

From Tragedy to Opportunity: A Case Study Assessment on the Controlled Disposal Facility at Payatas, Quezon City, Philippines

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EXECUTIVE SUMMARY

This paper presents the results of the case study assessment on the controlled dumpsite facility located at Payatas, Quezon City, Philippines. The facility formerly was an open dumpsite, which has a tragic history of more than 30 years of misuse, and on July 1, 2000 a hill of garbage fell on a slum community resulting in the death of nearly 300 people buried alive and leaving hundreds of families homeless. To address this problem, the dumpsite was converted to a controlled-waste disposal facility and undergone construction for an engineered sanitary landfill. Likewise, it was developed from waste to energy facility, i.e., the conversion of methane gas generated from waste into electricity – the first clean development mechanism (CDM) project in solid waste management in the Philippines and Southeast Asia. The article used the assessment tool developed under the Integrated Sustainable Solid Waste Management in Asia (ISSOWAMA) Project, funded by the European Commission, which aims at evaluating case studies on solid waste management from different Asian countries. As such, major sections of this paper discuss the findings on the performance of the six evaluation criteria of technical, environment and health, financial and economic, socio-cultural, institutional, and legal and policy performances. The paper briefly introduces the ISSOWAMA Project – its objectives as well as some of its main activities that resulted in the evaluation of this particular case. It also discusses the methodology employed in the identification, documentation and evaluation of the case studies using the integrated and sustainable solid waste management method that the Project is espousing. Lastly, it draws lessons/recommendations and implications to planning and management in terms of sustainable waste management for local government units (LGUs) based on the results of the assessment, as well as, from the authors' opinion as experts in the field.

INTRODUCTION

The ISSOWAMA Project

The Integrated Sustainable Solid Waste Management in Asia (ISSOWAMA) Project is a coordination action funded by the European Commission under its seventh framework program aimed at developing a performance assessment system for integrated waste management scenarios, which consists of a set of qualitative sustainability criteria along with quantitative impact indicators that enables assessment of waste management strategies. The project brought together 18 research organizations, universities and social and governmental stakeholders from 14 European and Asian countries to analyze major challenges in implementing new approaches to SWM in Asia; increase awareness on the need for an integrated and sustainable waste management (ISWM) approach through assessing solid waste management (SWM) systems; build capacities for the widespread adoption of the ISWM model to Asian countries; showcase various suitable and feasible solutions for specific SWM problems; and establish stable cooperation among the partner institutions.

One of the set of activities carried out under ISSOWAMA was the identification, documentation and evaluation of case studies submitted by the Asian partner institutions. This is to exemplify and learn the wide range of SWM alternative approaches being done in the other region.

METHODS

Pursuant to the ISSOWAMA design of mapping current researches only so as to identify data or information gaps, this paper made use of existing and available studies, reports or articles and official presentations on the Case of Payatas. The site was visited by some members of the project team from Asia and was able to walk-through to the area. The Payatas case is one of the 76 cases submitted by the project's partners (17 from the Philippines alone) for evaluation.

It utilized the assessment tool for solid waste management projects developed by the partners under the ISSOWAMA Project. The first part of the tool provides a qualitative description of the case to be assessed by setting the scope and limitation of the system. The second part deals with the technical, health, environmental, economic, institutional, socio-cultural and policy/legal aspects and impacts of the case.

RESULTS OF THE ASSESSMENT

A. Case Study

The Payatas Controlled Disposal Facility (henceforth referred to as the Payatas facility or the facility) is located in Quezon City, the largest of the 17 municipality and cities of the National Capital Region both in terms of land area (16,112 hectares) and population

(2,679,450 as of the 2007 Census). It used to be an open dumpsite that receives Metro Manila’s solid wastes until a tragic accident of trash slide in July 10, 2000, which resulted in the deaths of close to 300 people, compelled authorities to close it. Various enabling laws and multisectoral participation paved for its conversion into a controlled waste disposal facility which is more sustainable to the City. The facility has been formally closed since last December 30, 2010 in compliance with the Authority to Close Order issued by the Department of Environment and Natural Resources, and efforts for the establishment of an environmentally-compliant landfill are currently underway. This case study covers the conversion programs and activities that were undertaken since 2004 up to the present (post closure plans). It focuses on two major activities or projects: 1) the site rehabilitation and development, and 2) Biogas Emission Reduction Project.

The facility covers about 9.7 hectares of land, and serves as the main disposal site, which is for the exclusive use of its host city. The amount of wastes that enters the disposal facility is 466,679.01 metric tons annually, 39 % of which is recyclable while 61% is non-recyclable. However, only 455,679 metric tons of these go into final disposal as 11,498 metric tons are recovered by the dumpsite pickers for direct reuse, recycling, animal food, or valorized by formal solid waste or recycling or composting systems. The recyclable materials include paper, aluminum cans, plastics, glass and iron. Hazardous wastes like clinical wastes and other toxic and hazardous ones are not allowed to enter the facility.

B.1. Technical Functionality/Appropriateness

The conversion of the Payatas open dumpsite into a controlled disposal facility has been a multi-disciplinary and sectoral effort. Technology-wise, the Quezon City Government had tapped the expertise and services of local private contractors, local and international business sectors, a government agency and community organizations to undertake the following:

Table 1. Service Provider for the Program

Services	Partner	Partner’s Profile
1) Site rehabilitation & development	IPM Environmental Services	Local private contractor
2) Biogas Emission Reduction Project	Pangea Green Energy, Inc.	Italy-based company
3) Used Tire Retrieval Project and Co-processing of Residual Plastics	Holcim Cement Philippines, Inc.	Local private business
4) Plastic densification	Department of Science and Technology – Industrial Technology Development Institute (DOST-ITDI)	National government agency
5) Composting and materials recovery facilities	IPM Environmental Services	Local private contractor

Site rehabilitation and development: Rehabilitation and development of the site was contracted out to the Isabelita P. Mercado (IPM) Environmental Services, a local private

contractor. Engineering works for the site were implemented which specifically include the following activities: a) *slope re-profiling* which reduced the steep side slopes to a more stable angle; b) *slope greening* through the introduction of vetiver grass and other ornamental plants along the slopes and benches for erosion control; c) *leachate collection and re-circulation*, which helps in enhancing decomposition and minimizing the discharge of leachate into the waterways; d) *drainage system* improvement; and construction of *access roads* around the dumpsites to facilitate daily waste dumping, de-clogging operations, maintenance of slopes, and for emergency.

The technologies and resources used for rehabilitation and development are simple and readily available. There is sufficient local availability of know-how and experience to design and build as well as to operate and maintain the equipment and technologies used in the above-mentioned engineering works. These were all provided and taken care of by the local private contractor. The local government of Quezon City, on its part, conducts a series of on-site inspections and imposes the required penalties on the contractors whenever violations are committed.

Biogas emission reduction project. This project, otherwise known as Payatas Methane Recovery Project, is the first registered Clean Development Mechanism (CDM) initiative in Southeast Asia. It basically involves the extraction, collection, flaring and conversion of biogas produced from the dumpsite to energy.

Construction of the biogas plant and its facilities started in July 2007, and were completed and commissioned in March 2008. As per the latest monitoring report (January 10, 2010 – March 31, 2011), presently the generator is not capable of running with fossil fuel. Currently, the electricity produced is only for the internal consumption of the plant and for other users (free supplying) in Payatas area (street light, offices, multipurpose hall, dumping areas), which is free of charge. The last portion of the report also indicated that it was not able to reach the targeted certified emission reduction (CER) originally applied for (55,274 vs. 63,096). It furthermore stated that garbage disposal activities necessitated “the partial disconnection of some wells located in the two mound area of the dumpsite; this situation has caused losses in biogas production in the areas occupied by dumping activity (this is also the reason for lower CERs compared to PDD); the lost production is partially recovered through the installation of new wells in elevation, and horizontal trenches”.

On the other hand, the report stated that gas odor on top of the mounds has been greatly reduced since the plant began operation. Moreover, the continuous extraction of gas from the dump has reduced the risk of random combustion and fire in the area.

Of these activities, only the biogas emission reduction project made use of foreign technology – that of Pangea Green Energy of Italy through the CDM. Because of the very high cost needed to invest in this kind of project, the local government opted to enter into a 10-year period Memorandum of Agreement with the Italian company.

Through the CDM, Quezon City was able to acquire the needed technology minus the financial burden.

The project design document described the technologies to be used as innovative in light of the state of landfill methane recovery system in the Philippines. Due to this, local workers were trained, and specialist such as engineers and other professionals were hired. Aside from these, high efficiency flare suppliers are not available in the Philippine market hence, many components of the facility were imported to Europe particularly Italy.

B. 2 Health Impacts

The conversion safeguards the community's well-being and health for the following reasons: almost 1,000 families living along the dangerous zones adjacent to the dumpsite were relocated. Automatically, they were rid of the health and safety hazards they once exposed themselves into, such as the risk of another trash slide that could bury them alive; dusts and toxic substances like methane gas that can cause inhalation problems; and infectious organisms that brings about all kinds of diseases.

Also, the stabilization, greening and fencing of the dumpsite slope are processes undertaken to greatly diminish the likelihood of another waste erosion. As for security and safety, the facility has its own security personnel and trained firefighting unit available 24 hours a day. A medical team is also present at the site. Furthermore, the establishment of guidelines for the waste pickers had prevented fighting and accidents among them. Medical assistance is also provided to them by the private contractor whenever necessary.

In addition, the biogas emission reduction project prevents the occurrence of fire and explosion that can be brought about by the flammable gases from the dumpsite. Lastly, the emission reduction project not only reduces foul odor and greenhouse gases (GHG), but also risks of groundwater contamination and damage to nearby vegetation.

On site, worker's health are also safeguarded with the provision and mandatory use of safety gears such as gloves, masks, covered shoes/boots and helmets. Precautionary measures such as project briefings and trainings were undertaken to ensure that workers understand the proper and safe way of operating the machines, handling wastes, and applying disinfectants. A medical team provided by the contractor is also always present at the site.

B.3 Environmental Impacts

The major environmental laws applicable to the site are the Clean Air Act of 1999 or Republic Act (RA) 8749; the Toxic and Hazardous Waste Act of 1990 or RA 6969; the Ecological Solid Waste Management Act of 2001 or RA 9003; the Clean Water Act of 2004 or RA 9275; and the Climate Change Act of 2009 or RA 9729.

In 2004, the Quezon City Government embarked on the conversion of the open dumpsite into a controlled disposal facility: 1) In compliance with the Ecological Solid Waste Management Act of 2000 (R.A. 9003); 2) Improve environmental health and safety; 3) Ensure safety and stability of the dumpsite; and 5) Sustain livelihood needs of the immediate community.

In compliance of the Clean Air Act and the Climate Change Act, the methane to energy plant removes about 1,500 to 2,000 cubic meters per hour of biogas from the dumpsite. By producing electricity from biogas, the project avoids the use of grid electricity which has the carbon emission factor of 0.46 tons of carbon dioxide equivalent to per megawatt-hour of electricity. At an average of 4,200 MWh per year, the project reduces greenhouse gas emissions by about 1,930 tons carbon dioxide equivalent per year.

The first verification of emission reductions took place in the last quarter of 2008 wherein a third party accredited by the CDM Executive Board inspected the plant to check if the appropriate measuring devices and instruments are properly installed and calibrated. This is to enable them to recommend issuance of Certified Emission Reductions for the project.

Biogas Emission Reduction Project converts the biogas emitted from decomposition of organic solid wastes in the disposal facility into electricity. It contributes to the reduction of greenhouse gases by capturing methane from the biogas collected from the dumpsite. This project contributes to clean air through annual reduction in greenhouse gases of 116,000 tons of carbon dioxide equivalent which is a total 10-year reduction of 1,163,394 tons from 2008 to 2017. Methane extracted approximately 5,400 tons per year lessening adverse effects on health, damage to vegetation and cause of fire and explosion.

B. 4 Economic and Financial Implications

Waste disposal facilities are usually provided by the national or local government. However, the Quezon City government found it more convenient and economical to hire the expertise of a private contractor, the IPM Group of Companies, to handle the rehabilitation, daily operation and maintenance of the facility. Since this has undergone a public bidding process, it can be surmised that the services offered/rendered by IPM is the most cost efficient out of all the other private bidders. Thus, this public-private partnership has resulted in a win-win situation wherein the local government is able to respond to the needs of its constituents at a most cost-efficient and effective manner and a local business is able to provide the needed services in the same time getting profit. Savings may even be realized at the LGU's end in the form of deductions to payment to the contractors as penalty for not strictly following the set guidelines in garbage management.

An even more impressive strategy implemented by the City government is the CDM-registered Biogas Emission Reduction Project. This initiative allowed the Italian-based company, Pangea Green Energy, to implement an emission-reduction project at the Philippines in exchange of emission reduction of carbon credits, which can be sold to countries that committed to reduce their GHG emissions under the Kyoto Protocol. This move proved to be risk-free on the part of the government since the investment (reported at Euro 1.8 million initially) is shouldered by the foreign company. Hence, the Quezon City government was able to acquire a very expensive technology that addresses GHG emission problems at no financial cost at all.

Moreover, the LGU receives donation from the proceeds of emission trading activities expressed in percentage in direct proportion to the price per unit of CER. With an annual average of 116,000 CER, the project should have been able to donate a cumulative earning of at least €313,200 or €2,227,200 in 2010 alone. These added revenues can be used by Quezon City to finance more development projects.

An economic benefit of the emission reduction project is the generation of electricity, which is enjoyed by Payatas residents through the lights provided along the perimeter of the dumpsite and street lamps along Visayas Avenue Extension and Zamboanga Street in Barangay Payatas. The residents also get to use electricity for free in the so-called “Plantsahan ng Bayan”, a certain area in Payatas where the people are allowed to iron clothes and do other things that required electricity (Quezon City presentation).

Overall, the program also generated income and employment/business opportunities not just for private contractors, but for the community as well. Trading/recycling areas near the disposal facility are provided for scavengers, recyclers and junkshop operators to facilitate their livelihood. In fact, a study done by Sia in 2007 estimated that on a daily basis, a scavenger earns a net income of Php131.00 (US\$2.62), a vendor takes home Php114.25 (US\$2.29), and a junkshop operator earns Php323.30 (US\$6.47). It furthered that these earnings are enough to cover a family’s expenses for food, water and electricity (Sia 2007).

B.5 Social Impacts of a New Initiative After a Tragedy

The 2000 trash slide in the Payatas dumpsite that killed at least 300 people brought the reality of poverty in the Philippines in sharper focus, but at the same time, triggered initiatives that empowered and help raise the quality of living of the people in the area.

Prior to the implementation of the methane recovery project, the Philippine National Oil Company (PNOC-EC) and POG held a public consultation with the 23 local stakeholders who responded to the invitation. Scavenger group representatives, a homeowner, a junkshop owner, a barangay official, the social apostolate arm of the parish and a parents group (the last two representing children and youth concerns) attended the event. Some of the issues raised during that meeting can be seen in the following questions: a) *Would the extraction of gas pose a health risk, especially for the*

children, considering that the schools were close to the site?; b) How certain was it that no trash slides/fires would reoccur?; c) What will happen to those who are still living near the site?; d) What benefits would the residents enjoy from the project? After much discussion, the community did not endorse the project. The Barangay official claimed that the community was not involved in the planning of the Payatas Gas Project. Therefore, it can be concluded that no information from campaign/ environmental awareness program was conducted before the start of the project. In spite of the seeming lack of community endorsement of the methane gas project, the Quezon City proceeded with its plans secure in the thought that it was on the right path. Through the confluence of internal and external factors, the time seemed ripe for Payatas residents to quietly acquiesce to the project.

The months immediately after the tragic incident resulted in an outpouring of assistance to Payatas from NGAs, local and international NGOs, and church groups often requiring counterpart community organizations. To tap these offers of assistance, the people of Payatas formed people's organization for actual interest groups with various advocacies such as better livelihood opportunities, access to better health and educational services, women's rights, and security of land tenure. The optimism was high and the POG concentrated on its social responsibility program consisting of the following: 1) strengthening of workers' organization; 2) enhancing access to basic services; 3) establishing materials recovery and wastes volume reduction plant; 4) pursuing market development programs; and 5) enhancing the capability of the emergency response teams.

There are benefits in the electrification of Payatas producing 42,000 megawatts that was inaugurated in 2008. It has effectively contributed to the reduction of crimes in the areas. This is because of well-lighted streets not only within the Payatas dumpsite but in the Visayas Avenue Extension where people walk on their way in and out of Payatas.

As a result of the enactment of RA 9003 (Ecological Solid Waste Management Act) and the realization that there is money in recycling, it is believed that more households now recycle at source and deal directly with cart pushers who buy their recyclables. Furthermore, through POG efforts scavengers are now registered and pay an annual access fee that entitles them to an ID. The system involves in becoming a member in a cooperative which sets rules on the gleaning process, sharing profits, and access to savings and loans programs.

B.6 Organizational Strength and Institutional Support

The organization and institutional support of the whole conversion program lies in the City's commitment and political will to never let the year 2000 Payatas tragedy happen again. In light of this, the Quezon City LGU immediately issued an Administrative Order, dated November 2000, creating the Payatas Operations Group under the Office of the Mayor to manage, operate and secure the entire dumpsite, and act as the overall

regulatory body that oversees the operations of other related projects in the facility. It consists of 15 personnel.

Working with the POG are the various private sectors, NGAs and community partners. These are: a) the IPM Group of Companies for site rehabilitation and development, b) Pangea Green Energy, Inc. for the Biogas Emission Reduction Project, c) Holcim Philippines for the Used Tire Retrieval Project and Co-Processing of Residual Plastics, d) DOST-ITDI for the pilot testing of the Plastic Densifier Technology, and e) recyclers' association, which is composed of the dumpsite waste pickers, junk shops and recycling groups, for the recovery of the recyclable materials.

In each of these partnerships, Memoranda of Agreement were signed and ratified by the City Legislative Council for the legal protection of both parties as well as provide a clear delineation of functions between the POG and the partners.

Furthermore, the local government was able to mainstream the informal sector in Payatas (dumpsite waste pickers, junk shops and recycling groups) into the formal administrative system by organizing, accrediting and giving them proper identification. Aside from this, with the encouragement of the POG, the waste pickers were able to form and register the Payatas Alliance Recycling Exchange Multi-purpose Cooperative. This opened opportunities for financial assistance, education and skills training that will allow them to enter into small business ventures, and offer them alternative livelihood (Quezon City presentation n.d.).

Finally, the junkshop sector also received legal reinforcement through the Junkshop Standardization Program of the Quezon City government. Through the program, junkshop owners are provided access to certain incentives as per the Barangay Micro Business Enterprise Act of 2002 and City Ordinance No. 1576, S-2005.

B.7 Legislative and Policy Support

As mentioned in the previous sections, the immediate reaction of the local government officials of Quezon City is the establishment of the POG thru the issuance of an administrative order. The following year, Republic Act 9003 or the Ecological Solid Waste Management Act of 2001 was ratified by Congress. It stipulates that all LGUs to adopt a comprehensive and ecological solid waste management program, and mandates the closure and conversion of all open dumpsites into controlled disposal facilities/ and sanitary landfill. Despite this landmark legislation, it was only in 2004 that the City began the conversion efforts.

In May 2006, in compliance with the Authority to Close Order issued by the Department of Environment and Natural Resources (DENR), Quezon City implemented the Final Closure Plan for the facility. In 2007, the Payatas Methane Recovery Project was approved, and in February 2008, it was registered as a CDM initiative under the Kyoto Protocol by the UNFCCC.

Another law that is relevant to the case is RA 8749 or the Philippine Clean Air Act of 1999. It lays down the requirements for a comprehensive air pollution control and management programs. Section 11 of the law focuses on Air Quality Control Techniques, while Section 20 cites the specific provision banning incineration. Finally, Section 31 reiterates the country's commitment under the Kyoto Protocol to reduce the emission of greenhouse gases.

Other relevant legislations that provide the institutional frameworks for the Biogas Emission Reduction Project are: 1) for waste management - Republic Act 6969 or the Toxic Substance and Hazardous Waste Act and Presidential Decree 856 or Code of Sanitation; 2) for pollution control- Presidential Decree 984 or Pollution Control Law and the Republic Act 9275 or the Clean Water Act; and 3) for the environmental laws - Presidential Decree 1151 (Philippine Environmental Policy), PD 1152 (Philippine Environmental Code) and PD 1586 (Environmental Impact Assessment Framework).

CONCLUSION

The Biogas Emissions Reduction Project was the first registered Clean Development Mechanism (CDM) project under the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC), in solid waste management in the Philippines and in Southeast Asia.

The dramatic transformation of Payatas began in 2001, after the tragic garbage slide in July 2000. At present, it could be claimed that the site has transformed from tragedy to an opportunity. The benefits from the project are the following; 1) contributes to greenhouse gas reduction and mitigation of global warming, 2) improves the controlled dumpsite stability and safety, 3) generates renewable energy, 4) upgrade the lives of the communities through generation of employment and additional financial resources for the city, 5) builds capacity through education and training, and 6) comply with the major Philippine environmental laws, particularly the Ecological Waste Management Act and the Clean Air Act.

To enable and sustain the gains and improvements from the project, the following were recommended as discussed in the reports of the Payatas case: 1) institutionalize implementation of the program through the Quezon City Government's Environmental Protection and Waste Management Department and Payatas Operations Group; 2) institute legal measures by the City Government to ensure sustainability of the program and its components; 3) ensure methane gas management of the facility even after its closure through the revenues from CERs of the Biogas Project; and 4) make full use of the methane gas collected for conversion to energy, i.e., electricity.

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