



Case Study of Greenhouse Gas Credits from Landfill Gas Collection

“Cerro Patacon Landfill”
City of Panama, Panama

Presented by
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New Delhi, India

Outline of Presentation

- Landfill overview
- Operational challenges
- LFG project prefeasibility study
- Certified emission credits (CERs) as a beneficial opportunity
- Incentivizing using CERs
- Offsetting compliance costs with CERs
- Highlights

Landfill Overview



- Panama City Landfill
 - 20 year operational history
 - ~ 7 million tons of waste in-place
 - No gas collection system or venting wells
 - Large Scavenger community
- Operated by City of Panama



Operational Challenges

- Expense of compliance
- City's limited budget
- Poor landfill operations
 - Equipment issues
 - Cover practices issues
 - Slope stability issues
 - Leachate collection and treatment system issues
 - Presence of ~400 scavengers



BEFORE
(January 2006)

Prefeasibility Study

- Objective: Determine economic feasibility of LFG project under Kyoto Protocol CDM requirements.
- Analysis of two scenarios:
 1. Flaring only
 2. Energy Generation
- Results with a 0% investment and 6 years financing life and CER=\$6:
 1. IRR = ~ 40%
 2. IRR = ~ 30%

CERs as an Opportunity

- CAF approach the City to invest on the development of the LFG project under the Clean Development Mechanism (CDM)
- CAF finance the prefeasibility study
- CAF proposed to finance portion of the landfill operations through some of the revenue from the CERs
- CERs provided the city with steady revenue source to help fund the landfill operations



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Landfill Operations Tender

- Allowed city to solicit bids from contractors for design and operation of the landfill
 - International bid
 - 15 year contract
 - Based on cost per ton of waste, with minimum waste cap
 - All operational requirements to meet compliance
 - LFG recovery and control system included as part of the tender
 - CER incentive

Incentivizing using CERs

- City is using a portion of their CERs to incentivize Contractors performance
 - 100% of CERs – 0%
 - 150% of CERs – 5%
 - 175% of CERs – 10%
 - 200% of CERs – 15%
- To motivate the LFGTE Project, City has awarded all revenue from LFGTE project to Contractor and CERs from Offset of Fuel on LFGTE Project

Offsetting Compliance Costs with CERs

- Control of LFG migration to groundwater
- Improved liner systems
- Improvements of leachate collection
- Proper closure cap
- Relocation of scavengers
- Separation of medical waste
- Sludge drying

Highlights

- **Set Backs**
 - Long period of negotiation
 - Long tender process
- **Results**
 - Winning contractor proposed a cost per ton ~25% lower than expected
 - Signing of contract - January 2008
 - Notice to proceed - March 2008
 - Operator started implementation plan - March 2008
 - Engineering of LFG System - July 2008
 - Installation of LFG System – March 2009
 - LFG System Start Up – March 2010



UPSA

SCS ENERGY



6/8/2009



1/16/2010



6/8/2009



6/8/2009



8/26/2009



1/16/2010



6/8/2009



6/8/2009



2/4/2010

NOW



Sistema de Vigilancia URBASER

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Municipio de Panamá Urbalia Panamá (Informe Mensual Acumulativo)



Fecha: 09/01/2009 al 09/30/2009

Día	Cantidad CAMIONES	Total TONELADAS	Residuo URBANO	Residuo INDUSTRIAL	Residuo HOSPITALARIO	Residuo LODOS
2009-09-01	390	1777.65	1559.26	143.17	12.18	63.04
2009-09-02	411	1819.66	1464.37	256.71	9.36	89.22
2009-09-03	423	1914.27	1688.52	130.45	10.12	85.18
2009-09-04	408	1791.18	1517.82			
2009-09-05	407	1962.93	1629.71			
2009-09-06	193	1073.37	963.04			
2009-09-07	370	1642.76	1414.62			
2009-09-08	432	2054.8	1812.4			
2009-09-09	449	1907.33	1650.6			
2009-09-10	421	1838.68	1582.55			
2009-09-11	438	1816.21	1508.21			
2009-09-12	426	1874.7	1603.23			
2009-09-13	201	1102.95	1057.68			
2009-09-14	387	1787.69	1469.46			
2009-09-15	443	1989.58	1651.84			
2009-09-16	425	1825.33	1542.79			
2009-09-17	414	1878.96	1587.71			
2009-09-18	458	1874.97	1568.5			
2009-09-19	445	2040.88	1623.63			
2009-09-20	208	1081.28	1002.42			
2009-09-21	412	1773.54	1538.46			

Reporte x Zona





Thank You

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