



# **VEGA PROJECT**

## **Landfill Biogas Management Salvador da Bahia**

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# *SALVADOR LANDFILL*

## Concession contract:

- 20 years of operation + 20 years of post closure monitoring
- Attends European Standards (Bottom liner)

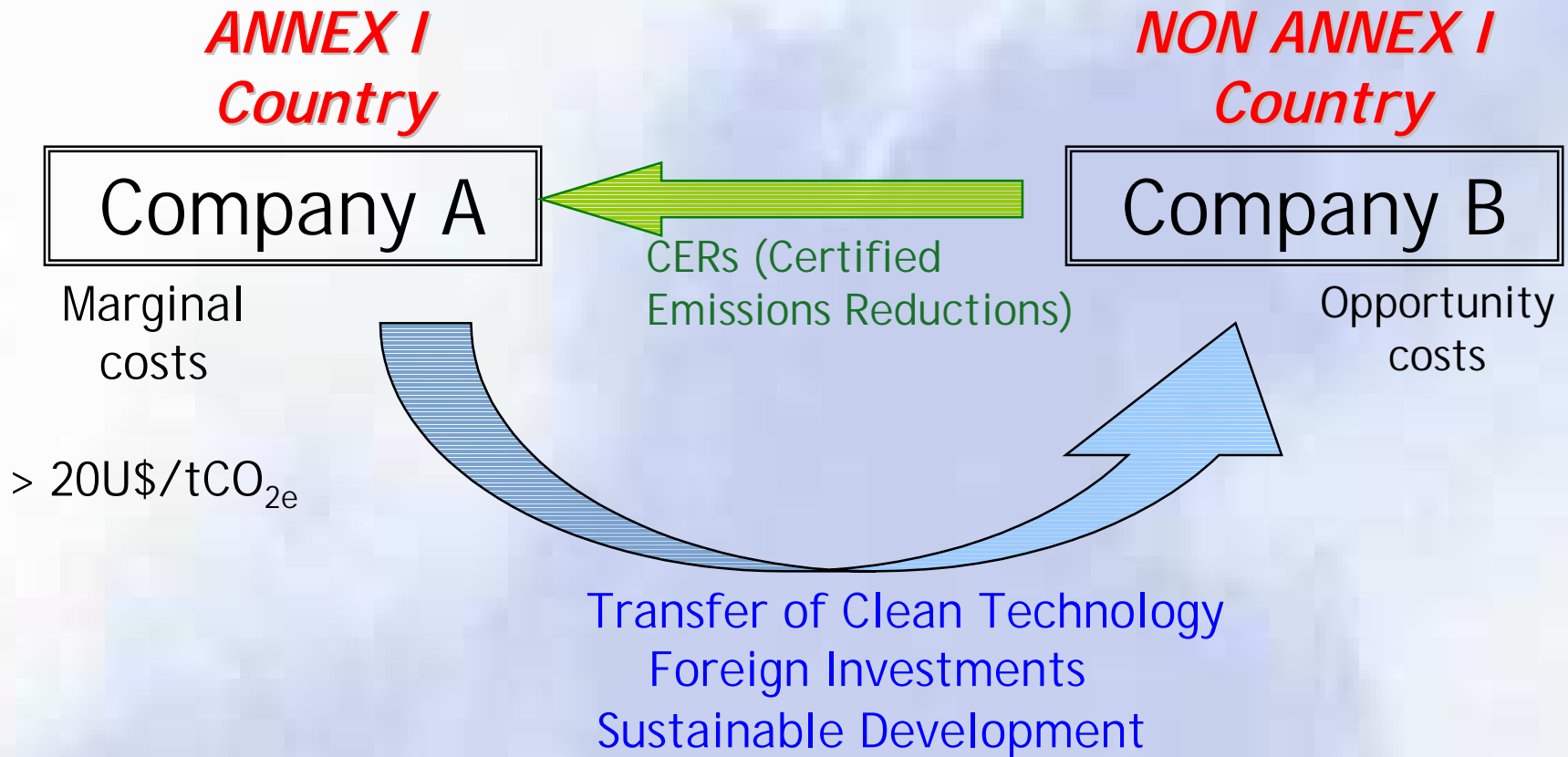
## Capacity:

- total: 18.000.000 tons
- Input: 800.000 tons/year
- 60% of organic matter
- Price: 25R\$/ton (6,5 Euro/ton)

1. CDM Project → CH<sub>4</sub> Emission Reduction
2. Gas-to-Energy Project
3. Sustainable development

# CLEAN DEVELOPMENT MECHANISM

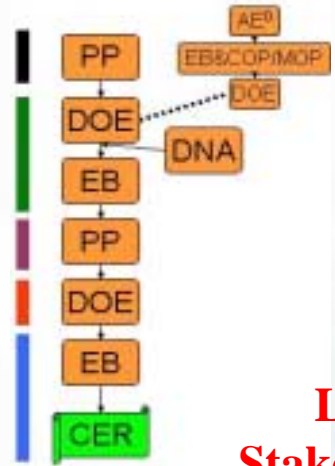
## The Concept





# CLEAN DEVELOPMENT MECHANISM

## Project Cycle:



**Local Stakeholders**

**Host government approval**

**1) FEASIBILITY STUDY**

(Sita's Guide book) - for landfills

**2) DESIGN OF THE PROJECT**

(Baseline, MVP and PDD)

**3) VALIDATION**

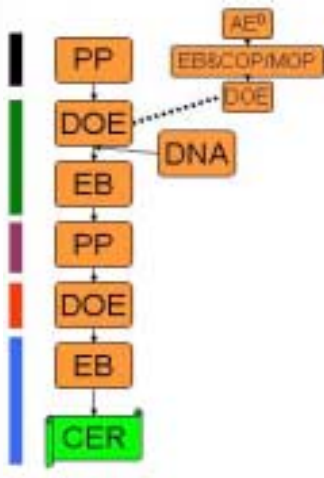
**Project validated by DNV Methodologies under review at CDM / EB**

**4) EB - REGISTRATION**

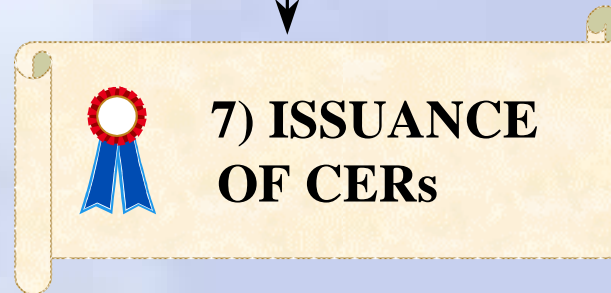


# CLEAN DEVELOPMENT MECHANISM

## Project Cycle: project implementation

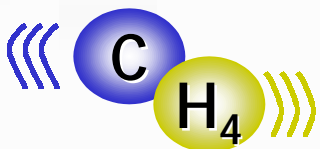


Independent consultants  
DOE  
(≠ of validation)





# LANDFILLS AND CDM IN BRAZIL



**ENVIRONMENTALLY  
CORRECT**

YES

**GHG EMISSION  
REDUCTIONS**

YES

**SUSTAINABLE  
DEVELOPMENT**

YES

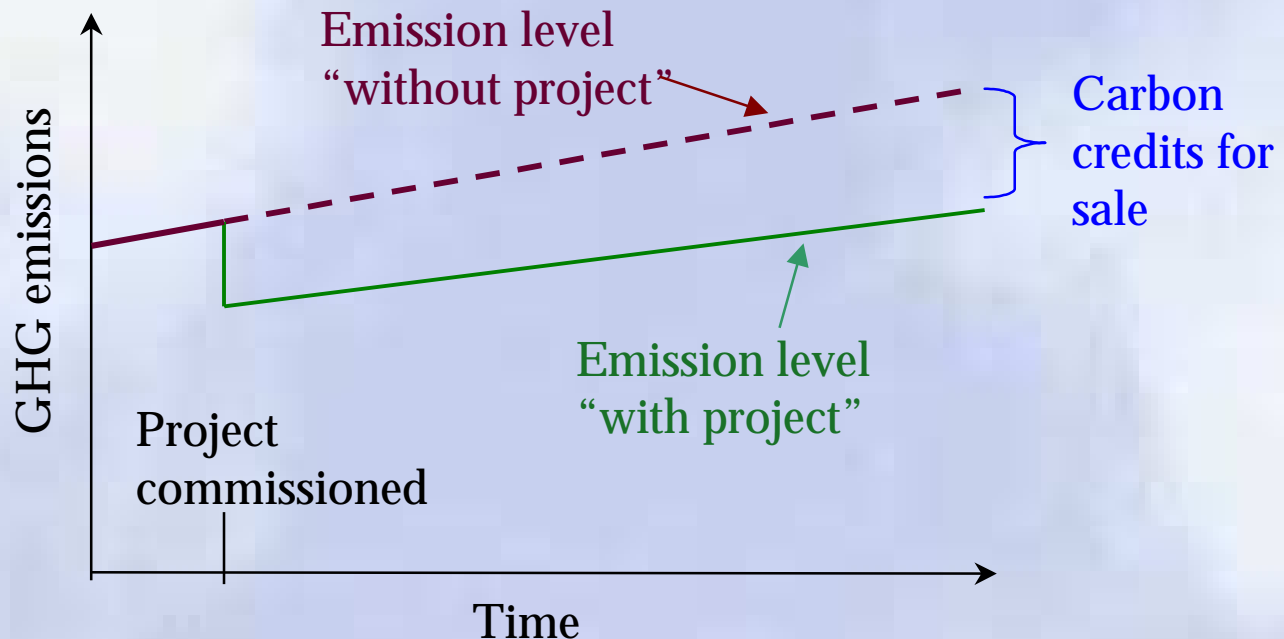


**CDM  
PROJECT**

# CLEAN DEVELOPMENT MECHANISM

## Technical Issues

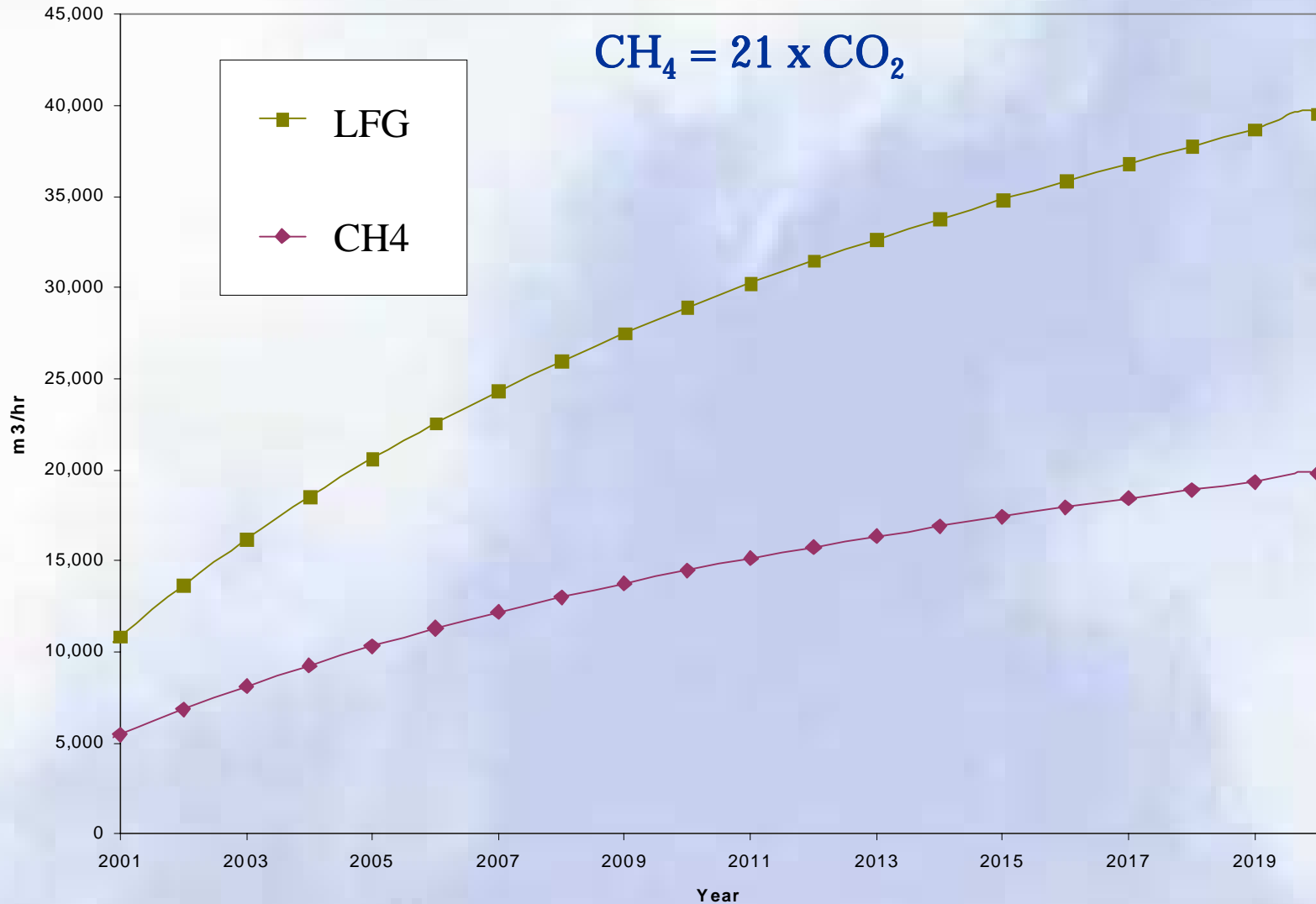
- ⇒ **Baseline** - Scenario emissions occurring without project.
- ⇒ **Additionality** - Occurs if the GHG emissions are reduced below from the emissions without the activity.







# BIOGAS EMISSION ESTIMATION



## TECHNICAL ASPECTS

**BASELINE**

Today's situation / concession contract:

- ✓ Atmospheric flares, isolated system: operation phase, cells not concluded;



20% to 25% of biogas destruction

concession contract obligation (technical proposal)

# TECHNICAL ASPECTS

**PROJECT**

## Biogas management:

Biogas capture system of high performance (efficiency above 80%), constituted by:

- final cover with GMB;
- Utilization of vertical and horizontal drains in more quantity (operational phase);
- partially leachate recirculation (bioreactor) ;
- destruction capacity suitable for the biogas production.



# TECHNICAL ASPECTS

## Network for biogas forced exhaustion



## Biogas destruction units





# *PRESENTATION PROGRAMME*

1. CDM Project → CH<sub>4</sub> Emission Reduction

**2. Gas-to-Energy Project**

3. Sustainable development





# ***GAS-TO-ENERGY PROJECT***

Potential (based on theoretical estimation)

<b>YEAR</b>	<b>Biogas capture (Nm<sup>3</sup>/h)</b>	<b>Power (MW)</b>
2003	11.600	8
2020	38.000	40



# *GAS-TO-ENERGY PROJECT*

## Technology

### 1. Motors (Otto cycle):

- best references
- imported ( $\approx 1.000$  US\$/kW)



### 2. Boiler + Steam turbine (Rankini cycle)

- national
- no reference
- under study



## Barriers:

### 1. Technical uncertainties:

- quality - ok (analysis by Spanish Lab)
- quantity - ???
- ↳ CDM will allow gas capture in real condition
- ↳ Verification of theoretical estimation

### 2. Economical uncertainties:

- capacity to be installed
- electricity commercialization
- dollar change



# *PRESENTATION PROGRAMME*

1. CDM Project → CH<sub>4</sub> Emission Reduction
2. Gas-to-Energy Project
- 3. Sustainable development**

## The project itself:

- Transfer of technology  
for biogas capture efficiency
- Increasing of the apparent density (bioreactor)  
for better use of the areas.
- Renewable energy production;



# *SUSTAINABLE DEVELOPMENT*

## Complemental actions:



- Financial resources to manage the Environmental Protection area called Joanes/Ipitanga;
- Environment education;
- Support for construction of a sorting center operated by former scavengers.

