Chapter 5

Solid Waste Treatment

5.1 Can The Waste-To-Energy Plant in Vietnam

Domestic waste is a major environmental issue in cities and communities. The Can Tho Waste-to-Energy Plant in Vietnam not only solves the problems resulting from domestic waste stacking in the open air in the city, but significantly contributes to reducing local waste pollution and improving people's living environments, thus promoting the technological development of Vietnam in generating electricity from waste incineration.

5.1.1 Background

Located in southern Vietnam, Can Tho is one of the five municipalities directly under the Central Government in the country. It is also the largest city in the Mekong Delta with a population of 1.95 million and is approximately 160 km away from Ho Chi Minh City. With the rapid economic development and continuous urban expansion in recent years, there has been a constant increase of domestic waste, bringing threats to the local residents' well-being and environmental protection. The amount of waste clearance in Can Tho reaches about 650 tons per day. In the past, there were two waste incineration plants (incapable of generating electricity) in the city, and their disposal capacity could reach 150 to 200 tons per day in total, but they have been shut down this year. The Can Tho waste-to-energy project in Vietnam has effectively tackled the shortage in local waste treatment capacity (Fig. 5.1).

Fig. 5.1 Panorama of Can Tho waste-to-energy plant in Vietnam

5.1.2 Project Overview

In July 2016, the Can Tho waste-to-energy project, which was invested, constructed, and operated by China Everbright International Ltd. (hereinafter referred to as Everbright International), was officially launched. The waste-to-energy plant was officially put into operation in November 2018. As the first modern waste-to-energy project in Vietnam, the plant can facilitate local economic development and environmental protection, thus serving as an important demonstration. In 2018, the project was awarded the “2018 Award of Orders of Merit to Enterprises in Can Tho” by the Can Tho Investment Promotion Conference (Fig. 5.2).

Fig. 5.2 Can Tho project was awarded the “2018 award of orders of merit to enterprises in Can Tho” by the Can Tho investment promotion conference

The project received a total investment of around USD 47 million and is constructed using the EPC¹ model, with an operation period of 22 years (including two years of the construction period). It is equipped with an incinerator disposing of 400 tons of domestic waste per day and a 7.5-MW steam turbine generator set. Currently, the waste disposal capacity of the plant takes up about 70% of the total daily waste treatment of the city. By the end of August 2020, the amount of domestic waste disposed of added up to 317,000 tons and 103 million kWh of electricity were generated. A part of the electricity generated is for the plant's own use, while the other part is transmitted to local electrical grids.

Other than disposing of new domestic waste every day, further efforts have been made to assist the government to gradually dispose of the stale waste in the original landfill sites, solving the problems resulting from domestic waste stacking in the open air in the city.

5.1.3 *Environmental Protection Technologies*

From construction to operation, the Can Tho project is implemented strictly in line with the *Domestic Waste Disposal Service Agreement* signed with government departments, and all its indicators strictly meet the standards in the project's EIA. During its construction, a total of five environment-related projects have been launched, including the wastewater collection and disposal project, dust and flue gas treatment project, domestic solid waste storage and disposal project, hazardous waste storage project, and environmental protection project. At present, the Can Tho project has obtained the certificate of completion of environmental protection facilities issued by the Ministry of Natural Resources and Environment of Vietnam, marking that all its five environmental protection projects have been completed.

Since the calorific value and composition of the domestic waste in Vietnam are close to that in cities in southern China, the technologies adopted by Everbright International include the mechanical grate technology of “multistage reciprocating forward-pushing + churning”, the flue gas treatment technology of “SNCR + semi-wet process + dry process + activated carbon injection + bag filter,” and the leachate disposal technology of “pretreatment + high-efficiency anaerobic IOC + aerobic A/O + ultrafiltration + chemical softening + microfiltration + reverse osmosis”. The aforesaid flue gas treatment technology and the leachate disposal technology have been widely used in cities of southern China and have become stable and mature. Constructed exactly according to China's standards, the Can Tho project is under strict control of Everbright International in accordance with the “one-in-four-out” principle (the waste goes in while cinder, flying ash, leachate, and flue gas come out) in the safety and environment management systems in China. According to a

¹ EPC (Engineering Procurement Construction) means a company (the contractor) is commissioned by the owner to undertake the whole or part of the construction work including design, procurement, construction, and trial operation of engineering construction projects in accordance with the contract.

Fig. 5.3 The Can Tho waste-to-energy plant in Vietnam

qualified third-party inspection in Vietnam, all data of the project meet the current national standards of Vietnam and the daily average value of online monitoring indicators for flue gas complies with the EU 2010 standards (Fig. 5.3).

5.1.4 Boosting Development of the Local Industries and Creating More Jobs

Since the waste-to-energy technology in Vietnam is still in its infancy, the relevant regulations and standards are not yet fully in place, but the Can Tho project's construction, technology, and operation standards have provided the Vietnamese government with references for improving the waste-to-energy industry standards. Adhering to the concepts of sustainable development and using local labor force, the Can Tho project has employed nearly 200 local residents from local universities, vocational training schools as well as the surrounding communities (Fig. 5.4).

In the past, the Vietnamese people were not familiar with the waste-to-energy technology, and neither did they support it. Everbright International actively organized Open Plant tours to increase the engagement from the public. The plant has a garden-style, odorless and noise-free environment, where the waste is disposed of with strict inspection and qualified emission. Also, the plant facilitates stale waste disposal and contributes to improving local urban ecological environment. Therefore, Everbright International has been recognized by the government, the public, and the media. In June 2020, the Can Tho project was approved by the Can Tho government as the first industrial tourism base in Vietnam's waste-to-energy industry (Figs. 5.5 and 5.6).

Fig. 5.4 Training local employees to increase local employment

5.1.5 Actively Communicating with the Local Governments and Communities

The Can Tho project is completely open to the public and subject to the supervision of the government and the society. The flue gas data are made public on the LED screens outside the plant's gate, and released to local environmental regulation departments via the internet in real time. By giving the access to visiting the plant and knowing the operation of environmental protection facilities and pollution control information in real time, the pollution control facilities are supervised by the public. The project not only maintains a high level of environmental management, but ensures the safe, uninterrupted, stable, and qualified operation. Since April 2019, the project has made the first Friday of each month as the Open Plant Day. As of today, it has received over 2,000 people times in more than 100 tours, including government agencies,

Fig. 5.7 The Open Plant Day is organized on the first friday of each month

local residents, journalists, industry experts, employees' families, and students from elementary and middle schools (Fig. 5.7).

People in local communities have been engaged in the Can Tho project since its launch. In the early stage of the project, in order to avoid the “Not-in-My-Back-Yard” syndrome² in the domestic waste incineration project, people in local communities

² The “Not in My Backyard” (NIMBY) syndrome” is a characterization of dislike and intense, resolute, and sometimes highly emotional collective oppositions and even protests by residents or local organizations due to the fear that the construction projects (such as garbage dump, nuclear power plants, and other NIMBY facilities) may negatively affect the physical health, environmental quality, and property value.

Fig. 5.8 A local resident was interviewed by Xinwen Lianbo of China Central Television (April 2019)

were invited to see the waste-to-energy projects in operation by Everbright International in China. Besides, community surveys were also sent out during the project's environmental assessment, so as to ensure that the project was constructed in accordance with laws and regulations. After the completion of the project, local residents were invited to visit the plant for several times, which shows it is supervised by the public. The local residents commented, "In the past, the domestic waste stacking outside the houses would simply be incinerated or buried. But now, there are garbage trucks coming to our houses now and then to collect the waste, which makes our living environment much cleaner (Fig. 5.8)."

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