum River Basin recovery programs)in West Java

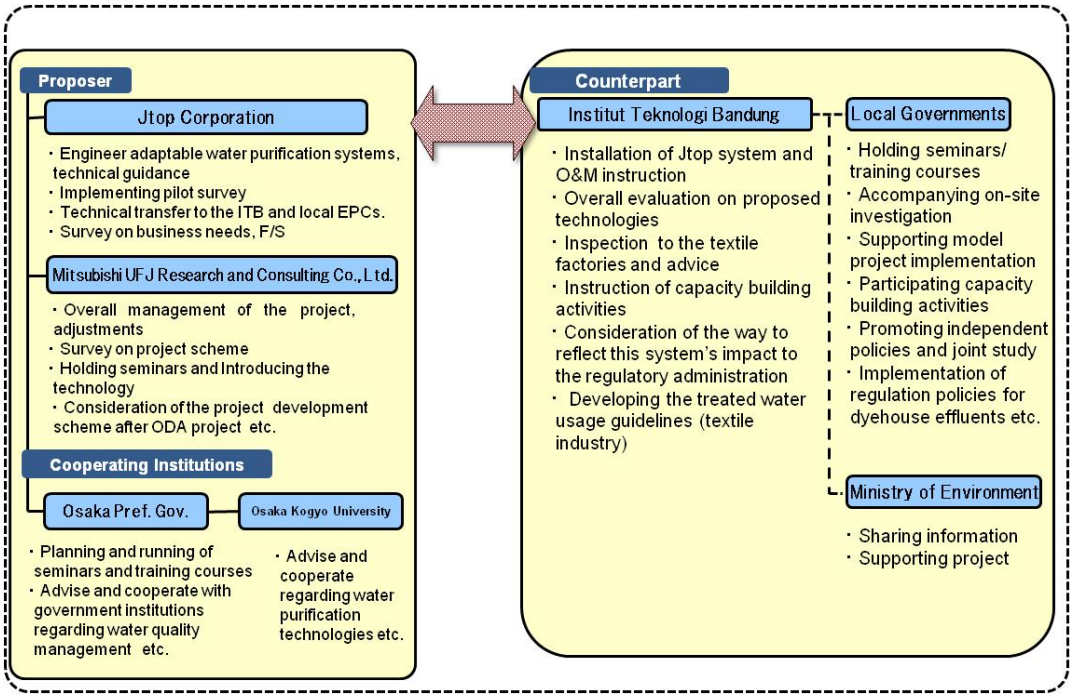
3) Support to the incentive program for environmentally conscious companies in Bandung City

4) Development of the treated water usage guidelines (textile industry)

5) Support to the initiative to obligate the use of treated water in Bandung Regency

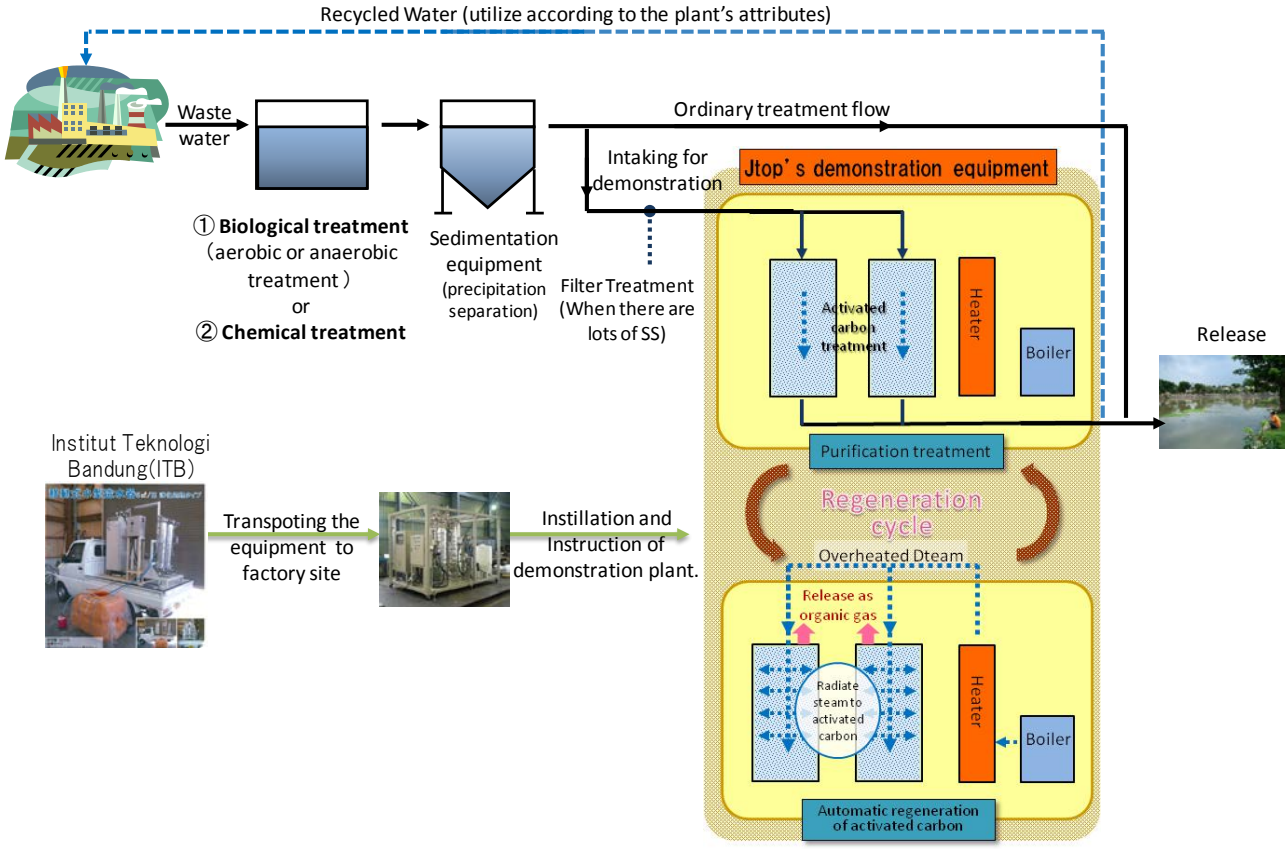
The implementation mechanism of the projects and approaches are as follows.

【The implementation mechanism】



The framework of "Test use and introduction of the technology of JTOP Co., Ltd. to the factories discharging dye effluent", the first and the main pilot survey, is as follows.

【The framework of demonstration use】



Type（Project Formulation Survey）
Indonesia, The Survey for dissemination of industrial waste water treatment with the use of Automatically Regenerating Activated Carbon Effluents Purification System

SMEs and Counterpart Organization

- Name of SME : Jtop Limited Company
- Location of SME : Sakai city, Osaka, Japan
- Survey Site, Counterpart Organs : Bandung; West Java Province, Bandung City, Bandung Regency, Institute of Technology Bandung(ITB)

Concerned Development Issues

- Lack of Knowledge and Human resources in Local Governments
- Lack of waste water treatment technologies to allow ease of operation or maintenance
- Lack of enforcement in effluent water regulation
- Environmental problems due to pollutants and colored wastewater
- Deterioration of river water quality
- Water shortage due to the effect of dry season and lack of governmental measures against subsidence

Products and Technologies of SMEs

- Features of Jtop technologies
  - On site regeneration of activated carbon and subsequent cost saving due to curtailing activated carbon replacement process
  - Easy maintenance due to automatic regeneration
  - No need of space and construction burdens
  - Removal of Persistent substances
  - Fulfillment of requirements for recycle water use

Proposed ODA Projects and Expected Impact

- Demonstration of Jtop technology as an advanced treatment device and a recycle water generator
- Capacity building of local governments(LGs) trough joint programs with ITB, Japanese experts and staffs of LGs
- Support of LGs' environmental programs through technology and knowhow transfers and advisory activities

Future Business Development of SMEs

- Improvement of recognition about Jtop technology
- Technology needs improvement and market creation through regulatory enforcement and incentives schemes