LFG Used as Fuel for a Medical Waste Treatment Facility in Argentina

Facultad de Ingeniería
Universidad Nacional del Centro de la Provincia de Buenos Aires - UNICEN
Background of the project

Olavarría MSW management based on landfill design since 1998

MSW composition

- Pathogens: 9%
- Metals: 1%
- Glass: 4%
- Textils: 1%
- Polyethilene: 8%
- Plastics: 1%
- Cardboard: 1%
- Paper: 1%
- Others: 4%
- Organics (Rests of food): 70%

100,000 inhabitants
90 ton MSW/day
First Feasibility Study to assess options of MSW management (2002):

- Recycling of Materials
- LFG capture
- Fluff Production

Second Feasibility Study to assess potential uses of LFG (2004):

- Electricity production
- Direct use
- Combustion of LFG and CDM development project
Evolution of LFG project

Feasibility Study

Electric Energy Generation
- Low prices of electricity
- Complex regulatory market
- Economic Indicators

Direct use of LFG
- Low prices of NG
- High availability of NG
- Absence of users in the nearby
- Economic Indicators

Capturing and Flaring of methane

Plant of LFG

Community Plan
Example of Economic Indicator

Cost of electricity from LFG

US$ / kWh

Current price

Number of In-habitants
Organization of the project development

- Agreement between Municipality of Olavarría and UNICEN
- UNICEN as developer of:
  - LFG plant engineering design
  - CDM project cycle
  - ERPA negotiations
- Technical Assistance of CDCF World Bank
- Bidding process at national level
- O&M bidding process at local level
- Development of the Communitary Plan for a rural county
Preliminary estimation of LFG potential generation

\[ CH_4 = \sum_{x} A \cdot k \cdot MSW_T(x) \cdot L_o \cdot e^{-k(t-x)} \cdot RE \]
Plant Construction
Plant Construction
CDM project cycle

PDD and EIA Development
Oct’03-Apr’04

Negociation with CDCF
Oct´03-Jun´04

Price of CER
Transaction Costs
In advance Payment

First Auditory
DOE
June 2004

Call for Public Inputs
July-Aug’04

Validation Report
Aug´04

Ask for Revision to EB CDM
Feb’05

Registration EB CDM
Jan 2006

Eng, Development Bidding process
May-Dec/04

Bidding for LFG Construction plant
Feb/05

LFG construction plant
July-Oct/05

Start up of LFG plant
Oct-Dec/05

Beginning of CERs crediting period
Jan 2006

PDD Presentation National Authority
May’04

Evaluation of National Authority
Jun-Nov´04

Letter of National Approbation
Nov´04

Signing of ERPA MO-CDCF
09 Dec´04

Price of CER Transaction Costs In advance Payment

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Beginning of CERs crediting period Jan 2006
Community Development Plan

- Espigas county: 550 inhabitants
- 80 km from Olavarría city

- Installing of a safe water network
- Installing of a solar system for water heating at the local hospital as a pilot experience
Safe water...

- Tank 50 m³ capacity
- Capturing well 60 m deep
- 4000 m pipelines
- 160 households connected to the new network (almost 100%)
Solar system at the hospital

35-40% GLP substitution for heating water

10-15% substitution of total consumption LPG
Economics of the project

Total Costs (21 years) at NPV year 2005: US$ 640,000
Impacts of the Project

- **Environmental**
  - Reduction of GHG emissions
  - Mitigation of odors
  - Reduction of exploitation risks

- **Social**
  - Development of local technology
  - Use of local hand labor
  - Improvement of quality life of a rural community

- **Others**
  - Availability of LFG as energy resource
  - Development of capacity building at local level
  - Awareness on climate change, and potential renewable sources of energy from proper MSW management
Se firmó el convenio con el Banco Mundial por el biogás

Se pretende reducir la emisión de gases de efecto invernadero

El convenio es para el financiamiento de la conversión de gas del relleno sanitario. El Municipio construirá una planta para la captura del biogás y para la red de agua potable en Espigas, ya que el acuerdo contempla un proyecto de compromiso social. En el futuro, la reducción de gases que afectan al medio ambiente permitirá a Olavarría vender “bonos verdes” a otras naciones y así recuperar el costo de la inversión. Una iniciativa que apunta a colaborar en la protección del planeta.

Representantes del Muni.

“Olavarría es reducción de emisiones de gases de efecto invernadero”

El Municipio y el Banco Mundial firmaron un convenio para reducir las emisiones de gases de efecto invernadero. La planta de biogás será construida en Espigas, lo que permitirá vender “bonos verdes” a otras naciones y recuperar el costo de la inversión. Es una iniciativa de compromiso social llevada a cabo por el Municipio de Olavarría.
Barriers overcome

- Demonstration of a new activity related to MSW and renewable energy source
- Mitigation of GHG and certification of the project under a global mechanism
- Demonstration of the benefits of a proper MSW management
- Implementation of local technology and human resources for LFG development projects
- Improving the quality of life of a population
Barriers to overcome

- Generate models for the prediction of LFG potential based on local data
- Improve the procedures of landfill operation and capacity building for LFG capturing and use
- Promote a legal framework that help the development of LFG projects of capture and use as a renewable energy resource
- Searching of mechanisms that facilitate the acquisition of monitoring equipment for quality control and CDM procedures
- Promote the capacity building on LFG technology, human resources and engineering development
2nd phase: the present

- Identify and develop activities for the energy utilization of the LFG captured

- Transfer the knowledge and the gained experience for the developing of other projects in the region
The present

Use of the LFG as fuel for pyrolysis furnace for the treatment of medical wastes

Expansion of the capturing system to the current module under operation

Adaptation of the system to the new operative requirements
Energy balance

Furnace

16 m³/h NG
620.000 kJ/h

35 % bottled gas
0 % (Cell 1+2)

35 m³/h (Cell 1)
408.000 kJ/h (65%)

50 m³/h (Cell 1+2)
620.000 kJ/h

Burning of LFG

Burning of LFG

Flare
Financial Sources

- **EPA Grant 2008**: US$ 150,000
- **Municipality of Olavarría**: Civil works US$ 300,000
- **UNICEN**: Eng. & Design US$ 25,000
- **Lab of Environment Advance Techs**
Thank you for your attention

Contacts:

Estela Santalla
esantall@fio.unicen.edu.ar

Gabriel Blanco
gblanco@fio.unicen.edu.ar