



## **Project Profile** **Waste-to-Energy, Batangas Bay, Philippines**

### **Introduction**

Batangas Bay is situated some 100km south of Metro Manila and is experiencing a significant population growth resulting in a growing solid waste problem. The IMO selected Batangas Bay for a major environmental study in 1994. At the end of 1998, the IMO invited SPM to develop a waste-to-energy management project as an environmentally sustainable mixed-capital public private partnership. The early results of the feasibility study show that the project is viable. In the first instance however it is proposed that a demonstration facility be constructed for Batangas City. The same principles proposed for the provincial scheme will be applied to the Batangas City scheme.

In addition to the innovative business structure, a number of new social, technical and economic approaches are also proposed. These include turning unused sections and the buffer zone at the landfill site over to high return agricultural production throughout the life of the project. It is also proposed that the landfill site will host the Batangas Environmental Management and Research Centre to promote community awareness, waste reduction, recycling and community training.

The project has broken new ground in the Philippines by addressing a high profile environmental problem with innovative structuring and rigorous environmental standards. When implemented it will be a model to lead the Philippines in the development of municipal solid waste management. The outcome of this work will not only benefit Batangas, but other Local Government Unit's in the Philippines and throughout the East Asian region, in the application of the PPP financing process.

### **Technology/Innovation component(s)**

At the heart of the project is the potential to produce significant levels of energy from the digestion of organic waste. The application of this technology will be determined from research being undertaken by SPM in Samoa. The inclusion of anaerobic digestion of waste will greatly strengthen the MC-PPP opportunities. The project will be implemented at the community level so as not to destroy the livelihood of the merchants and junk collectors who currently survive on recycling.

The joint venture business has been designed to be financially viable and sustainable for 25 years. Basic financial parameters show that the average fee to the householders of Batangas ranges from US\$1.30 – 3.20 per month. The estimated minimum fee ranges from US\$0.26 – 0.64 per month. This minimum fee, attached to the household power bill, is key to the acceptance and success of the project.

### **Beneficiaries**

The beneficiaries of this project will be the people of Batangas City in that a well managed and integrated waste collection, treatment and disposal system will be established using PPP principles meaning it will be sustainable long-term. There will be public health benefits in that the risks inherent in improperly disposed wastes will be greatly reduced. There will also be other poverty alleviation benefits such as the



employment opportunities for the poor who currently scavenge on the existing waste dumps. In time it is envisaged that the provision of this employment will produce sufficient income per household that the children will be able to go to school instead of scavenging thus breaking the poverty cycle for these families. The improved waste collection systems will be available to all the communities in the city. Local waste collection companies will be offered the opportunity to become partners in the PPP business.

Community participation is an integral part of this project. Local NGOs are involved in the implementation of the project to ensure community education is happening in tandem with the development of the waste facility so that people become much more aware of their waste practices and how to change the negative ones. A recycling scheme will be established as part of improving the overall management of waste in the City. Improved waste collection, treatment and disposal services will also have flow-on public health benefits.

This project will provide for the first time in Batangas City, a fully integrated waste collection, treatment and disposal service to all consumers, from poor households to industrial sites. This project is also in keeping with new environmental laws and programmes the national government is currently implementing which are designed to improve the overall management of waste throughout the Philippines by 2006. Providing a recycling scheme and a more efficient waste collection system will underpin these efforts and encourage more careful approaches to waste products at the household level.

### **Global long-term benefits**

The capture of methane gas from the anaerobic digester process will have significant green-house gas emission benefits. As this technology is likely to be replicable in developing countries in general, this will have long-term and far-reaching benefits globally.

### **Achievements**

The development of an Integrated Solid Waste Management Scheme has been proven to be technically viable with a single centralized sanitary landfill facility, major and minor transfer stations, and large haul vehicles (20 tonne). In addition to this the financial viability of such a scheme has been proven using an Environmental Management Fee delivered to the community via the utilities bill. Using the utilities bill the Integrated Solid Waste Management Scheme is in fact financially robust. The legal viability of this approach has also been tested and found to be satisfactory.

### **Problems addressed/overcome**

As a result of two well publicised disasters involving significant loss of life and some very high profile uncontrolled dumpsites, overcoming public opposition to any facility dealing with solid waste is a very real challenge in the Philippines. Because of this the preferred site for the sanitary landfill is not available and SPM and the IMO have recognised that the best way forward is to build a demonstration facility at an existing dumpsite.



The Philippines is also politically complex with a number of levels of government influencing public works and services. This has made the public approval process, never easy when dealing with solid waste projects even more demanding.

### **Verifiable indicators**

1. The demonstration facility is constructed as soon as possible and its results are fed into the business plan for the larger facility.
2. Political issues, surrounding the identification of the land to be used for the main facility, are overcome by the time the demonstration plant is completed.

### **Stakeholders in the Project**

1. BESI is the Batangas Environmental Services Incorporated public sector entity established for the PPP. It comprises the Governor of Batangas Province, and representatives of the 34 municipalities.
2. SPM is an international development group using sustainable business based solutions to solve urban infrastructure challenges in the water, waste, energy efficiency/renewable sectors.
3. NZAID is the New Zealand Government's new international development agency that is a semi-autonomous body within the Ministry of Foreign Affairs and Trade. However the New Zealand government through its Official Development Assistance Programme has been supporting PPP initiatives globally since 1996, and SPM's work in the Asia/Pacific region specifically since 1998.
4. IMO is the International Maritime Organisation which is involved in this project through the Programme for Environmental Management in South East Asia (PEMSEA).

### **Scale of project site**

The Batangas City demonstration project will initially involve 10 hectares and 1 main transfer station. The site can however be expanded to incorporate the regional scheme. This would involve the following elements:

- A centralised sanitary landfill facility up to 130 hectares
- 6 Major Transfer Stations
- 40 Minor Transfer Stations
- + 40 5 tonne haul vehicles
- + 8 20 tonne haul vehicles
- Waste to Energy plant (landfill gas)
- Environmental Research Centre

### **Economics/Finance, Cost of project**

Achieved financing: SPM's costs funded by NZAID; private sector costs self-funded; Filipino costs self-funded; IMO costs self-funded.



Future financing: No additional funding is required to address the demonstration site. However the regional scheme will require funding. Summary of costs are as follows;

**Option 1: Landfill gas**

Initial Capital Cost (Landfill only) US\$ 5.85m  
Averaged Annual Operating Costs (over 20 years) US\$ 13.7m  
Averaged Cost per tonne US\$ 28.24

**Option 2: Waste to Energy Plant**

Initial Capital Cost (Landfill only) US\$ 12.4  
Averaged Annual Operating Costs (over 20 years) US\$ 14.6m  
Averaged Cost per tonne US\$ 8.04

**Self-Sufficiency / Longer-term financial plan**

As the management and operation of the waste facility will be designed as a Mixed-Capital Public Private Partnership, it will be constructed as a commercially viable venture which will be sustainable long-term. By adopting the MCPPP business model, the facility will generate an internal rate of return of around 15 percent over a twenty-five year time-frame.

Host fees are payments made to a community in recognition of hosting the Provincial Environmental Management and Research Centre. In the current financial analysis a US\$0.23/tonne provision has been made against all waste inflows. The facility is expected to receive a minimum of 100,000 tonnes/year in the first year of operation, increasing to 200,000 over the next 5 years, then to 300,000 tonnes beyond.

The construction phase of the Centre will employ up to 140 personnel and the ongoing management and operation of the Centre will create up to 70 permanent employment opportunities. The transfer station and transport operations (provincial wide) will require the services of up to 600 personnel, ranging from collection vehicle drivers and assistants to transfer station managers.

The Centre will attract downstream industry to service the development. Examples include: maintenance services (mechanical and electrical repairs), catering and food supply, alternative crop growing/distribution, accommodation/housing, banking and other small industry.

It will provide co-ordination and economic benefits for recyclers throughout the Province, and underpin improvements in health and sanitation, as well as the environment.

The Ecological Solid Waste Management Act of 2000, Sec 45 provides for a number of financial, and other incentives for the Local Government Unit's, NGO's and other committees which actually participate in sustainable solid waste management projects.

The gas production from the facility will be used as fuel for industry and/or power generation which is an incentive for industry to set up locally.

Land not being used at any one time for land-fill will be available for horticulture offering additional employment opportunities and income generation for the community etc.



### **Next Steps**

As mentioned, a demonstration facility is to be constructed in Batangas City. Up until now, SPM has not had representation on the ground but has used personnel resident in S E Asia to manage the project with support from the IMO. However it will be important for the next and subsequent phases of this project that SPM appoints a local representative well versed in the local political and economic scene. Funding is required for this position.

### **Potential for replication**

There is high potential for replication both in the Philippines where awareness is already there in the other Provinces about what is to be established in Batangas and the need to comply with the new national legislation about waste management by 2006. Across S E Asia, where solid waste management is an issue in most countries, this model could also be replicated.