

**PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE**

Report No.: AB3924

Project Name	Integrated Solid Waste Management and Carbon Finance Project
Region	LATIN AMERICA AND CARIBBEAN
Sector	Solid waste management (100%)
Project ID	P106702
Borrower(s)	GOVERNMENT OF BRAZIL
Implementing Agency	Caixa Econômica Federal (Caixa)
Environment Category	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> FI <input type="checkbox"/> TBD (to be determined)
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1. Country and Sector Background

Brazil is highly urbanized, and has 251 municipalities (with over 100,000 inhabitants) generating over 100,000 tons of solid waste per day (See Table 1). Many of these cities face problems with proper waste disposal.

Table 1. Overview of Municipalities with over 100,000 Inhabitants by Region

Region	Population	Number of Municipalities	Urban Solid Waste Generation (t/day)
Norte	6,155,006	16	6,862
Nordeste	19,312,522	50	20,635
Centro-Oeste	6,601,990	13	4,418
Sul	12,180,808	45	10,320
Sudeste	52,295,385	127	63,709
Total:	96,545,711	251	105,944

Source: Associação Brasileira de Empresas Públicas e Resíduos Especiais (ABRELPE)

The “2000 National Basic Sanitation Study” (IBGE 2002) revealed that, while about 80% of the urban population receives solid waste collection service, and over 99% of municipalities have some kind of collection service, the waste often tends to be improperly disposed of. In smaller municipalities, the majority of solid waste ends up in open dumps, contaminating soil and water, increasing air pollution and odor, and adversely affecting the health and safety of the surrounding population. In addition to the diverse environmental and social impacts of improper waste disposal, many municipalities face such sector-related challenges as inadequate financial resources, lack of qualified staff, and an entrenched culture of non-payment.

The 2000 IBGE study also shows certain improvements over time in Brazil’s basic sanitation, compared with similar research conducted in 1989. The major factors leading to improvements in solid waste management (SWM) in Brazil include: (i) a growing awareness among the population regarding waste related issues; (ii) the active engagement of the Public Attorney’s

Office (*Ministério Público*) in enforcing legal requirements to promote the closure of open dumps by municipalities; (iii) increased federal funding for the sector through the National Environment Fund; and (iv) increased sector support from several state governments.

In spite of these positive developments, however, a 2007 ABRELPE (Brazilian Association of Public Companies and Waste (Associação Brasileira de Empresas Públicas e Resíduos Especiais) study estimates that while 141,000 tons of waste are collected daily in Brazil, only 39% of the country's 5564 municipalities adequately dispose of their waste (i.e., at a sanitary landfill). Approximately 32% of municipalities deposit waste in controlled landfills, and the remaining 30% in open dumps. These numbers reflect the continued insufficiency of SWM in most Brazilian cities.

Table 2. Projections of Final Disposal of Collected Waste

Region	Municipalities with adequate final destination*	Municipalities without adequate final destination**	Adequate final destination (%)*
North	67	382	14.8
Northeast	448	1,345	25.0
Center-East	163	303	35.0
Southeast	789	879	47.3
South	691	497	58.1
Total	2,158	3,406	38.6

ABRELPE (2007). *Panorama dos Resíduos Sólidos no Brasil (2007)*.

* Sanitary landfill.

** Controlled landfill or open dump.

Decentralized responsibility and need for private sector engagement. Article 30 of the Brazilian Constitution stipulates that urban cleaning and SWM services are the responsibility of municipalities. Their efficiency thus largely depends on local government engagement with the sector. Yet, financial resources are generally inadequate and municipalities spend a small proportion of their budgets on SWM. The 2000 IBGE study also found that, of municipalities with waste collection and sweeping services, 15.9%, spent between 5 and 10% of their budgets on such services and 79.2% spent 5% or less.

Many municipalities have limited investment capacity and access to credit for SWM services reinforcing the need for private sector involvement in SWM. At the same time, a number of states are starting to show interest and are getting involved in preparing strategic plans, implementing regional landfills and fostering the creation of consortiums of municipalities.

In Brazil, as in other developing countries, municipalities invest first in waste collection and only afterwards in appropriate disposal. While nearly all municipalities collect their waste in some manner, only 8.2% have a selective collection system (IBGE 2000). As the economic costs of waste disposal tend to be concentrated less in the construction of disposal sites than in their

maintenance, it is essential to have an appropriate cost recovery mechanism. Still, more than half of all Brazilian municipalities do not charge for collection and disposal and, of those that do, most fail to charge sufficiently (about 90% of these cost recovery systems are linked to the property tax, or IPTU). The private sector has recently begun to show interest in long-term concessions, which promises to help promote the introduction of best practices in major cities. While in many cases, private concessionaires would not be able to generate profits with the low tipping fees paid by municipalities for their solid waste, additional businesses – such as recycling, treatment of medical waste, and special waste from private suppliers – can make waste disposal operations financially attractive.

Estimated sector investment needs. A study by the Ministry of Environment and the Caixa Econômica Federal (Caixa) estimates an annual need for US\$ 550 million in capital investment in facilities (landfills, transfer stations, recycling facilities) and equipment and US\$ 420 million in operations alone.¹ The sector currently spends approximately US\$ 2.2 billion a year (2004 figures) and directly employs 440,000 people. The private sector has concentrated its efforts in solid waste collection and street cleaning services. Privately operated landfills receive about 15% of all waste collected in Brazil. Relevant experience with private concessions for final disposal and treatment is limited (as of 2004, only 24 municipalities had some form of private sector concession). While private sector financing is critical to improving SWM services, a myriad of issues hamper investment.

Carbon Finance in the solid waste sector. Brazil has been among the most proactive countries in the Latin American region in pursuing Clean Development Mechanism (CDM) opportunities, and is currently third in the world (after China and India) in number of ongoing CDM projects. Both the private sector and civil society see Carbon Finance as a suitable instrument to help attract foreign investment and technology transfers. Brazil was an early advocate for incorporating CDM into the Kyoto Protocol, and its national sustainable development strategy is largely based on attracting external financing through the provision of global environmental services for biodiversity protection and climate change mitigation. In the solid waste sector, carbon credits can be an important enabling factor for improvements in final disposal and treatment, as well as for making the closing of existing dumps financially viable. The preparation of financially attractive and sustainable Carbon Finance projects by municipalities has the potential to catalyze sector investment. As a proponent of the Kyoto protocol, furthermore, Brazil has demonstrated a firm commitment to reducing GHG emissions. Several projects related to landfill gas capture and/or use for electricity generation are currently being planned or under review.

Final disposal siting and licensing. The Brazilian environmental licensing system is one of the most consolidated in the developing world. It is also, however, highly bureaucratic, which impedes badly needed investments in such basic services as the construction of sanitary landfills. Recent government regulations require a license prior to the awarding of concessions, thus reducing risk for private sector investment, but at the same time increasing the municipalities' responsibilities in project preparation. More streamlined and transparent licensing procedures for adoption and application by municipalities in the sector are still needed.

¹ These figures do not include remediation or clean up of old dump sites, which are often more expensive than building new sanitary landfills.

Waste Pickers. The presence of waste pickers at open dumps has been reported in over 56% of Brazilian municipalities. Although both Brazilian law and Bank safeguard policies require that the closing of existing dumps and opening of new landfills address the presence of waste pickers, only 16% of those municipalities have developed programs for their social and economic inclusion (IBGE 2002). Caixa has developed a comprehensive methodology for addressing the needs of this marginalized group in an equitable and sustainable way, and JSDF Seed Fund money has been obtained for multi-level stakeholder consultation of this strategy. JSDF funding is helping support the testing and revision of this strategy in a group of selected pilot projects.

Brazilian SWM-related institutions and legislation. At the federal level, responsibility for SWM services is shared among three Ministries (Health, Environment and Cities). Proper coordination among them, however, is lacking. The *Foro de Lixo e Cidadania* (Waste and Citizenship Forum) has recently been created in the aim of coordinating the agendas of these Ministries and other governmental and non-governmental organizations (a bill for a National Solid Waste Policy has been submitted to Congress, and is expected to be ratified in the coming year).

At the state level, the situation varies considerably. Only 8 states currently have specific solid waste legislation (Ceara, Goias, Mato Grosso do Sul, Pernambuco, Parana, Rio Grande do Sul, Bahia and Mato Grosso), 14 are in the process of preparing such legislation, and 7 have yet to begin. Although there had been a significant increase in federal funding to the SWM sector, and particularly for the closure of open dumps (in January 2004, Caixa and BNDES allocated more than US \$1 billion to Sanitation and SWM) available resources are still insufficient compared to sector needs.

Sector priorities. The Ministry of Cities has indicated that the prioritizing of SWM investments should contemplate: (i) the reduction of open dumps by 50% within 5 years; (ii) the unification and coordination of existing financing lines and programs; (iii) capacity building, with a focus on the development of integrated SWM plans for municipalities and states, with research and support to NGOs and technical assistance programs; and (iv) promotion of programs with socio-economic objectives linked to waste collection (e.g., the creation and enhancement of solid waste collection cooperatives, recycling and selective collection programs, capacity building, etc.).

2. Objectives

The project will contribute to the following higher-level objectives: (i) reduction of environmental and health impacts related to improper solid waste disposal; (ii) reduction of poverty and improved social inclusion of marginalized waste pickers; (iii) improvement of the regulatory, institutional and financial management of municipal waste and attraction of more private investments in the sector and (iv) reduction of emissions from the waste sector.

3. Rationale for Bank Involvement

Caixa, the second largest public Bank in Brazil, administers a Federal Guarantee Fund dedicated to private sector investments in municipal sanitation and solid waste projects. While the fund has been well-utilized for sanitation, disbursements for solid waste projects have been low, due in

part, to: (i) fiscal and financial constraints at the municipal level that require private investments in the sector; (ii) problems with the environmental licensing of landfills; (iii) social issues related to the presence of informal sector workers (“waste pickers”) working on open dump sites to be closed; (iv) lack of local government capacity to prepare SWM and Carbon Finance projects that are commercially viable for the private sector; and (v) a general mistrust between the private and public sectors. In light of the Bank’s experience with integrating SWM and Carbon Finance (e.g., NovaGerar, Brasília Sustainable Development Project and Teresina Municipal Loan), Caixa has thus approached the Bank to provide financing and technical assistance for the preparation of public-private partnerships and concessions of SWM projects with Carbon Finance that are sufficiently viable from a financial and technical point of view to significantly increase private sector interest and investment in the sector.

The Bank has worked with both the public and private sectors in Brazil and can serve as a valuable broker in this process by helping to ensure that the needs and concerns of all parties are included. The Bank’s technical and regional expertise would be useful in building local government capacity to streamline bureaucratic procedures (as entry barriers and risks are among the major impediments to private sector investment), the preparation of public-private partnerships and concession agreements, the conducting of transparent bidding processes, and the ensuring of the financial and technical viability of subprojects. The Bank can also bring considerable regional experience to bear on the sector, through lessons learned in similar operations in Argentina, Colombia, Mexico, and elsewhere.

With its extensive experience in Carbon Finance, the Bank is well-positioned to help integrate and maximize the potential of Carbon Finance in the solid waste sector, as well as to strengthen Caixa’s as a Carbon Finance intermediary in the scaling up of Brazil’s Carbon Finance market. The GHG emissions auction process that the Bank is currently exploring in Brazil would also be of potential benefit to the project.

Links to the Brazil CPS and Sectoral Strategies. The proposed program is in line with Brazil’s national development priorities, as expressed in the Brazil CPS, including:

- addressing issues of extreme poverty by developing strategies to improve living conditions, create jobs and reduce health risks to poor people living on existing dumps;
- implementing an integrated national legislation and strategy for improving municipal management and accounting of solid waste services and reducing the environmental and health impacts of improper waste disposal; and
- improving the overall regulatory and institutional climate, so as to attract more private investment in the sector.

The project is linked to several Bank project and investments, namely:

- Municipal projects with SWM components (Brasilia, Ceara, Rio Grande do Sul);
- the Low Carbon Brazil Case Study, which will include specific analysis on accelerating the phasing out of GHG emissions from the Brazilian solid waste sector;
- the National Environmental Program with MMA, which has been providing resources to states for strategic planning in the solid waste sector;

- the National Environment System (SISNAMA), which will help states and cities prepare environmental assessments and licensing for landfills and other solid waste treatment facilities;
- the project also builds upon a number of TA activities financed by PPIAF (on privatization models), JSDF (waste picker inclusion strategies); and PHRD (landfill gas studies); and,
- Carbon finance projects of Novagerar I and II

4. Description

1. The project will contribute to the following higher-level objectives: (i) reduction of environmental and health impacts related to improper solid waste disposal; (ii) upgrading and enhancement of existing working and living conditions of affected waste pickers; (iii) improvement of the regulatory, institutional and financial management of municipal waste and attraction of more private investments in the sector and (iv) reduction of emissions from the waste sector.

A. PROJECT DESCRIPTION

The project has two components:

Component 1: Infrastructure Investments in Solid Waste Disposal and Treatment. Through a credit line of USD 195 million, this component will finance public or private sector infrastructure investments to improve final waste disposal and treatment within comprehensive SWM strategies, so as to reduce negative environmental and health impacts. The project will assist states and municipalities in the preparation of subprojects and institutional arrangements for private sector participation in waste treatment and final disposal. Carbon Finance opportunities will be assessed and, where viable, integrated into subprojects. The component supports three types of activities:

- (i) construction and operation of sanitary landfills;
- (ii) closing of open dumps and management of environmental impacts; and
- (iii) development of alternative waste treatment facilities (e.g., transfer stations, composting and recycling facilities).

Component 2: Technical Assistance and Institutional Strengthening and Project Management. This component is focused on developing an integrated approach to SWM at the national, state and local levels. Regulatory, financial and technical guidelines will be developed to enable and encourage private investment in the sector. The component is divided into three set of activities:

- (i) *Technical assistance and capacity building for the public sector in project preparation for private sector involvement.* Caixa is setting up a Project Preparation Fund to provide technical assistance to the public sector in subproject preparation, focusing on such key issues as: (a) increasing accountability and transparency in service delivery; (b) improving municipal capacity in financial management and cost recovery; (c) assessing the technical and economic viability of final treatment and disposal alternatives; (d)

developing new models for private sector participation (e.g., contracts, bidding documents, and the supervision and monitoring of services); (e) environmental licensing of final disposal and treatment activities; (f) addressing the presence of waste pickers in an equitable, viable and sustainable way; and (g) promoting the preparation of Carbon Finance projects and maximizing their benefits. Expenditures incurred as part of project preparation will be recovered through the private operator. In other words, the public sector will include the preparation costs in the bidding documents and require that these expenditures are repaid by the winning bidder.

- (ii) *Technical assistance to strengthen Caixa's capacity to invest in SWM and support Carbon Finance projects.* An important project goal is to strengthen Caixa's institutional capacity to manage credits and design appropriate lending products for investment in the waste sector and blend these, wherever viable, with Carbon Finance. The Bank will provide the necessary technical support to build the Caixa team's capacity to apply the necessary Bank policies in subprojects, so as to allow Caixa to serve as both a financial intermediary for future on-lending IBRD resources to the private and public sectors for finance investments (described in Component 1), as well as for delivering Carbon Finance to projects that generate carbon credits. Caixa is allocating its own training budget and resources to these capacity building activities (as it has done throughout Project Preparation).
- (iii) *Project Management.* This component will ensure that the proper management and supervision structures are in place to monitor project implementation. The project's complexity and nature require that considerable resources are devoted to this component. It is also important that external experts and consultants are involved to assist Caixa in the technical aspects of implementation.

5. Financing

A summary of main costs by component is provided in the table below:

Components	Indicative Costs	IBRD Financing	Caixa Financing
1. Solid waste subproject investments	195.00	45.00	150.00
2. Project Management and Technical assistance (to public sector and Caixa)	7.20	5.00	2.20
Total:	202.20	50.00	152.20

6. Implementation

The project's overall financing structure involves a Financial Intermediary Loan (FIL) to Caixa as a financial intermediary which will on-lend to states, municipalities or private operators to implement or improve final urban waste disposal and treatment facilities, or rehabilitate existing dumpsites. The project blends IBRD lending (USD 50 million) with counterpart financing from

FGTS (USD 150 million), managed by Caixa. Through a SWAP operation, the Bank will convert the IBRD loan (in USD) into local currency (BRL) at the time of disbursement, so that Caixa's loan obligation will be in BRL.

The IBRD loan is designed to complement public funds managed by Caixa from FGTS (USD 150 million). The FGTS is the main national fund for Water and Sanitation Projects in Brazil and an important part of the funding for the Housing Finance System.

Caixa's GESAN will be responsible for project implementation and will coordinate this project and interface with the Bank's project team. SUDES will support GESAN in the technical execution of the project at the local level. SUDES' technical staff – including engineers, environmental and social specialists, architects and lawyers – are directly responsible for technical evaluation and preparation of subprojects and supervision and monitoring of subproject implementation.

Besides providing financing for the implementation of projects by the public or private sector, Caixa will manage a technical assistance fund to provide support to municipalities in project preparation. Based on a Memorandum signed between Caixa and a public beneficiary, consultants will be contracted by Caixa to help cities and states in preparing solid waste projects, especially regarding socio-environmental, financial, institutional and bidding aspects of the sub-projects. Specific criteria have been prepared for sub-project selection.

7. Monitoring and evaluation of outcomes/results

The Results Framework provided in Annex 3 will be used to assess project effectiveness during implementation and to measure final outcomes upon completion. The main expected results are the positive environmental and social impacts achieved through improved waste treatment and disposal, which will be facilitated by increased private sector involvement.

The main expected positive results are the environmental and social benefits to be realized through improvements in waste treatment and disposal. Subprojects to construct landfills or rehabilitate dumpsites will integrate environmental monitoring activities, and operators (whether public or private) will be required to continuously monitor the quality of groundwater, surface water, and soil and air quality, so that any problems may be quickly identified and addressed. These data can be used to assess projects impact on the surrounding environment and population.

Caixa's performance will be closely monitored through assessment of its key financial indicators, to ensure its soundness. Monitoring of the project portfolio and documentation of the key indicators will also be important to demonstrate the viability of SWM lending and encourage commercial banks to "crowd-in" to the sector.

Projects that include carbon finance will require independent monitoring reports for carbon emissions reduction and project sustainability (which will necessarily entail monitoring of other environmental impacts). This will ensure that monitoring is fully incorporated into project operation and costs. The monitoring system will be operational by effectiveness, as Caixa will be customizing the existing systems at no additional cost.

8. Sustainability (and Replicability)

The structure of the credit line will create a sustainable fund. For SWM lending, Caixa has had close to zero default in the last five years due to strong guarantees and commercially oriented policies. To protect against loan-defaults by the public sector, public loans are guaranteed by the Federal Treasury Department. If loans become past-due, Caixa receives direct payments by the Treasury Department from automatic constitutional transfers to the respective sub-national public entity. Private sector loans are guaranteed through the opening of a designated account at Caixa for tariff or taxation revenue deposits that can be blocked in case of default and the required balance transferred to Caixa. Also, the interest rate structure will cover the risk premium, administrative costs, and the costs of funds. Finally, the tariff structure used for SWM services further contributes to the high likelihood of repayment of loans to Caixa.

Project sustainability will also be strengthened by the promotion of private sector investment in SWM. The project is expected to significantly increase private sector involvement by helping states and municipalities adopt: (i) streamlined processes of engagement; (ii) improved subproject designs; and (iii) more attractive Carbon Finance opportunities.

One key aspect is building the capacity of municipal staff to manage and supervise the implementation of the contracts with the private sector. During subproject preparation, the project will help assess and develop the skills of municipal (and other government agency) staff involved in the supervision of these contracts.

The country will also benefit from the provision of technical assistance to increase Caixa's capacity to manage Carbon Finance projects, as this will simplify the process for new Carbon Finance subprojects and improve emissions reduction prices through wholesale mechanisms. The Bank has committed funding to assist Caixa on the first CDM project. Caixa is already planning to create and staff a dedicated unit to ensure that it can properly respond to the demand for CDM.

9. Lessons Learned from Past Operations in the Country/Sector

Privatization of solid waste service delivery. As the economic costs of waste disposal are found less in the construction of disposal sites than in their maintenance, it is essential to have an appropriate cost recovery mechanism. Still, more than half of Brazilian municipalities do not charge for collection and disposal services, and most of those that do charge insufficiently for those services. The private sector has only recently become interested in long-term concessions, which promise to help promote the introduction of best practices in major cities. While in many cases, private concessionaires will not be able to generate profits with the low tipping fees paid by municipalities for their solid waste, additional businesses – such as recycling, treatment of medical waste, carbon finance and special waste from private suppliers – can make waste disposal operations financially attractive. The project will help design cost-recovery and financing mechanisms to attract private investments and secure payment for services by the public sector.

Carbon Finance to increase the viability of subprojects. Many States and Municipalities would like to access the carbon market and use carbon revenues to promote sustainable waste management projects. Yet, due to limited experience and technical capacity, and generally accepted interpretations of the necessary legal instruments, CDM projects promoted by public entities in Brazil have not yet materialized. The project will facilitate the entry of new projects and their approval process by building on new opportunities for more programmatic approaches to Carbon Finance. Composting will be explored during project implementation, as a way of reducing waste volumes in landfills and increasing the lifetime of these facilities, as composting can be a CDM activity.

Waste pickers. Working with waste pickers at dumpsites is a complex and delicate task that, if not properly handled, can result in serious negative impacts, both for the waste pickers and for the project. Successful best practice examples do exist, however, and the task team has worked closely with Caixa's national multi-disciplinary team of experts to prepare a comprehensive social inclusion strategy, as part of the social safeguards, for informal sector waste workers, to be applied in selected subprojects, and duly revised, based on the results obtained, for application Program-wide.

10. Safeguard Policies (including public consultation)

Based on experience with similar projects and Environmental Assessments of landfills and other waste processing facilities in the region, the following Bank safeguard policies have been triggered in the project:

Safeguard Policies Triggered by the Project	Yes	No	OP 4.00 Use of Country Systems (UCS)
Environmental Assessment (OP/BP/GP 4.01)	[X]	[]	[X]
Natural Habitats (OP/BP 4.04)	[X]	[]	[X]
Forests (OP/BP 4.36)	[]	[X]	[]
Pest Management (OP 4.09)	[X]	[]	[X]
Physical Cultural Resources (OP/BP 4.11)	[X]	[]	[X]
Indigenous Peoples (OP 4.10)	[]	[X]	[]
Involuntary Resettlement (OP/BP 4.12)	[X]	[]	[X]
Safety of Dams (OP/BP 4.37)	[]	[X]	[]
Projects on International Waterways (OP/BP/GP 7.50)	[]	[X]	[n/a]
Projects in Disputed Areas (OP/BP/GP 7.60)*	[]	[X]	[n/a]

(See Annex 10 for more detailed information.)

* By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas.

Use of Country Systems (UCS). According to the Safeguard Diagnostic Review (SDR), conducted by staff from LCSEN, LCSDE, LEGEN, and QACU, Brazil's legal, regulatory and institutional framework is almost fully equivalent to the World Bank's corresponding Safeguard Policies for Environmental Assessment, Natural Habitats, Pest Management, Physical Cultural Resources, and Involuntary Resettlement. Brazil's regulatory framework and Environmental and Social Impact Assessment review and approval system takes into consideration the country's commitments to its international environmental agreements with respect to these safeguards. On this basis, the project was selected as a UCS pilot. However, if Caixa fails to implement its ESMF in non-Bank financed operations, the Bank would have no liability whatsoever (including Inspection Panel claims) because such operations would be legally out of the scope of the Bank's contractual agreements with Caixa.

11. List of Factual Technical Documents

Project Documents

1. Project Concept Note
2. Minutes of the PCN Review Meeting
3. Project Concept Note Data Sheet
4. Integrated Safeguards Data Sheet – Concept Stage
5. Integrated Safeguards Data Sheet – Appraisal Stage
6. Project Information Document – Concept Stage
7. Project Information Document – Appraisal Stage
8. Minutes of the QER Meeting
9. Project Appraisal Document
10. Aide memoire Mission Caixa to Washington, DC, March 2008
11. Aide memoire Mission World Bank, October 2008
12. Aide memoire Mission World Bank, February 2009
13. Economic Analysis of Projects
14. Financial Analysis of Brasilia Landfill

Project Reports and Studies

15. TF053757 PHRD Grant financed studies on Clean Development Mechanism in Brazil (TBAdded)
16. Training materials by IBAMA
17. PPIAF study on privatization of SWM services (draft)

References

18. Model DBO
19. Inter American Development Bank, Price Waterhouse Coopers, Financial Structuring of Infrastructure Projects in Public-Private Partnerships: an Application to Water Projects, December 2006, Publication of the IDB

20. SCS ENGINEERS, Comparison of Forecast and Reported Methane Recovery Rates at Selected Landfills in Developing Countries, November 19, 2007 (Commissioned by the World Bank)
21. IBGE (Instituto Brasileiro de Geografia e Estatística). 2003. National Survey of Domicile Samplings (PNAD—2003). Ministry of Planning, Budget and Management, Federal Government of Brazil.
22. ABRELPE study 2007

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