This is a new section of the Public-Private Partnership Resource Center website and is currently in draft form. Your feedback is welcome: If you would like to comment on the content of this section of the website or if you have suggestions for links or materials that could be included please contact us at ppp@worldbank.org.

Photo Credit

Waste Treatment Facility Model for ERP, aerial view of modern water cleaning facility at urban wastewater treatmen

Waste Treatment Facility Model for ERP

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On this page: *Waste Treatment Facility leveraging a Existing-Build-Finance-Bulk-Tariffs model - Model 10 in the ERP Project Guidelines. Read more below, or visit Strategic Guidance for Country System Assessments, Guidance for Countries in Assessing ERC Projects, or Mobilizing ERC Finance.*

Project Type: Landfill gas

Sector: Waste

Applicable Project Methodology: AM0025 – Avoided emissions from organic waste through alternative waste treatment processes

This project type aims to reduce methane emissions by setting up and running composting facilities. These facilities will treat organic matter obtained from municipal waste. The project's core activities include pre-sorting and categorizing municipal solid waste (MSW), recycling plastic waste, and subjecting the organic portion to thermal-aerobic treatment. The primary objective of the project is to generate aerobic compost from MSW, which would otherwise undergo anaerobic decomposition in waste landfills.

Proposed Structure of this Public Private Partnership (PPP) Model

The project will be leveraging a **Existing-Build-Finance-Bulk-Tariffs** model. An experienced waste treatment operator is provided the concession to receive pre-agreed daily volumes of waste from the government or state-owned entity landfill operator, in lieu of landfill tipping at no charge. The private sector entity in this case will be raising financing and building the waste treatment facility, after which the investment will be recovered through the sale of the by-products (e.g. compost material), as well as through the emission reduction credits (ERCs) generated and sold in the voluntary carbon markets.

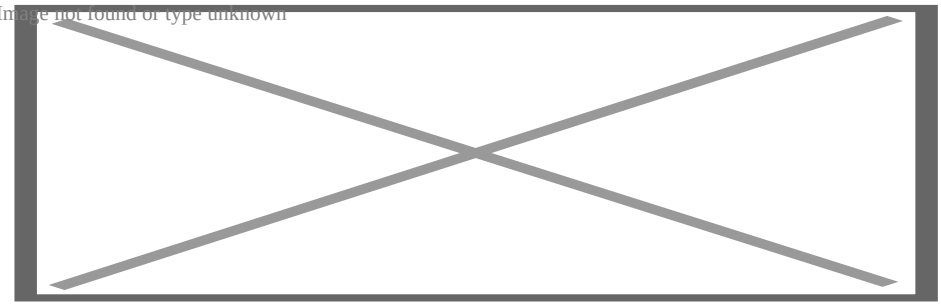
Table 1: Model Attributes

Dimension	Attribute	Description
Business	*New*	This model assumes that the government or state-owned entity grantor will be granting a concession to an experienced waste treatment operator, potentially through a competitive bidding process.
	Existing	
Construction	*Build*	The project involves the build of the new waste treatment facility in the vicinity of the landfill operated by the grantor.

Dimension	Attribute	Description
Refurbish		
Private Funding	*Finance*	The project company will be charged with raising financing for the new installation, both from financial institutions as well as the voluntary carbon markets.
Service	*Bulk*	Revenues of the project company will be sourced from contracted bulk purchasers of the waste treatment's by-products.
	User	
Revenues	*Fees*	Revenues in this model will be driven by the tariffs paid to the project company for the by-products produced by the waste treatment facility.
	Tariffs	

Proposed risk allocation of the Public Private Partnership Model

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Key features of PPP structure

- Private sector entity to design, build, finance, operate and maintain MSW project via long- term agreement with the ministry/ government or state-owned entity
- The private sector entity acts as the implementation partner, and is responsible for all activities related to the implementation, management, monitoring and reporting of the project over the project crediting period
- In exchange, private sector entity can earn the revenues from the ERCs generated from the project
- The government or state-owned entity benefits from the cost savings from not needing to treat municipal waste

Expected ERC end use

- End use can belong to project developer as part of additional revenue stream

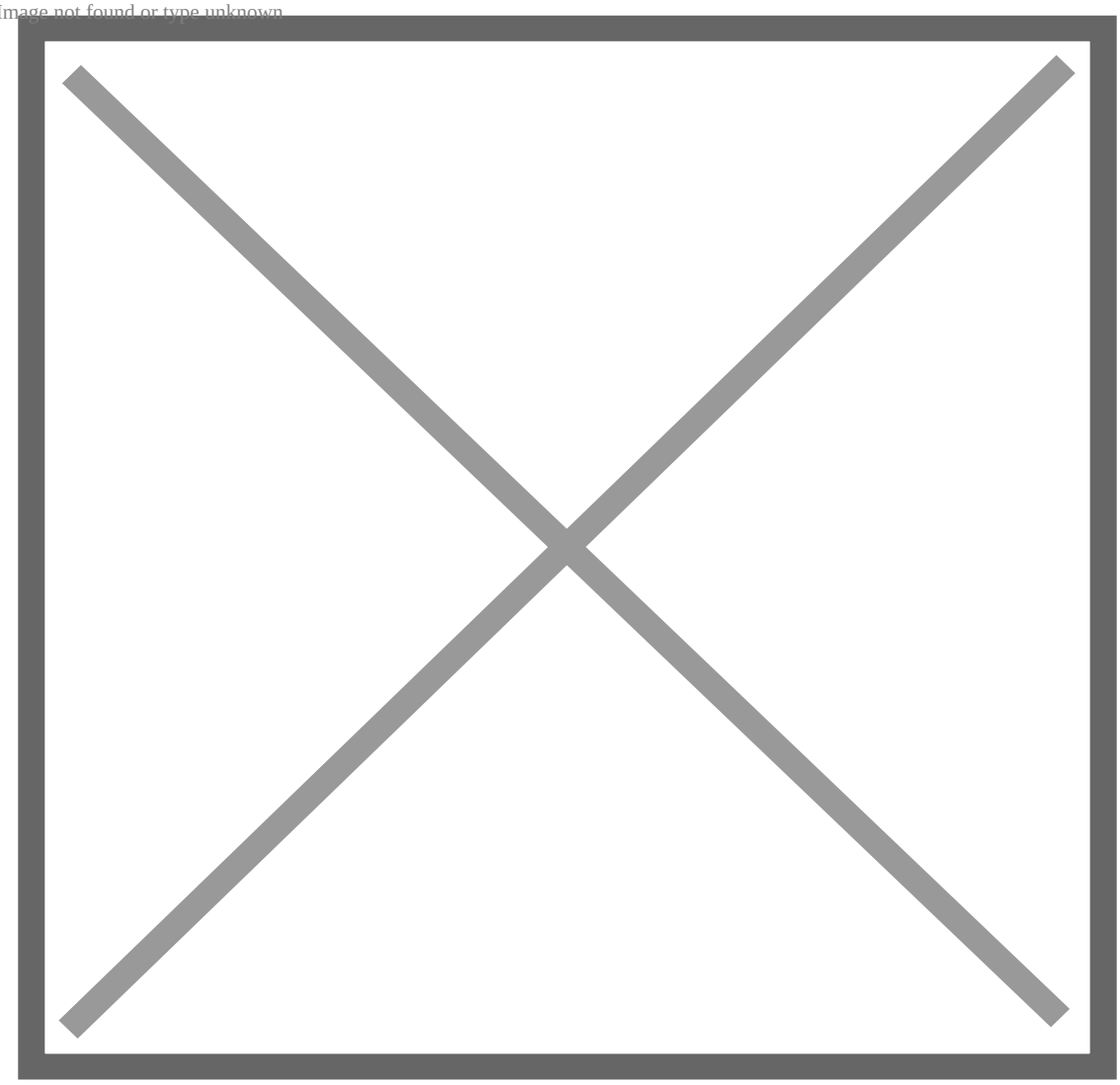
Key considerations/risks for proposed project

- Extensive stakeholder engagement required to ensure buy-in from operators of landfill sites as well as any other relevant stakeholders
- Need to ensure adequate technical local expertise in day-to-day execution to ensure minimal carbon leakage from treatment of MSW
- Stable political environment key to enable smooth execution of MSW project
- Partnering with a service provider for the project's marketing, sales and pricing is needed to identify potential offset buyers, negotiate contracts, and secure good target price per tonne to enable the financial viability of ERC generation
- Contracting a monitoring, verification and reporting (MRV) service provider with experience in conducting MRV and preparing the necessary documents for generating ERCs in a voluntary carbon market standard will reduce risk of registration and issuance delays or bottlenecks, and strengthen

credibility of project’s carbon integrity quality

Figure 1: Financing and Activity Flows for the Model

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Case study: Vietstar Municipal Solid Waste Treatment Facility, Vietnam

Project description

The project will reduce methane emissions by establishing and operating composting facilities to treat organic matter collected from municipal waste. The total designed capacity of 432,000 tons of solid waste per year with daily waste reception of 1200 tons and the proposed product of organic compost as 53,568 tons annually.

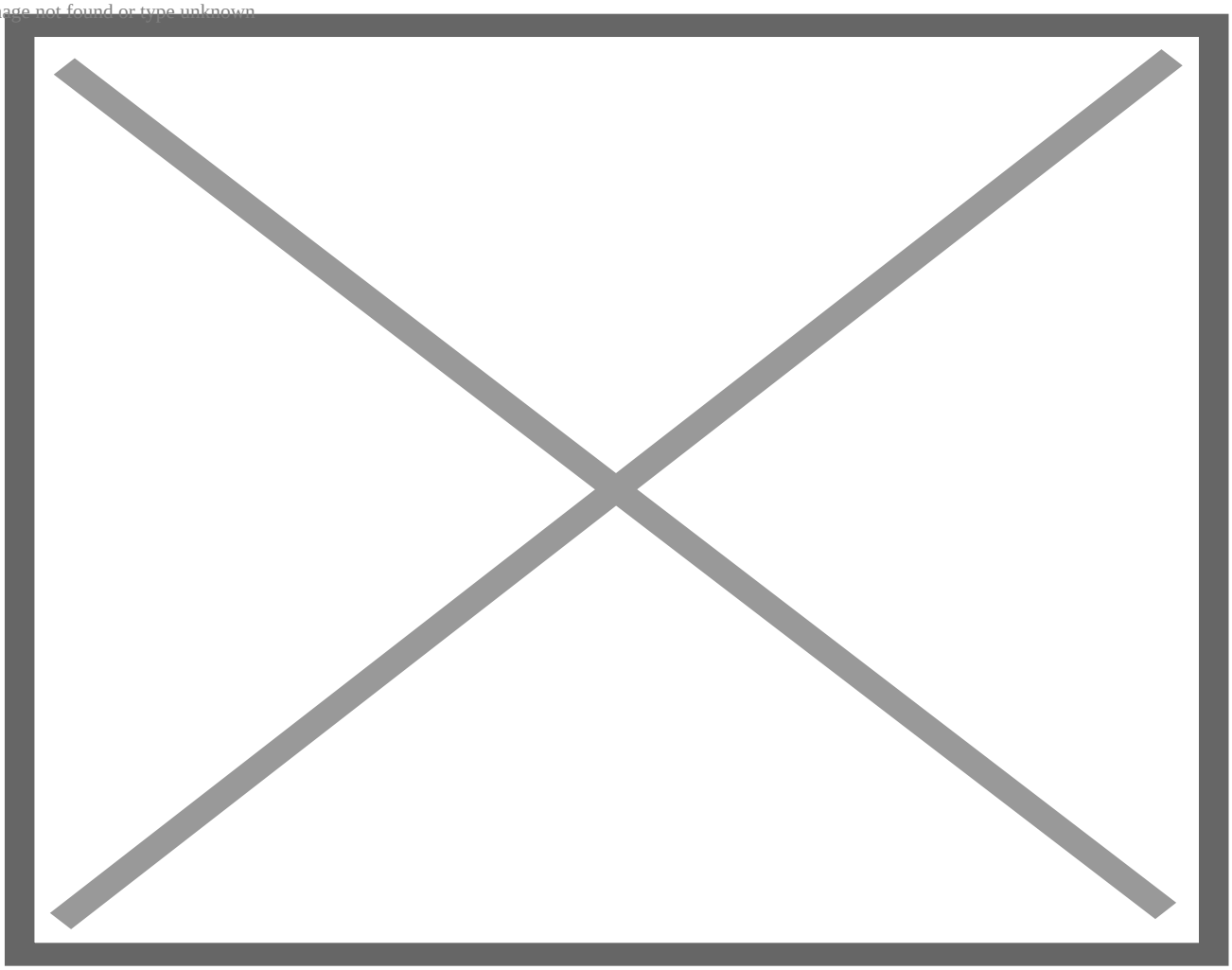
The proposed project activity involves the pre-sorting, classification of municipal solid waste (MSW), recycling of plastic waste and thermal-aerobic treatment of the organic fraction utilizing LEMNA composting technology. The main purpose of the proposed project is to produce aerobic compost from MSW that would have been left to decay anaerobically in waste landfills.

Targeted results

Expected annual ERCs generated from the program will be 181,492 tonnes.

Figure 2: Structure of Case Study PPP

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Vietstar Joint Stock Company, the project owner, operates a Public Private Partnership (PPP) with the Ho Chi Minh Department of Natural Resources and Environment (DONRE) via waste treatment contract signed between the two entities, agreed at $5[1] per tonne of waste treated.

Summary of the model financials

Assuming a similar project parameter as the case study, the project's Net Present Value (NPV) without ERC in- and outflows – only considering non-ERC inflows through other revenue streams or cost savings enabled by the project – is $1.18 million (M), while the NPV of ERC in- and outflows alone is $6.68M, reflecting the significant value that generating ERCs from the project will bring. Considering all ERC and non-ERC cashflows, the project's NPV is $7.87M, approximately 6.5 times of the NPV without ERC cashflows, which demonstrates a strong case for such project archetypes to consider generating ERCs.

Table 2: Summary of sources of inflows and outflows and key assumptions

Value component	Assumptions	Sources

ERC revenues or inflows	• Three issuances across the project's 10-year crediting period, at year 3, year 6 and year 10 • $9.05 per tonne today for 604,976 estimated tonnes of ERCs likely generated in the first issuance • 10% price increase to $9.95 for 1,209,952 estimated tonnes of ERCs likely generated for the second and third issuance	Average Gold Standard (GS) price of waste disposal in Asia from Allied Offsets database (2022)
Non-ERC revenues or inflows	• $45 per ton of compost sold for 53,500 tons of compost produced per year, over 10-year crediting period • $5 per ton of waste treated for plant capacity of 1200 tons per day and 360 days per year, over 10-year crediting period at maximum capacity • $400 per ton of recycled plastic and 5,400 tons recycled per year over 10-year crediting period	Project Design Document (PDD) of the case study
Investment cost	• $36M across project's lifetime, over 10-year crediting period	PDD of the case study
Project implementation	• $8.3M annual operation costs, over 10-year crediting period	PDD of the case study
ERC generation	• $2000 for preliminary review and performance review fees for registration at year -2 • $15,000 for each verification process across three issuance cycles • 15c per tonne for the first issuance • 30c per tonne for the subsequent two issuances	Gold Standard Fee Schedule

Table 3: Net cashflows summary (in USD)

Components	Sum of initial outlays	Sum of in- or outflows from crediting period	Total cashflow
ERC Component			
Revenues/Inflows	0	17,520,105	17,520,105
Costs/Outflows	-17,000	-483,732	-500,732
Net value	-17,000	17,036,373	17,019,373
Primary/Non-ERC Component			
Revenues/Inflows	0	74,002,500	74,002,500
Costs/Outflows	-36,000,000	-11,412,500	-47,412,500
Net value	-36,000,000	62,590,000	26,590,000

Components	Sum of initial outlays	Sum of in- or outflows from crediting period	Total cashflow
Net Present Values			
NPV	$7,868,052		
NPV (ERC Component)	$6,683,357		
NPV (Non-ERC Component)	$1,184,696		

Footnote 1: All prices are expressed in United States Dollars (USD)

Related Content

- **Guidance for Countries in Assessing ERC Projects (Download PDF version)**

Additional Resources

- Climate-Smart PPPs
- Finance Structures for PPP

This section is intended to be a living document and will be reviewed at regular intervals. The Guidelines have not been prepared with any specific transaction in mind and are meant to serve only as general guidance. It is therefore critical that the Guidelines be reviewed and adapted for specific transactions. Unless expressly stated otherwise, the findings, interpretations, and conclusions expressed in the Materials in this Site are those of the various authors of the Materials and are not necessarily those of The World Bank Group, its member institutions, or their respective Boards of Executive Directors or member countries. For feedback on the content of this section of the website or suggestions for links or materials that could be included, please contact the Public-Private Partnership Resource Center at ppp@worldbank.org.