

LOCAL USE OF RESOURCES FROM CLEAN DEVELOPMENT MECHANISM PROJECTS IN LANDFILL SITES IN THE CITY OF SÃO PAULO¹

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Introduction

The aim of this article is to describe and analyze the generation of funds and their use within the *Fundo Especial do Meio Ambiente e Desenvolvimento Sustentavel* – FEMA [Special Fund for the Environment and Sustainable Development], focusing on stakeholders' access to these resources. These funds are generated by trading Certified Emission Reductions (CERs) from Clean Development Mechanism (CDM) projects implemented at the Bandeirantes and São João landfill sites, both located in the city of São Paulo.

The Kyoto Protocol was established in 1997 at the Third Conference of Parties of the United Nations Framework Convention on Climate Change (UNFCCC) and came into force in 2005. This Protocol established that countries⁴ included in Annex I should reduce their greenhouse gas emissions (GHGE) by at least 5% between 2008 and 2012, in relation to 1990 emission levels. In order to assist Annex I countries to comply with their GHGE reduction targets, the Protocol established three flexibility mechanisms. Both the so called “Joint Implementation” and “Emission Trading” mechanisms are restricted to Annex I countries. The most important mechanism within the Brazilian context is the Clean Development Mechanism (CDM), that is, the implementation of activities which reduce GHGE in emerging and developing countries, resulting in Certified Emission Reductions (CERs), which can be bought by Annex I countries, thus helping them to comply with part of their targets agreed in the ratification of the Kyoto Protocol.

The Protocol considers that the emissions of the following GHGs are mainly responsible for climate change: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride

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(SF₆). Once the global warming potential (GWP) of each of these gases is known, it is possible to measure CERs by converting this figure to a standard unit defined in tonnes of carbon dioxide equivalent (tCO₂e). GWP is an index which evaluates the potential each gas has to cause global warming. Thus, a CER unit corresponds to the reduction or non-emission of a tCO₂e and can be traded within the terms of the carbon market regulated by the Kyoto Protocol. For CDM projects to generate CERs they must comply with the following project development stages as shown in Table 1.

Table 1: Development Stages of a CDM project

1) Project Viability Study
2) Drafting of the Project Design Document (PDD)
3) Validation by a Designated Operational Entity (DOE)
4) Approval by a Designated National Authority (DNA)
5) Submission to the CDM Executive Board for registration of the project
6) Monitoring of GHGE reductions
7) Verification of monitoring reports by a DOE
8) Issuing of CERs by the CDM Executive Board

Source: Own data

Apart from assisting Annex I countries in complying with their GHGE reduction targets, in line with article 12 of the Kyoto Protocol, these projects must also assist in promoting sustainable development in the host countries where they take place.

CDMs also encompass activities for reducing GHGE by establishing projects across a wide range of sectors, including landfill sites. These projects have a significant potential for reducing GHGE; this is due to the bacterial decomposition of organic waste under anaerobic conditions which produces methane, a greenhouse gas with a global warming potential 21 times higher than carbon dioxide. Therefore, they can potentially generate a large number of carbon credits.

Within the Brazilian context, few landfill sites use biogas to burn or generate energy, and those that do are landfills implementing CDM projects. In Brazil, like in the rest of the world, it is common practice to allow gas to escape directly from landfills to the atmosphere by using a methane drainage pipe. Therefore, the employment of practices to recover and burn biogas can be a positive differential for landfill sites.

These types of projects represent a differential for landfills with the potential to go beyond merely reducing GHGE, since they can also contribute towards improving the management and monitoring of the area. This is because apart from the monitoring required for the general operation of landfill sites, carried out by public environmental organizations, in landfills which implement CDM projects, auditing is carried out by organizations which validate these projects, the Designated Operational Entities (DOEs). The DOEs carry out independent assessment of a project's activity based on CDM requirements. Thus, DOEs will visit a project, check documentation relating to

it, and request changes and additional requirements, amongst other actions, in order to ensure that the activities of the project comply with CDM regulations.

It is worth highlighting that the concept of CDM encompasses both global issues linked to climate change and the promotion of development within the local context (BRASIL, 1997). In Brazil, the specifications related to a project's promotion of sustainable development are presented in a separate document, based on information from Annex III, Resolution n.1 of the Inter-Ministerial Commission on Global Climate Change (IMCGCC), which establishes both the benefits to the local area and how project activities contribute to each of the following aspects: environmental sustainability; improvement in working conditions and net job creation; income distribution; training and technological development; and finally, regional integration and working in conjunction with other sectors (BRASIL, 2003). The Designated National Authority (DNA)⁵ is responsible for analysing and approving the project according to the rules and regulations set up by the CDM's Executive Board⁶, focusing on an activity's sustainability criteria, as described in Annex III, Resolution n. 1 of the IMCGCC (BRASIL, 2003).

The importance of civil society's effective participation throughout the approval process of a CDM project is worth stressing. Another important point is that project proponents should send letters of invitation to all project stakeholders, taking into consideration the following agents: the local authorities and the chamber of deputies of all municipalities involved, the municipal and state environmental departments; the Brazilian ONG and social movement forum, community associations both directly and indirectly associated to the project's activities; and both the State and the Federal Public Prosecution offices.

However, according to Cole and Liverman (2011), only 40% of Brazilian projects clearly documented that all stakeholders who may have been affected by the activities of projects were invited to comment on them. Although deficiencies in relation to letters of invitation were noted, 86% of projects did provide stakeholder commentaries.

In Brazil, of the 499 CDM projects carried out in different sectors, 38 are projects in landfill sites, 14 of which are located in the state of São Paulo (UNEP RISOe, 2012). The Bandeirantes and São João landfill sites were chosen for empirical studies as their CDM projects have similar characteristics and because they are located within a municipality which is very complex to manage, in particular due to the amount of Urban Solid Waste (USW) produced on a daily basis - up to 17,000 tonnes/day (PMSP, 2010c).

Furthermore, 50% of resources resulting from the Certified Emission Reductions (CERs) generated by these projects are directed to the municipal authority, in particular to FEMA, a fund linked to the Green Areas and Environmental Municipal Department (SVMA).

This article is divided into four sections. Following the introduction, section 2 describes the methodological procedures employed. In section 3 the results are presented, identifying the financial resources generated by these projects and their employment. Finally, the conclusion follows in section 4.

Methodology

Data regarding the use of CDM project resources were collected by conducting a documental research of the annual reports relating to the monitoring carried out by the municipality, and from spread sheets detailing the application of CDM project resources resulting from the income from CERs. These were provided in 2011 by FEMA. Resolutions ns. 38, 48, 54, 83, 84 and 85 of the Special Fund for the Environment and Sustainable Development Council - (CONFEMA) and CONFEMA activity reports were also analysed. These documents will be made explicit during this article.

Data relating to CDM projects were obtained from documental research of monitoring reports and project design documents (PDDs) from the period 2003 to 2010. The United Nations Environment Programme Database (UNEP Risoe) was used. It provides monthly data on status, RECs generation, purchasers and DOEs responsible for the validation of CDM projects in landfill sites. Another source of data employed was the UNFCCC CDM registry, an online platform for registering CDM projects⁷.

In order to analyse the employment and appropriation of CDM project resources, the multi-agent model developed by Windrum and García Goñi (2008) was used. It was adapted to the context of CDM projects in landfill sites so as to map and identify the preferences of stakeholders, thus encompassing all the different agents in the political, economic and social spheres. Windrum and García Goñi approach innovation in public services through a multi-agent model, suggesting the inclusion of the government as an important agent, with particular emphasis on the relational component.

The use of the multi-agent model to understand the dynamics between social actors is widely employed nowadays and various analytic models have been developed (such as Multi-Stakeholders Platforms), focusing more directly on the management of water resources. Different authors use the multiplicity of agents and their interrelation in terms of conflicts and interests as a way of finding solutions to complex problems, such as the issues of managing USW, water and the scarcity of natural resources, among others (STEINS; EDWARDS 1999; WARNER, 2005; WARNER; VERHALLEN, 2004). These models allow for the possibility of involving civil society in the decision-making and consultation processes of various public authorities (JACOBI, 2010).

New institutional arrangements, such as those present in the multi-agent models, are characterized by a context of networking which presupposes that organisations are complementary. In order to attain positive results they have to be able to join forces, thus making best use of their combined potential.

Programmes involving multiple agents can be characterized by conflicting interests leading to difficulties in attaining collective targets. However, these new models of organizational management are important in order to formulate policies which deal with goods that have to be shared, both in the public-private and the global-local spheres. It is through conflicts that the interests, limitations, preferences and obligations of the various stakeholders emerge, as well as their common and specific

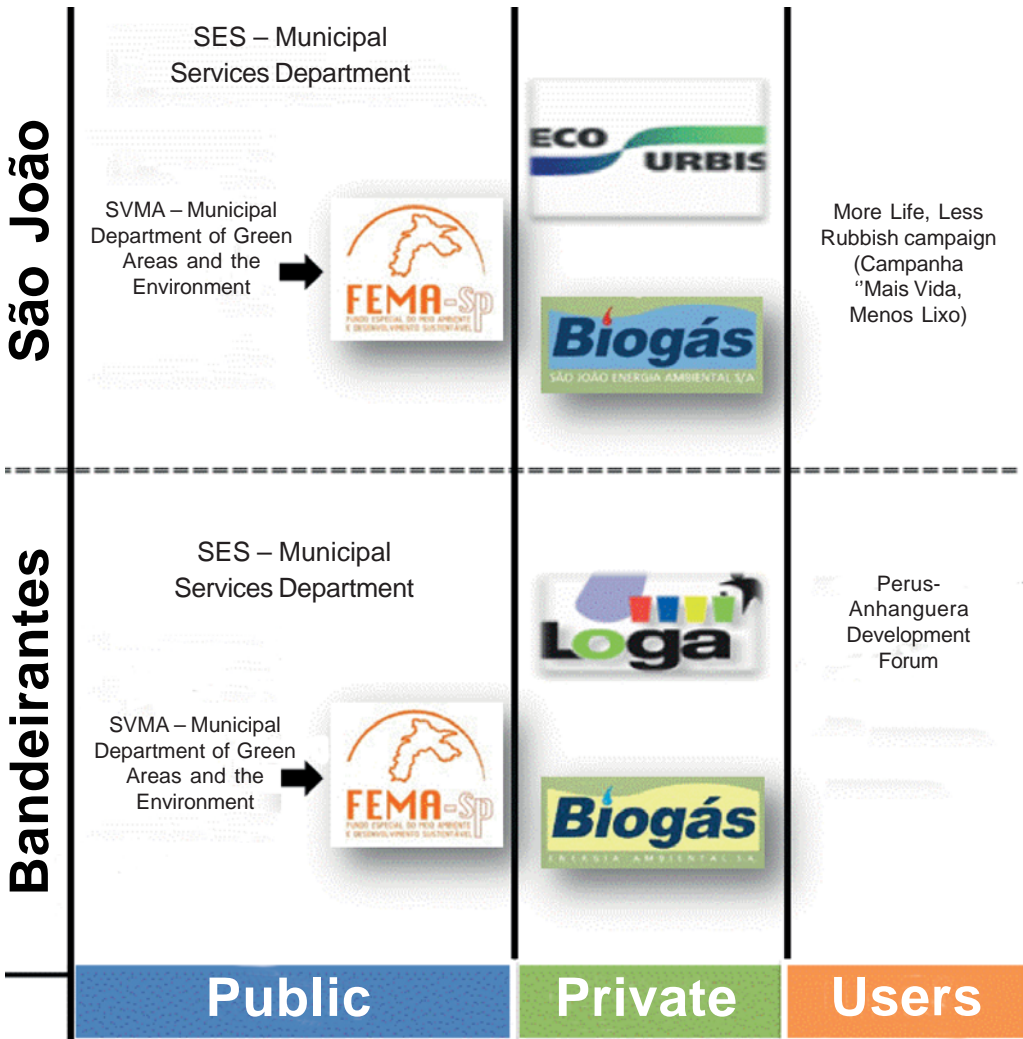
objectives. In this way, obstacles become clearer and can be overcome so as to comply with commitments.

However, there are concerns that these models - because they propose equity of rights and negotiating conditions between agents from different sectors of society - work within a fictitious reality, and end up strengthening the strongest groups instead of benefitting the weakest, allowing for the possibility of manipulation and for people to interact in a way that does not change their social-environmental relations (WARNER, 2005).

We sought to identify the main stakeholders involved in the management of the USW and the CDM projects at the Bandeirantes and São João landfills. In order to do this, data was collected using face-to-face interviews with a semi-structured questionnaire where the interviewer was free to add more questions in order to further explore points considered to be relevant to the aim of the study (MOURA; FERREIRA, 2005).

The questionnaire was organized as follows: environmental quality monitoring, gas emissions monitoring, closing of the landfill, access to CDM projects, relationship between stakeholders, contribution of CDM projects' resources to the management of solid waste. These topics were presented and discussed with the stakeholders during the second half of 2011, as shown in figure 1: a) the Municipal Department of Green Areas and the Environment, Municipal Services Department; b) the operating companies Ecourbis, Loga, São João Energia Ambiental S.A. and Biogás Energia Ambiental S.A.; c) the Mais Vida, Menos Lixo (More Life, Less Rubbish) campaign and the Perus-Anhanguera Development Forum, which are local community associations in the areas of the landfills being studied.

Figure 1:
Stakeholders – CDM Projects at the Bandeirantes and São João Landfill Sites



Source: Own data

Eight interviews were conducted in order to identify the generation and distribution of income resulting from RECs from CDM projects at the Bandeirantes and São João landfill sites and the use of these resources.

Results

By using data from documental research and the interviews with stakeholders, presented in figure 1, the aim of this section is to analyse the generation and distribution

of income originating from the trading of RECs from CDM projects at the Bandeirantes and São João landfill sites, and how these resources are being appropriated and used. In Table 2 the main characteristics of these two projects are highlighted:

Table 2 – Characteristics of the Bandeirantes and São João Landfill sites

<i>Characteristic</i>	<i>Bandeirantes Landfill</i>	<i>São João Landfill</i>
Year landfill started operating/closed	1979/ 2007	1992/ 2009
Waste tonnes/ day	4,000 to 5,000	6,000
Date the project was registered under CDM	20 Feb 06	02 Jul 06
1 st Period under the credit scheme	Dec 03 - Dec 10	May 07 - May 14
Average GHGE reductions for the first period (7 years)	7,494,404 tCO ₂ e	5,718,583 tCO ₂ e
Average tCO ₂ e/ year	1,070,629 tCO ₂ e	816,940 tCO ₂ e
Thermoelectric Plant: Installed Capacity	20 MW	24.64MW
Private Companies operating at the landfill	LOGA S.A./ Biogás Energia Ambiental S.A.	Ecourbis S.A./ São João Energia Ambiental S.A.
Waste received during years of operation (tonnes)	37,226,873	26,153,980

Source: Based on UNFCCC (2005a); UNFCCC (2005b)

Division of RECs between (public and private) agents (up to 2008) according to data obtained from monitoring reports and reports produced by consultancy companies responsible for developing the project during the CDM project period. This encompasses the collection and storage of all necessary data to calculate RECs estimated in the Project Design Document (PDD). These are also checked by a DOE, as specified in Table 3.

Table 3 – Division of generated RECs (2007 and 2008 Auctions)

Bandeirantes Landfill						
Auction	Average REC price (R\$/ tco2e)	REC monitoring period	RECs issued	2% UNFCCC ¹	PMSP ²	Biogás Energia Ambiental S.A
1º	45	2004 - 2006	1,670,306	33,404	818,451	818,451
2º	50	Jan 2007 - Mar 2008	908,037	18,160	444,938	444,938
Total			2,578,343	51,564	1,263,389	1,263,389
São João Landfill						
Auction	Average REC price (R\$/ tco2e)	REC monitoring period	RECs issued	2% UNFCCC	PMSP	São João Energia Ambiental S.A
2º	50	Jan 2007 - Mar 2008	527,868	10,556	258,657	258,657

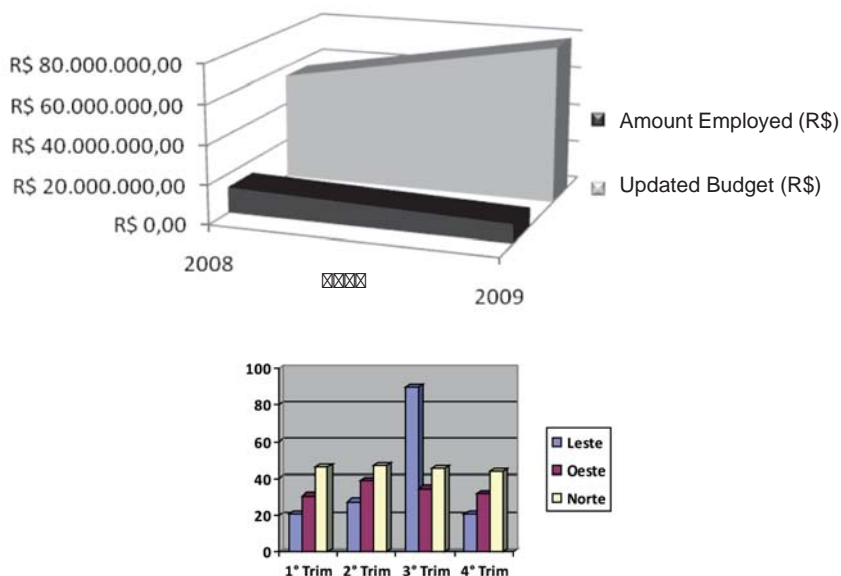
Source: Based on project monitoring reports (UNFCCC)¹⁰; PMSP 2012; Delbin (2011)

¹ All CDM activities, aside from small-scale forestry and re-forestry projects, as well as projects located in less developed countries, have to provide 2% of RECs to UNFCCC (Adaptation Fund).

² São Paulo Municipal Authority.

The 2008 and 2009 FEMA estimates¹¹ for CDM carbon credit projects were obtained from the São Paulo Municipal Authority's annual monitoring reports for the Bandeirantes and São João landfills. They refer to lots traded in two auctions which took place with the support of BM&FBovespa and employed in programmes and projects as shown in Graph 1.

Graph 1 – FEMA Estimates for carbon credit from the Bandeirantes and São João landfills employed in programmes, projects and activities



Source: Own production, based on the PMSP Monitoring Reports (2008 and 2009)

According to data analysed, it was observed that a small amount of the resources from the auctions of the Bandeirantes and São João projects was employed, compared to the updated budget (24.21% in 2008 and 12% in 2009). This amount had been set aside for a pre-planned payment.

The monitoring reports show that controls for monitoring FEMA's budget compliance are deficient, mainly due to the different income sources. Furthermore, a plan for using these resources was not published. It is worth pointing out that the municipality's accounting guidelines establish that: "... CONFEMA **must comply with the requirement** to publicize plans, programmes and projects developed with FEMA resources" (São Paulo City Monitoring Report, 2009, p. 387, bold added by authors).

Therefore the following provision relative to the 2007 fiscal year remained unregulated: "**Set up an appropriate plan** in order to **use the resources** of the so-called Certified Emission Reductions." (SP Municipality Monitoring Report 2008, p.374; and 2009, p. 387, bold added by authors).

In relation to 2010 data, FEMA reported that RECs resources were basically used to expropriate areas in order to implement the Central Itaim Paulista Ecological Park, expand the Anhanguera Park and establish the Perus Ribeirão Riverside (riparian) Park. For 2010 it was observed that a large amount of resources were used in comparison to the updated budget, namely 96.53%.

The CONFEMA Resolutions, published during the period when projects were being carried out, established the plans for the employment of financial resources originating from the first Carbon Credit auction. Table 4 shows the first plans from September 2007 and September 2008 for employing resources from the RECs auctions of the landfills being studied.

Table 4 – First plans for employing financial resources from RECs auctions of CDM projects at the Bandeirantes and São João landfills

CONFEMA Resolution/ Date	Object	Observation
N.38 2 nd October 2007	<i>Plan for using financial resources from the Carbon Credit auctions of the Bandeirantes landfill site</i>	Plan for employing financial resources from the Carbon Credit auctions of the Bandeirantes landfill site in the sub districts of Perus and Pirituba/Jaraguá: I. Perus Riverside Park; II. Bamburral Riverside Park; III. Setting up cycle paths; IV. Anhanguera Park; V. Fogo/ Pirituba Riverside Park; VI. 'Jardineiros de Bairro' [Community Gardens]; VII. Selective Rubbish Collection; VIII. Establishing Squares
N.48 29 th April 2008	<i>Supplementation of Resolution n.38/CONFEMA/2007, 2nd October 2007, which establishes the plan for using financial resources from the Carbon Credit auction of the Bandeirantes landfill site</i>	To unanimously approve the supplementation of Resolution n.38/CONFEMA/2007, 2nd October 2007, which establishes the plan for using financial resources from the Carbon Credit auction of the Bandeirantes Landfill, including the following items: IX. "Required works and services in order to establish, improve and recover green areas and complementary actions in the sub districts of Perus and Pirituba." X. Accessibility, monitoring and environmental education projects in the Anhanguera Park.
N.54 8 th July 2008	<i>Supplementation of Resolution n.38/CONFEMA/2007, 2nd October 2007, which establishes plans for using the financial resources from the Carbon Credit auction of the Bandeirantes landfill site</i>	To unanimously approve the supplementation of Resolution n.38/CONFEMA/2007, 2nd October 2007, which establishes the plan for using the financial resources from the Carbon Credit auction of the Bandeirantes Landfill, including the following items: XI. Supporting the project for the recovery of the Perus-Pirapora railway.
N.83 15th July 2009	<i>Directives for using the financial resources from the sale of carbon credits</i>	Contractual proration for Implementing Jardim Monte Belo Square - Vale do Saber, Subdistrict of Perus.
N.84 11 th August 2009	<i>Directives for using the financial resources from the sale of carbon credits</i>	To unanimously approve, as a directive for using the financial resources from the sale of carbon credits. These resources can be used in plans, programmes and projects with the purpose of employing natural resources in a rational and sustainable manner, to control, monitor, safeguard and recover the environment, as well as in actions relating to environmental education, focusing on issues of climate change in all regions of the City of São Paulo.
N.85 11th August 2009	<i>Use of financial resources from the sale of carbon credits generated at the São João landfill</i>	To unanimously approve the use of resources from carbon credit generated at the São João landfill site. These should be used in plans, programmes and projects with the purpose of employing natural resources in a rational and sustainable manner, to control, monitor, safeguard and recover the environment, as well as in actions relating to environmental education focusing on issues of climate change, prioritising the sub-districts of São Mateus and Cidade Tiradentes.

Source: CONFEMA Resolutions n. 38, 48, 54, 83, 84, 85.

Table 4 shows that planning for the use of FEMA resources is based on generalised directives. These do not clearly state which programmes, projects and activities should be carried out. They also do not state the time period for complying with these obligations.

Projects to be funded through RECs resources were proposed during CONFEMA's Regular Plenary Meeting which took place on 13th October 2009. Other actions projected to be set up with RECs resources were published by means of communiqué n. 05/FEMA/2010, 4th March 2010. The projects proposed are listed in Table 5.

Table 5 – Planned projects and actions to be funded by RECs from the Bandeirantes landfill, proposed during the CONFEMA Regular Plenary Meeting in 2009 and in Communiqué n.5, FEMA 2010

Project/Programme – Proposed at the plenary meeting 2009	Amount (R\$)
Tendering out of Executive Project and Works for the building of Praça [square] da Rua da Mina – Recanto dos Humildes / Paraiso. Area affected 10,350 m ²	1,351,918.21
Tendering out of the Plan for the neighbourhood of Distrito Anhanguera	1,491,690.53
Executive Project Contract for the Perus Riverside Park	1,545,000.00
Concession Contract for Praça Tarcon [square]	66,434.31
Concession Contract for Praça Jardim Monte Belo [square]	23,374.92.
Total Amount – Projects and Investments	4,478,417.97
Project/Programme – Proposed in FEMA Communiqué n. 05, 2010	Amount (R\$)
Setting up of Urban, Natural and Riparian Parks	43,207,810.00
Establishment of Nurseries	200,000.00
Establishing Environmental Projects	2,630,000.00
Implementation of Municipal Climate Change Policies	1,450,000.00
Total	64,581,518.00

Source: PMSP (2009c); PMSP (2010b).

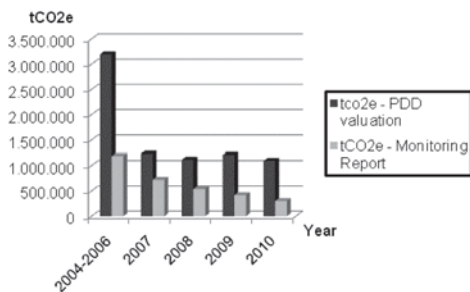
Table 5 shows that works to be carried out with funding from CDM projects at the Bandeirantes landfill will be destined almost in their entirety to establishing parks. In order to do this, SVMA will need to make further funds available, in addition to those from carbon credits, because the budget for projected works exceeded the amount of resources obtained from the sale of CERs.

Information from the Perus-Anhanguera Local Development Forum highlights that the implementation of parks is not a priority for the population. Thus, the Forum expects to hold a meeting with SVMA to renegotiate this project.

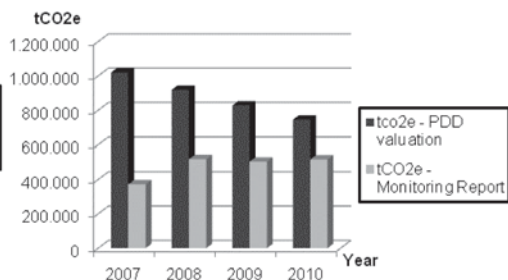
Many disparities in relation to what was announced and what was actually carried out are evident when comparing data over a longer period concerning published projects to be implemented with CDM funding.

It was also observed that the generation of CERs comply with less than half of what was expected by the project PCDs, as shown in graphs 2 and 3 which compare the estimated amount of tCO₂e in the documents with the amount actually generated as stated by the monitoring reports.

Graph 2: Bandeirantes Landfill



Graph 3: São João Landfill¹²



Source: Based on own data: UNFCCC, Bandeirantes and São João CPDs and monitoring reports for both landfills

This is due to the difficulties in better exploiting biogas. Brazilian landfill sites, like those in most countries, were not built with the aim of capturing biogas. They were projected only to ensure that waste was securely contained.

Furthermore, CERs traded on the carbon market were devalued. According to the CONFEMA Activity Report for 2009 and 2010:

“Due to various factors that had an impact in terms of economic issues, there was an appreciable drop in the value of CERs on the market. Therefore, the Department of Finances reported that carbon credit auctions expected to take place in the 2009 financial year did not occur. They should resume in 2010 when the world economy recovers and carbon credits can become profitable”. (2009, p. 21, author’s italics)

In June 2012, the Municipality of São Paulo auctioned 530,000 CERs at a unit value of • 3.3, these were purchased by the Swiss company *Mercuria Energy Trading S.A.* We stress that this value is much lower than that registered during the first auction, in 2007, when the minimum unit price for CERs was • 12.70 and the final price was • 16.20.

Another difficulty raised by SVMA relates to the type of competition established by FEMA. This is carried out by means of public announcements for the presentation of plans, programmes and projects in accordance with the directives, priorities and programmes established annually by the Municipal Council for the Environment and Sustainable Development (CADES).

That is, the sub districts of Perus and São Mateus, where the landfills being studied are located, have to initially formulate a project in order to apply for CERs funds. The issue of the quality of projects, plans and programmes was also raised. A high level of technical training is necessary in order for them to be proficiently compiled. This may often be a restricting factor for the local administrations in question.

Since the beginning of the CDM projects there have been discrepancies between documents which aim to publicize actions to be carried out with CERs resources. There is a large range of programmes and activities, and documents analysed diverge in terms of project type, timetables, objectives and amounts employed in activities, and so on.

Furthermore, it is not known which aforementioned proposals have actually been implemented, or even at what stage of development they are at.

The following hypotheses may explain the reasons for these divergences: a lack of initial experience on the part of FEMA to manage and apply the resources, considering that these are pioneer projects in Brazil; uncertainties in relation to the amount of CERs obtained; the need to make immediate announcements about these projects, due to the pressure from associations representing the local communities, as well as from the public in general.

Table 6, provided by FEMA in 2011, shows the projects that have actually been carried out with income from the Bandeirantes landfill CERs, and the amount paid for each activity:

Table 6 – FEMA – Bandeirantes Landfill Carbon Credits: Financial years 2009, 2010 and 2011

FEMA – Carbon Credits: Financial Year 2009	
Object	Amount Paid (R\$)
Book Purchase – Zeladores de Praças Project [square caretakers]	6,381.20
Uniform Purchase – Zeladores de Praças Project [square caretakers]	27,878.10
Personal Security Equipment – Zeladores de Praças Project [square caretakers]	16,504.06
Tools Purchase – Zeladores de Praças Project [square caretakers]	13,944.18
Speaker – Training Zeladores de Praças Project [square caretakers]	18,000.00
Undoing Contract Pirituba Local Administration	564,746.00
Squares (Tarcon, José Correia Picanço, Canhoba, Mogeiro, Cuitegi, Monte Belo, Flor de Imperatriz, Vale do Saber)	614,794.70
Senhor do Vale Park	644,031.51
CRAS - Anhanguera Social Services Centre	2,341,060.43
Expropriation for the implementation of the Ribeirão Perus Riverside Park	1,373,535.53
Total Amount Paid	5,620,875.71
FEMA – Carbon Credits: Financial Year 2010	
Object	Amount Paid (R\$)
Expropriation for the implementation of the Ribeirão Perus Riverside Park	8,700,523.26
Expropriations Anhanguera Park	20,387,680.83
Senhor do Vale Park and Ribeirão Perus Riparian Park Project	1,075,612.50
Expropriation of threatened area – Travessa José de Oliveira	10,324.38 ok
CRAS Anhanguera, Squares, ICU II (Intensive Care Unit) and Woodwork School	2,270,188.15 ok
Total Amount Paid	32,444,329.12
FEMA – Carbon Credits: Financial Year 2011	
Senhor do Vale Park and Ribeirão Perus Riparian Park Project	488,304.00
CRAS Anhanguera, Squares, UTI II and Woodwork School, Recycling Bins site	2,067,788.83
Total Amount Paid	2,556,092.83

Source: PMSP (2011)

In relation to the eastern region of the city of São Paulo [Zona Leste] programmes projected for 2011 from São João CERs are shown in Table 7. Data also provided by FEMA in 2011.

Table 7 – Works projected from São João Landfill CERs

Bidder/Project	Local Administrative Authority [sub district]	Initial	Amount (R\$)	Observations
Contracting of hydraulic installation works in area of the future Sapopemba park	SVMA/DEPAVE/ZONA LESTE	2010	20,148.04	To be carried out
Contracting of enclosing/fencing works in area of the future Sapopemba park	SVMA/DEPAVE/ZONA LESTE	2010	2,453,803.32	To be carried out
Contracting of electric installation of Sapopemba Park	SVMA/DEPAVE/ZONA LESTE	2011	19,367.66	To be carried out
Implementation of Nebulosas Park - São Mateus	SVMA/DEPAVE/ZONA LESTE	2011	5,321,062.39	To be carried out
Total			7,814,381.41	

Source: PMSP (2011)

When comparing Tables 4 and 5 with the previous tables which show the projects announced in 2007, 2008 and 2009, various disparities are observed in relation to what had been announced and executed, both in terms of the type of project and in relation to the amount allocated for carrying out these projects. Furthermore, there are no time limits for executing and using resources, an essential tool for evaluating and monitoring results.

In relation to accessing and meeting the wishes of the population close to the landfills, it can be shown that, up to now, their demands are not being considered when resources are allocated. For these agents, the allocation of project resources should fund research into new ways of managing waste and also promote landfill pre-construction programmes, dealing with the root of the problem by means of, for example, environmental education programmes, selective garbage collection systems, promotion of cooperatives for local garbage collection and NGOs dealing with recycling, among other measures.

The participation of stakeholders only happens during public meetings where the arguments of the municipality and the operating company's technicians prevail. The imbalance in access to information is one of the main issues highlighted. Furthermore, many obstacles need to be overcome so that local residents can participate in the decision-making process. They receive no support in order to understand what a CDM project is, particularly considering that most of the documents are in English. Project documents available to the population, such as the Project Design Document (PDD), merely state the amount of biogas being captured and are not the most appropriate means of demonstrating to society the transparency of the project.

There was resistance by local residents and recyclable material collectors to the implementation of the São João landfill CDM project. They believed that this mechanism would lead to the establishment of further landfills in the city and that the solution to issues of Urban Solid Waste does not lie in only building more landfills.

None of the recyclable material collectors' cooperatives have benefitted from CDM funds. As access to FEMA funding occurs through concession bids, these

associations find it difficult to draft projects in order to compete for this funding. Furthermore, cooperatives do not usually possess all the required documentation. Therefore, bureaucratic issues end up preventing cooperatives benefiting from the funding from projects developed in the city's landfill sites.

In fact, CDM project resources could contribute to reducing the amount of waste and other materials destined for landfill by seeking to fund recycling cooperatives and environmental education programmes, thus increasing the life-cycle of landfills. This would corroborate with the wishes of local communities in that they do not want more landfills to be established in their regions.

This overview of the generation and use of resources from the Bandeirantes and São João landfill CDM projects makes it clear that it is essential to evaluate all the results of actions carried out by the municipality to identify programmes, projects and activities that actually take into account the preferences of the parties involved. These are the local population living close to the landfills, the municipal authorities and the concession companies.

Conclusion

It was observed that activities carried out with funding from certified emission reductions did not meet their planned targets. There is also a need for better evaluation and monitoring of the allocation of these funds.

The main obstacles identified in local use and appropriation of funds were that there are many disparities between the projects announced and those that are actually carried out, and the wishes of the population affected have not been met by funds from certified emission reductions.

Rigour is necessary both in order to correct these oversights and meet budgetary obligations relating to the Special Fund for the Environment and Sustainable Development [FEMA], as well as in announcing actions to be carried out with funding from certified emission reductions. This is because disparities can compromise the credibility and transparency of the agents involved, as well as making it more difficult for stakeholders to monitor the development of projects.

Thus, the public audiences that were conducted could have been made better use of, promoting the real participation of associations and organisations representing local communities, who should have been previously instructed in relation to the provisions regarding Clean Development Mechanism projects carried out in landfill sites. Data obtained during these meetings could be used as a resource for information programmes to be developed by the appropriate municipal organisations with the aim of making local benefits resulting from the projects, both social and environmental, more in line with the expectations of the users.

In order for there to be changes in the management of Urban Solid Waste, it is crucial to implement a direct communication channel between service providers and users with the aim of gauging the level of satisfaction of the latter in relation to services provided and to encourage suggestions in relation to CDM projects in landfills.

Furthermore, access to information would ensure that users can follow up and monitor public services and projects dealing with the reduction of greenhouse gases.

In relation to the bidding for resources from the Special Fund for the Environment and Sustainable Development, which occurs through tenders set up annually by the Municipal Council for the Environment and Sustainable Development (CADES), the Certified Emission Reductions funds should be dealt with in a different way, cutting down on the bureaucracy of the process so that local sub district authorities can have easier access to these resources.

Finally, in relation to the cases studied here, there can be an improvement in the management of Urban Solid Waste by using CDM projects in landfill sites and resources from certified emission reductions, within a scenario where all stakeholders network and can participate. Both public and private proponents must interact and plan how the Bandeirantes and São João clean development mechanism projects can become an effective tool for local sustainable development taking into account the surrounding communities participation, considering the stakeholders access to these revenues. }

Notes

⁴ OCED Member-States (Organization for Cooperation and Economic Development) in 1992, considered to be economically developed or in transition countries such as Germany, Belgium, Croatia, Russia, France, Spain, Sweden and Greece.

⁵ In order for a CDM to be approved, it must be approved by the Designated National Authority (DNA). During this stage, voluntary participation and the project's contribution to the promotion of sustainable development in the host country is assessed. In Brazil, the DNA is represented by the IMCGC, a collegiate body made up of 11 ministries, chaired by the Minister of Science and Technology with the Minister for the Environment as Vice-Chair.

⁶ The CDM Executive Board is responsible for supervising the operation of CDMs. They are responsible for the following activities: crediting Designated Operational Entities; validating and registering CDM projects; issuing RECs; supervising the registration of CDM projects; improving and setting up the methodologies used in the projects, among others.

⁷ The details of the Project Design Documents (PDDs) and Monitoring Reports (MR) are found in the references.

¹⁰ The Monitoring Reports (MR) analyzed are available in the CDM register at: <http://cdm.unfccc.int/Registry/index.html> They are further detailed in the references.

¹¹ The figure R\$80,000,000.00 is found in the Monitoring Annual Report from the São Paulo Municipal Authority, fiscal year 2009.

¹² Idem

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LOCAL USE OF RESOURCES FROM CLEAN DEVELOPMENT MECHANISM PROJECTS IN LANDFILL SITES IN THE CITY OF SÃO PAULO¹

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Resumo: O artigo tem como objetivo descrever e analisar a geração e a utilização dos recursos destinados ao Fundo Especial do Meio Ambiente e Desenvolvimento Sustentável provenientes das reduções certificadas de emissões, leiloadas em 2007 e 2008, dos projetos do Mecanismo de Desenvolvimento Limpo (MDL) implantados nos aterros Bandeirantes e São João, no município de São Paulo, considerando o acesso das partes interessadas a esses recursos. A análise é feita com base em pesquisa documental e entrevistas, tendo sido adotada a estrutura analítica do modelo multiagentes, permitindo abranger os diversos agentes nas esferas política, econômica e social. Averiguou-se que o acesso e atendimento das preferências colocadas pelas populações do entorno dos aterros, não vêm sendo contempladas até o momento. Por fim, destaca-se a insuficiência de ações que coloque a perspectiva da gestão local de resíduos sólidos urbanos como diretriz para a apropriação local dos recursos do mercado de carbono.

Palavras chave: Mecanismo de Desenvolvimento Limpo; Gestão de Resíduos Sólidos Urbanos; Aterros Sanitários.

Abstract: This paper aims to analyze the generation and use of income, intended for the *Fundo Especial do Meio Ambiente e Desenvolvimento Sustentável* (FEMA - Special Fund for the Environment and Sustainable Development), from certified emission reductions (CERs) auctioned in 2007 and 2008, taking into account stakeholder access to these funds. These CERs were the result of Clean Development Mechanism projects established in the *Bandeirantes* and *São João* landfill sites in the city of São Paulo. The analysis is based on documental research and interviews, adopting a multi-agent approach, covering agents in the political, economic and social spheres. It was found that both access to funds and preferences of communities close to these landfills have so far not been addressed. Finally, the perspective of local management of urban solid waste has not been sufficiently taken into account in the directives, in order for there to be local ownership of carbon market funds.

Keywords: Clean Development Mechanism; Urban Solid Waste Management; Landfill.

Resumen: El artículo tiene como objetivo presentar y analizar datos sobre el generación y uso de los recursos asignados al Fondo *Especial do Meio Ambiente e Desenvolvimento Sustentável* de reducciones certificadas de emisiones, subastado en 2007 y 2008, de proyectos de Mecanismo de Desarrollo Limpio desplegados en los vertederos Bandeirantes y São João, São Paulo, considerando el acceso de los interesados a esos recursos. El análisis está hecho de pesquisa documental y entrevistas, adoptando el marco analítico del modelo multi-agente, que permite cubrir los diversos actores en las esferas políticas, económicas y sociales. Se encontró que el servicio de preferencias y acceso planteados por las poblaciones que rodean a los vertederos, no han sido tratadas hasta ahora. Por último, queremos destacar la insuficiencia de las acciones que ponen la perspectiva de la gestión local de los residuos sólidos municipales como pauta para la propiedad local de las características del mercado de carbono.

Palabras clave: Mecanismo de Desarrollo Limpio; Gestión de los Residuos Sólidos; Vertederos.
