CHAPTER 8

CONTRIBUTION OF THE CLEAN DEVELOPMENT MECHANISM TO SUSTAINABLE DEVELOPMENT[1]

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1 INTRODUCTION

As a principle (Article 12, paragraph 5, of the Kyoto Protocol), clean development mechanism (CDM) projects should be voluntary, provide real, measurable and long-term support for mitigating climate change, produce greenhouse gas (GHG) emissions that are additional to those that would occur in the absence of the mechanism and contribute to the sustainable development of the host country.

The concept of sustainable development emerged in the '80s, and became popular in 1987 with the publication of *Our Common Future* by the World Commission on Environment and Development (UN, 1987). Sustainable development carries the economic goal of growth, linked to the reduction of poverty and inequality and the need to maintain natural resources. It is noted that the scope in defining this concept implies that the determination of the means to achieve sustainable development is quite complex and specific to the evaluation context.

As a result, the evaluation of required elements of a CDM project activity was objectively disciplined by standards, procedures and methodologies approved by the CDM Executive Board, with the only exception being evidence of the project's contribution to sustainable development. In the absence of international standards for the definition of sustainable development, and due to national sovereignty (COP 7),[3] the prerogative of assessing the CDM's contribution to sustainable development was transferred exclusively to host countries.

In the Brazilian case, the Interministerial Commission on Global Climate Change (CIMGC) acts as the Designated National Authority (DNA) to approve projects under the CDM. This was established in Annex III to Resolution No. 1,[4]

1. Note from the editors: the assertions made throughout this text are an opinion, as per the personal judgment of the author. They do not reflect a doctrinal understanding or a universally scientific character, but provide a range of reflections on subjects that are still presented as challenges of the CDM experience.

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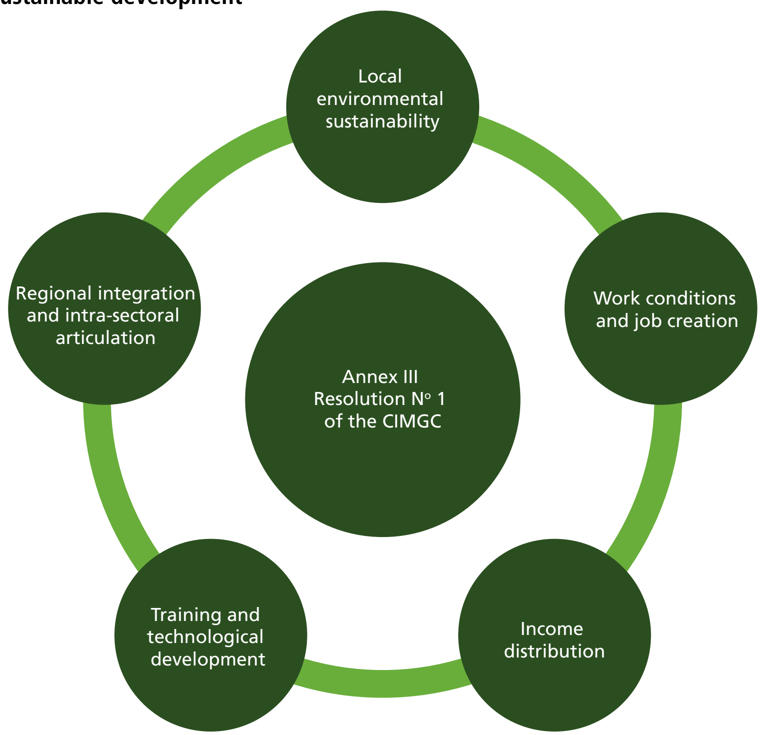
3. For more information, go to: http://unfccc.int/resource/docs/cop7/13a02.pdf.

4. Available at: https://goo.gl/ZShqVu. Accessed on July 19th, 2018.

dated September 11st, 2003, five aspects for assessing the contribution of CDM project activities to national sustainable development, namely: *i*) contribution to local environmental sustainability; *ii*) contribution to working conditions and net job creation; *iii*) contribution to the income distribution; *iv*) contribution to training and technological development; and *v*) contribution to regional integration and articulation with other sectors (figure 1).

FIGURE 1
Contributions from clean development mechanism project activities to national sustainable development



Source: CIMGC.

Thus, all Brazilian CDM projects submitted to the CIMGC evaluation must necessarily prepare a document evidencing, from the criteria established in Annex III of the CIMGC, its contribution to the national sustainable development. Following the flow of national approval to issue the letter of approval (LOA), each self-declaration submitted by the project proponent is evaluated by the committee issuing an opinion on the expected contribution to national sustainable development. Annex III of each CDM Project submitted for approval by the

CIMGC is public and made available at the Ministry of Science, Technology, Innovations and Communications (MCTIC) website.[5]

This chapter analyzes the contribution of the CDM to the sustainable development of Brazil. To this end, it defines timeframes by evaluating all the Brazilian projects registered by the CDM Executive Board during the first commitment period of the Kyoto Protocol.

2 OBJECTIVE

Therefore, the procedure adopted by the Brazilian government to evaluate the contribution of CDM project activities to national sustainable development involves the definition and analysis of a list of specific pre-established criteria. Despite the availability of these public occurrences, there are no initiatives aimed at using this information to carry out an objective assessment of the CDM impact on national sustainable development.

Thus, the general objective of this chapter is to present an analysis of the CDM contribution to sustainable development in Brazil, based on the criteria established by the Interministerial Commission on Global Climate Change. For this purpose, timeframes were established in order to evaluate all the Brazilian projects registered by the CDM Executive Board during the first commitment period of the Kyoto Protocol, which ended on December 31st, 2012.

This chapter also has specific objectives, as described below.

- To propose and test an assessment method of the CDM contribution to national sustainable development.
- To identify the project typologies with greater/lesser impacts to the sustainable development of Brazil.
- To provide a critical view of the CDM contribution to sustainable development and to the procedures of the CIMGC in order to provide recommendations for future procedures within the mechanism or another instrument that might replace it.

3 MATERIAL AND METHODS

Annexes III of the projects registered between 2004 and 2012 were evaluated for the construction of eleven indicators that allow for the aggregation and hierarchization of projects from the perspective of their contribution to sustainable development

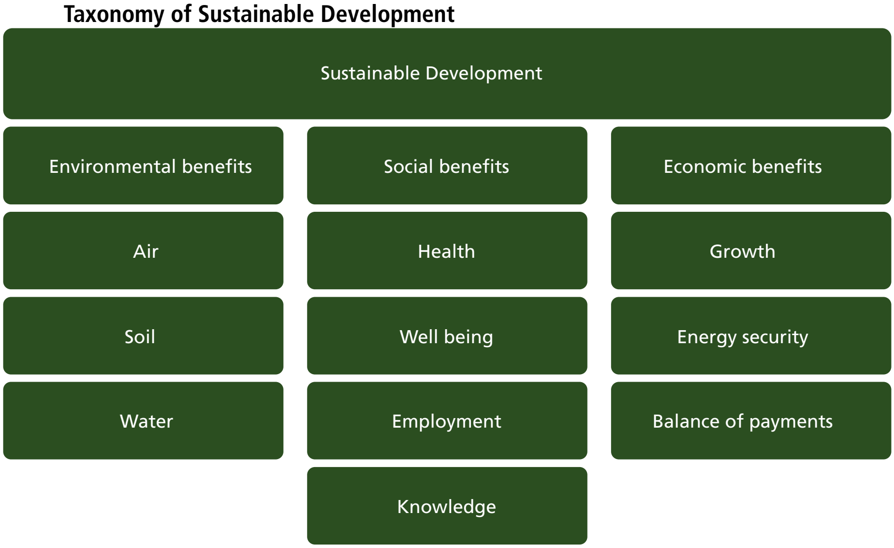
5. Available at: https://goo.gl/7p54Mv. Accessed on July 19th, 2018.

based on a multicriteria analysis (MCA). MCA methods are usually applied in the evaluation of heterogeneous indicators that, at first, cannot be directly compared.

The MCA is a diagnosis tool that can be used both prior to executing a project (*ex-ante*), for the definition of priorities or other strategic decisions in the planning phase; and after executing a project (*ex-post*), allowing performance and impact assessments against a set of pre-established criteria. In practical terms, the results represent an effort to quantify the self-declared sustainable development contributions by project proponents.

The eleven analysis indicators were defined in accordance with Annex III of the CIMGC, aligned with the taxonomy of sustainable development (figure 2), presented by Olsen and Fenhann (2008), and used by the United Nations Framework Convention on Climate Change (UNFCCC) as the basis for its CDM assessment and contribution tool for sustainable development launched in 2012 (Teri, 2012).

FIGURE 2
Taxonomy of Sustainable Development



Source: Olsen and Fenhann (2008).

Environmental, social and economic indicators and their relative weights are presented in detail in Annex B herein. The contribution scales have a score from 0 to 3,[6] the non-contribution of the project to the national sustainable development being the lowest score (0) and the largest contribution being the highest score (3).

6. For more details, see tables B.1 (environmental indicators), B.2 (social indicators) and B.3 (economic indicators) in Annex B herein.

Regarding the environmental dimension, Annex III of the CIMGC refers specifically to local environmental sustainability. Thus, indicators were defined to evaluate the contribution of projects to improving local air quality, improving water quality and reducing or mitigating soil pollution. In addition, an indicator was included that evaluates the contribution of the project to the national GHG reductions.

The social attributes described in Annex III of the CIMGC refer to the contribution of the CDM project to improving working conditions, net job creation, income distribution and capacity building. Thus, indicators were defined to evaluate the CDM project's commitments to social and labor responsibilities, the implementation of health and education programs and the defense of civil rights, reducing inequality and improving the quality of life of low-income populations and for applied technology training and reproducibility activities.

Finally, there are four economic indicators evaluated. According to Annex III of the CIMGC, the direct and indirect net job creation, the degree of technological innovation, the transfer of technology and the contribution of the project to the regional development are assessed. In addition, the project's contribution to structural sectoral changes and changes in the common practices of the sector in which the project is inserted have also been assessed.

Utility functions, for each dimension being evaluated – environmental, social and economic –, were constructed based on a *multi-attribute utility theory.* The utility function describes how the weighted attribute scores are summed to integrate a final score for a particular rating. The general formula of the utility function with *m* attributes is given by:

$$U(x_1, \dots, x_m) = \sum_{i=1}^{m} w_i U_i\,(x_i) \tag{1}$$

where U represents the utility value of an i attribute, x is the initial score of the attribute at hand, and w is the weight. The assessment was carried out individually by project. A database was structured to release the notes and other relevant information. The aggregation of data and weights and the algebra of the final score was performed according to equation (1).

For each analysis attribute, the indicators notes were weighted as shown below:

$$U_{AMB} = \sum_{i=1}^{m} w_i U_i\,(AMB_{AR}, AMB_{SOLO}, AMB_{AGUA}, AMB_{CO2e}, \dots, x_m) \tag{2}$$

$$U_{SOC} = \sum_{i=1}^{m} w_i U_i\,(SOC_{COND\_TRAB}, SOC_{IGUALDADE}, SOC_{CAPACITACAO}, \dots, x_m) \tag{3}$$

$$U_{ECO} = \sum_{i=1}^{m} w_i U_i\,(ECO_{EMPREGO}, ECO_{TECNOLOGIA}, ECO_{INTEGRACAO}, ECO_{RCEs}, ECO_{PRAT\_COM} \dots, x_m) \tag{4}$$

The final database allows for the hierarchization of results by project, geographic distribution and project typology. The fact that Annex III of the CIMGC does not request information regarding the potential negative impacts of CDM activities is highlighted as limiting the assessment. Thus, the zero score means that the project proponent has not stated any positive impact on any of the evaluated aspects.

It should also be noted that the methodology is limited to evaluating the data contained in the declarations provided by the CDM project proponents to the CIMGC in response to Annex III of the CIMGC, not considering any additional elements to the information listed from the public data available on the MCTIC site.[7]

4 CDM ADVANCES IN BRAZIL: SAMPLE DEFINITION OF ANALYSIS

Brazil was the first to develop CDM projects, and registered its first project activity on November 18th, 2004.[8] Between 2004 and 2012, Brazil had 28 projects rejected and eight that were withdraw from the UNFCCC registration request. Also, the number of projects that did not go through the validation stage is surprising. The public data do not allow a careful evaluation of the causes, but a total 175 projects failed to go through the validation stage. It is noteworthy that only 32 projects received a negative opinion formalized by a designated operational entity (DOE) during validation. The other projects were either replaced or had validation interrupted at the proposing country request.

TABLE 1
Detailed status of the Brazilian CDM portfolio (2004-2012)

Project Status	Number of projects
Registered	300
Validation interrupted	175
Replaced at validation	86
In the process of validation	66
Validation denied	32
Rejected	28
Replaced, validation interrupted	13
Withdrawn	8
Requesting registration	1
Replaced, validation denied	1

Source: CDM Pipeline.

7. A complementary study developed by the author carried out a sectoral approach seeking to identify the impact of the CDM on the national sustainable development from economic, technological and socioenvironmental macrotransformations.
8. Brazil NovaGerar Landfill Gas to Energy Project – UNFCCC ID CDM00007.

Because it is understood that only the registered projects comply with the requirements of the CDM, both at the international and domestic levels, this study is carried out based on the three hundred[9] CDM projects registered during the first commitment period of the Kyoto Protocol, which ended on December 31st, 2012.

4.1 Profile of projects registered between 2004 and 2012

Table 2 details the number of projects registered by type, during the assessment periods. Hydroelectricity projects, which include micropower plants,[10] small hydroelectric power plants[11] and large hydroelectric power plants, represent 25.7% of the total Brazilian projects. It should be noted that seven types of projects represent 94% of the total portfolio and are therefore a priority for the development of this analysis (graph 1).

TABLE 2
Projects registered by type of project (2004-2012)

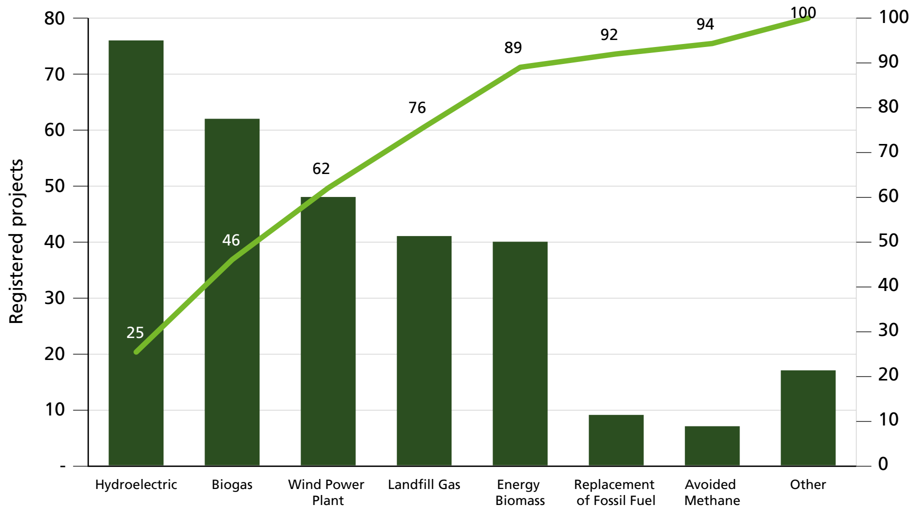
Type of project	Number of projects	Share (%)
Hydroelectric	77	25.7
Biogas	62	20.7
Wind power plant	48	16.0
Landfill gas	40	13.3
Energy biomass	39	13.0
Replacement of fossil fuel	9	3.0
Avoided methane	8	2.66
Other	17	5.7

Source: MCTIC (2016). Available at: https://goo.gl/J2z76j.
Note: This research was developed under the cooperation agreement with the United Nations Development Program (UNDP), the data were opened directly by the CIMGC to the author in XLSX format.

9. Annex A herein presents the list of the three hundred projects assessed.
10. Undertakings with up to 1 MW installed power.
11. Undertakings between 1,1 MW and 30 MW installed power.

GRAPH 1

Projects registered by type and representativeness in the portfolio (2004-2012)
(In %)



Source: MCTIC. Available at: https://goo.gl/J2z76j.

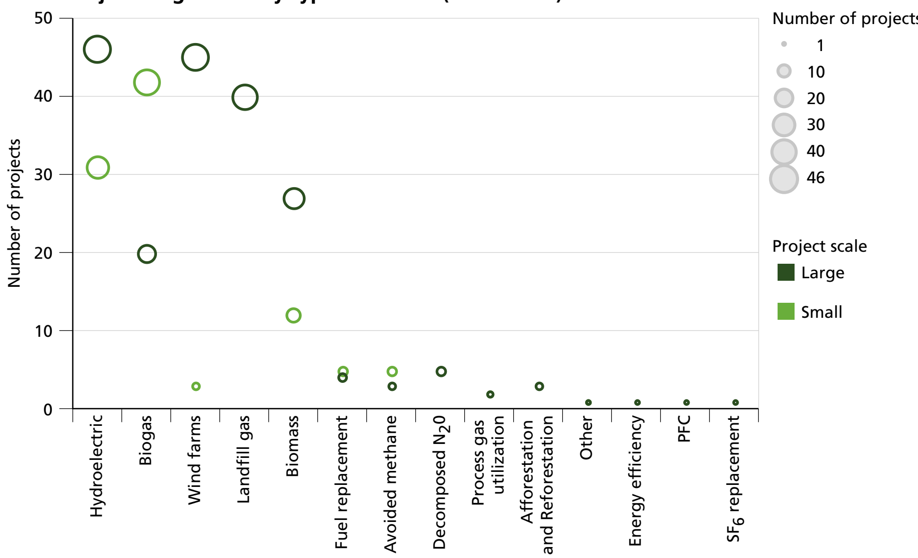
In terms of scale, small-scale projects represent approximately 33% of Brazilian CDM projects and were developed mainly for biogas (42 projects), hydroelectric (31 projects) and biomass (12 projects) projects (figure 2). For renewable electricity generation activities, projects that qualify as small-scale[12] projects have developed as such, benefiting from the simplified modalities and procedures of the CDM. Therefore, small hydroelectric power plants (SHPs), hydroelectric generating plants, small biomass cogeneration plants and wind power plants have greater representation among small-scale projects in Brazil, adding up 46 projects.

Biogas projects have the largest representation among small-scale activities in pig farming. It should be noted that the evaluation carried out based on the number of registered projects covers a fundamental characteristic of these project activities: pig farming projects are mostly microprojects. Thus, a small-scale project design document (PDD) typically aggregates a set of poultry farms.[13] Therefore, the number of pig farming projects quantified from the PDDs does not represent the real extension of this project activity in terms of the number of farms participating.

12. Installed power below 15 MW. Available at: https://bit.ly/2MYkK8X.

13. Project Bundle. Available at: https://bit.ly/2Kn1Qqz.

GRAPH 2
Projects registered by type and scale (2004-2012)

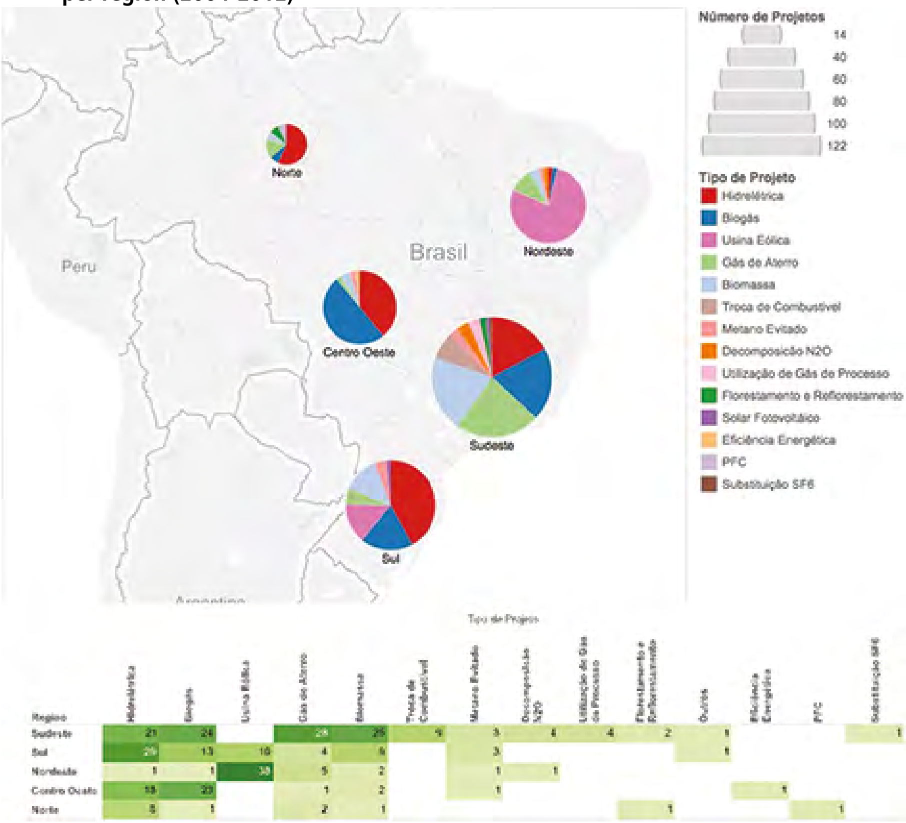


Source: MCTIC. Available at: https://goo.gl/J2z76j.

Geographically, projects are distributed heterogeneously throughout the national territory. Due to the grouping of project activities in the same PDD, the option was to not conduct such assessment by state of the Federation, but by region. Figure 3 shows the location of the projects, divided by type, by country. It is clear that the distribution of activities reflects the physical and socioeconomic characteristics of the Brazilian regions. The Southeast region has 122 projects, with predominance of landfill gas (28), energy biomass (25), biogas (24) and hydroelectric power plants (21). In addition, the region aggregates all fuel replacement projects (9), process gas utilization (4), SF_6 replacement (1), and 80% N_2O destruction projects (4).

The South region has 69 projects, the majority of them include hydroelectric power plants (29), followed by biogas (13), wind power plants (10) and energy biomass (9). The Northeast reached the record of 49 projects with total predominance of wind farms (38), followed by landfill gas (5) and energy biomass (2) projects. The Midwest region, with 46 projects and a dynamic agricultural sector, has a predominance of biogas (23) and hydroelectric projects (18). Finally, Northern Brazil with only fourteen CDM projects took advantage of its water resources to register eight hydroelectric projects.

FIGURE 3
Geographic distribution of CDM projects registered by number and type of projects – per region (2004-2012)



Source: MCTIC. Available at: https://goo.gl/J2z76j.
Obs.: Figure displayed in low resolution and whose layout and texts could not be formatted and proofread due to the technical characteristics of the original files (Publisher's note).

The geographical and technological distribution points to a potential limitation of the CDM contribution to the sustainable development of Brazil. This hypothesis is anchored in conclusions of other studies and refers to two main elements.

First, the geographical concentration of CDM projects in the more developed regions, especially in the Southeast and South, tends to reduce the CDM contribution to sustainable development. Disch (2010) demonstrates that the regional development stage influences the mechanism's additional contribution to local development. In his evaluation, he points out that South Africa had, on average, better scores than Brazil with the exception of environmental indicators. In other words, developed regions capture little or no contribution from the CDM to sustainable development, and it is not possible to identify elements that, in fact, have a relevant positive impact. In a similar discussion, Fenhann (2011) concludes that the more developed countries (Brazil, China, India and Mexico) have a worse performance in advancing sustainable development when compared to less developed countries with less participation in the CDM.

Second, the predominance, in the Brazilian case, of technologies with low potential to have a local positive impact. It should be noted that the evaluation criteria in Annex III of the CIMGC assess elements on which these technologies have limited impact. For example, wind farms do not contribute to the improvement of the local environmental quality in relation to the reference scenario and the generation of jobs is concentrated in the implementation phase. Obviously, at the national level, there is a positive impact of renewable generation sources, mainly due to the technological diffusion and structuring of a national industrial park. However, the criteria defined by the CIMGC are also concerned with elements of positive impact and transformation at the local level.

5 EVALUATION CRITERIA FOR THE CONTRIBUTION OF THE CLEAN DEVELOPMENT MECHANISM FOR SUSTAINABLE DEVELOPMENT IN BRAZIL

5.1 Sustainable development in the context of the CDM

The principles of the CDM are defined in Art. 12 of the Kyoto Protocol, which states that CDM project activities shall contribute to the sustainable development of the host country. Furthermore, in 2001, the Marrakesh Agreement defined that the host country has the prerogative to assess the contribution to sustainable development. An evaluation by Schneider and Grashof (2007) concluded that in practice such a decision materialized in the evaluation of project design documents (PDDs) by designated national authorities from a set of pre-established criteria covering environmental, social and economic aspects. Still, some criticism has been raised suggesting that the CDM has limited impact on local sustainable development (Lohmann *et al.*, 2006; Boyd *et al.*, 2009) and that in some cases of large-scale projects, countries have opted to redirect part of the financial flows from the trading of Certified Emission Reductions (CERs) for local development projects seeking to reverse this situation (Ellis *et al.*, 2007). China, for example, applies tax rates of 65% on CERs revenue from HFCs destruction projects (Boyd *et al.*, 2009).

As a market-based instrument, the value of CERs reflects the dynamics of supply and demand for carbon emission reductions rather than the value of socio-environmental development benefits potentially linked to a reduction certificate. Therefore, the sustainability assessment criteria established by the host country are critical to the tangible contribution of CDM projects to national sustainable development since the market will not reflect such benefits in price variations. Such a commoditization process implies that the provision of additional benefits from emissions reduction projects is a consequence of the process by which countries approve projects (Ellis *et al.*, 2007). When comparing CDM projects in Brazil and Peru, for example, Cole and Roberts (2011) concluded that these countries have established quite different social development objectives. While the former emphasized job creation and income distribution, the latter sought to meet the aspirations of local communities.

This difference between Brazil and Peru was also reflected in the institutionalized assessment processes of each country. Peru has opted for an *ad hoc* approach whereby the DNA selects and visits project sites and interviews communities to identify their needs and how the project contributes to them (Cole, 2007). In the Brazilian case, the DNA established a set of criteria that should be considered by the CDM projects and informed to the DNA, by means of a declaration containing the fulfillment description of the criteria established by Annex III of Resolution No. 1 of the CIMGC. It is noteworthy that one can hardly argue in favor of one approach or another. The difference between the countries, in the case of this example, is sufficient to disqualify any judgment in favor of one or another evaluation process.

Other publications have, in fact, defended the approach used by the Brazilian DNA. Olhoff *et al.* (2004) define the Brazilian process as a list of specific criteria for assessing the contribution of the CDM to national sustainable development. According to the authors, the Brazilian criteria focus on local environmental benefits, job creation and income distribution, technological changes, training, health, education and financial returns to local agents. Olsen and Fenhann (2006) also point out that the method employed by Brazil is the most commonly used by other DNAs, although small variations have been identified, including other large emerging countries such as India, South Africa, Mexico and China.

Finally, market-based standards have come up to attest the impact of CDM projects on local sustainability through specific procedures and audit systems, for example the *gold standard (GS*). In order to achieve additional certification, the project proponent must submit to the DOE specific documentation, in accordance with the socio-environmental impact standard employed, and the evidence needed to validate their statements. However, studies on additional project certifications suggest little or no additional benefit in terms of sustainable development compared to projects without such certifications (Teri, 2012).

5.2 Annex III of the Interministerial Commission on Global Climate Change

For the purposes of this analysis, the concept of sustainable development is that defined by the Designated National Authority of Brazil through its Annex III of Resolution No. 1,[14] dated September 11st, 2003. According to the annex, the evaluation of the CDM project activity contribution is based on the evaluation of a description by the project proponent of how the project will contribute to sustainable development in relation to the five criteria described below.

1) Contribution to local environmental sustainability – evaluates the mitigation of local environmental impacts allowing comparison with expected local environmental impacts for the baseline scenario.
2) Contribution to the development of working conditions and net job creation – evaluates the project's commitment to social and labor responsibilities, health and education programs and the defense of civil rights. It also evaluates the increase in the qualitative and quantitative level of jobs (direct and indirect) comparing the project scenario with the reference scenario.
3) Contribution to income distribution – evaluates the direct and indirect effects on the quality of life of low-income populations, observing the socioeconomic benefits provided by the project in relation to the reference scenario.
4) Contribution to training and technological development – evaluates the degree of technological innovation of the project in relation to the reference scenario and the technologies used in activities that can be compared with those provided for by the project. It also evaluates the possibility of reproducing the technology employed, observing its demonstrative effect, also evaluating the origin of the equipment, the existence of *royalties* and technological licenses, and the need for international technical assistance.
5) Contribution to regional integration and articulation with other sectors – assesses the project's contribution to regional development by integrating the project with other socioeconomic activities in the implementation region.

6 CDM CONTRIBUTION TO SUSTAINABLE DEVELOPMENT

The results of the analysis are presented in this section, including an effort to a clipping of the sample by type of project.

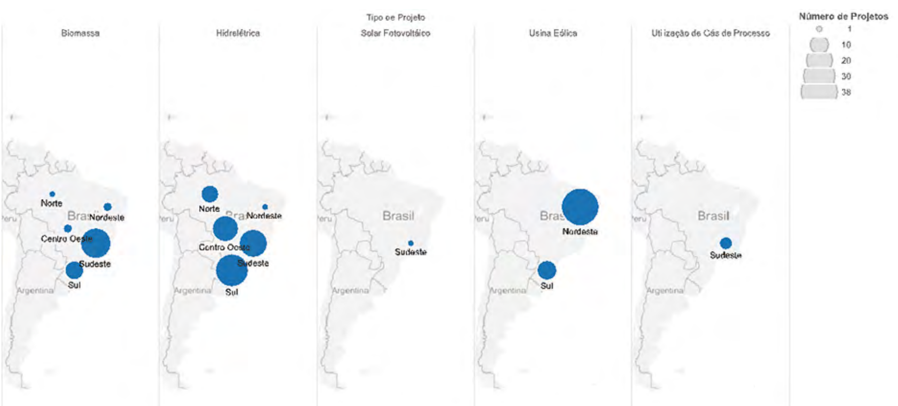
14. Available at: https://goo.gl/tVv5Zs. Accessed on July 19th, 2018.

6.1 Evaluation by type of project

6.1.1 Renewable energy

Renewable energy projects constitute 55% (159 projects) of the Brazilian portfolio in number of projects and 52.26% of estimated GHG reductions (187,893 $MtCO_2e$). CDM projects for renewable energy include hydroelectric plants, which are subdivided into hydroelectric generating units, small hydroelectric power stations and hydroelectric generating plants; thermoelectric biomass, which in Brazil include exclusively with residual biomasses such as bagasse, rice hulls, black liquor and wood residues; wind power plants; a solar photovoltaic plant and projects of use of process gas, mainly in the steel industry. Figure 4 shows the distribution of the projects, by type and regions of Brazil.

FIGURE 4
Geographic distribution of renewable energy CDM projects by number of projects and type – by region (2004-2012)



Tipo de Projeto

Regiao	Biomassa	Hidrelétrica	Solar Fotovoltáico	Usina Eólica	Utilização de Gás de Processo
Sudeste	25	21	[illegible]		4
Sul	9	29		10	
Nordeste	2	1		38	
Centro Oeste	2	18			
Norte	1	8			

Source: MCTIC. Available at: https://goo.gl/J2z76j.
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The project activities are mainly distributed among three regions of the country. The Southeast holds 51 projects, followed by the South region with 48 projects and the Northeast with 41 projects. The Midwest region recorded 20 projects while the Northern region registered nine. Hydroelectricity is therefore highlighted with 77 projects, wind generation with 48 and biomass thermals add up 39 projects.

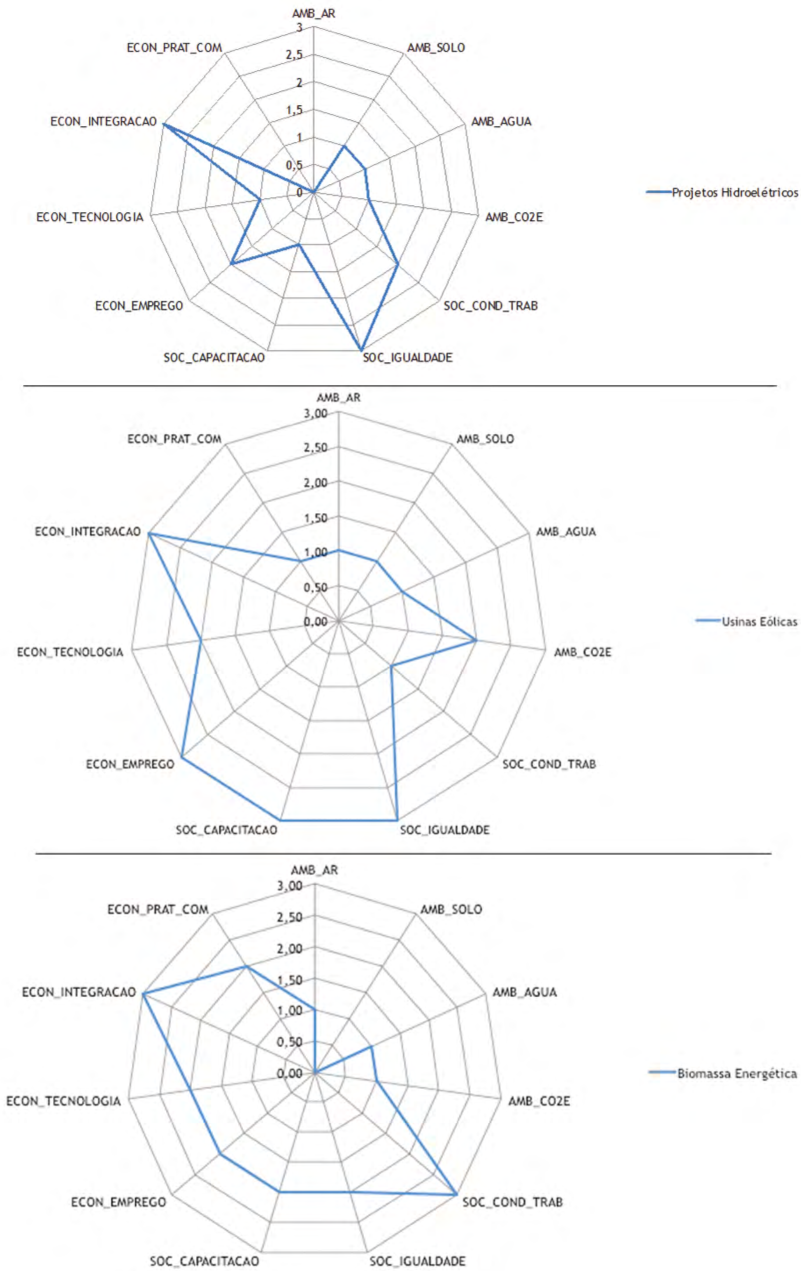
The hydroelectric projects add 750.42 MW of installed capacity to the Brazilian electrical mix. The figure is quite modest compared to the expansion of this source in the period between 2004 and 2012. Data from the Energy Research Company (EPE, 2013) show an expansion of 13,436 MW, from 70,858 MW in 2004 to 84,294 MW in 2012. Therefore, the CDM projects contributed with 5.58% of the new installed power in the analysis period.

Unlike hydroelectric generation, wind power plants became representative among the Brazilian electricity grid sources from 2004. CDM wind energy projects added up 3,750 MW, 44.17% of all wind energy contracted in the evaluation period, signaling for the relevance of the mechanism to boost this generation source. Also, it is known that the financial model of wind farms participating in energy auctions often considered the revenues from the sale of CERs in the composition of the final price of electricity.

The last group of relevant projects in terms of number of registered activities and estimated emission reductions is the group of energy biomass ventures. Thirty-nine projects with a large area of sugarcane bagasse were registered as the main energy input in 27 projects (69%). From the data presented in the PDDs of the sugarcane bagasse projects, it was observed that their installed capacity is 1,226 MW. Thus, they represent 21.91% of the total installed potential of sugarcane bagasse during the analysis period.

The grades for each renewable energy CDM project were scored individually and then aggregated by type to make a contribution to sustainable development (figure 5).

FIGURE 5
Contribution to the sustainable development of renewable energy projects – by hydroelectric, wind and biomass types



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From the analysis of the graphs in figure 5, it can be seen how hydroelectric projects contributed to the sustainable development of Brazil. It reinforces the low environmental contribution of this type of project; on the other hand, these are projects with relevant social and economic components, contributing to the job creation, working conditions and social equality.

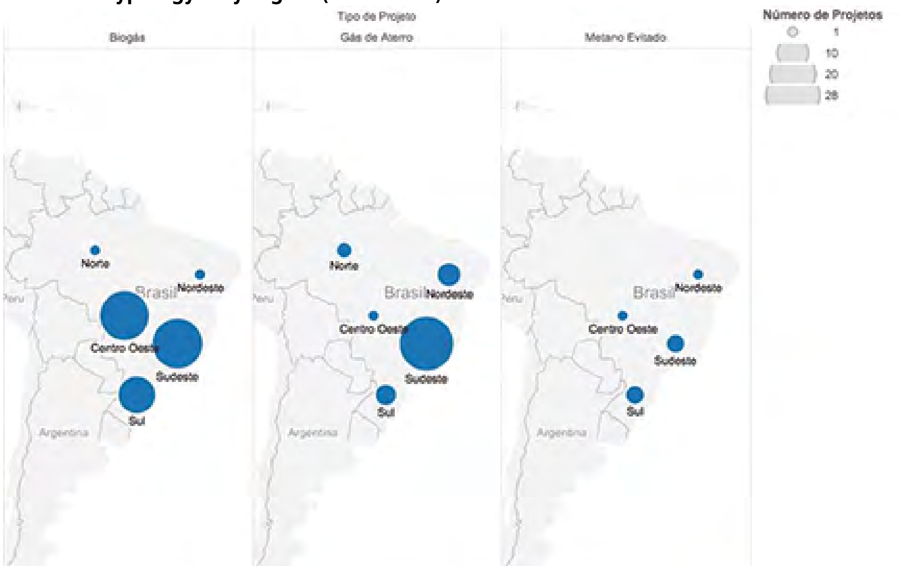
In the case of wind farm projects, the contribution to environmental development is also of little relevance. The only exception is the expected emission reductions, since the estimated volume of CERs for these projects is significant. In turn, the social and economic contributions are relevant, with maximum marks obtained in equality, capacity building, job creation and regional integration indicators.

Finally, the evaluation of biomass projects reinforces the low relevance of the CDM in the energy sector in contributing to environmental development. In addition, energy biomass projects presented an intermediate profile in terms of technology transfer and diffusion by applying technologies available nationally, but not used, until 2004, by the sector. Therefore, although the technology was dominated by the national industry, as in the case of hydroelectric plants, high-efficiency cogeneration systems were not used for electricity generation from biomass. Therefore, these projects contributed to the inter-sectoral technological transference, presenting a strong demonstrative character.

6.1.2 Methane

The methane CDM projects constitute 33.66% (110 projects) of the Brazilian portfolio in number of projects and 31.74% of the estimated reductions (111,951 $MtCO_2e$). CDM projects in pig farming represent the main initiative with the potential to contribute to the sustainable development of small-scale producers in microscale. Another relevant set of activities is the capture and flaring of landfill gas and avoided methane activities that cover composting projects and replacement of liquid effluent treatment technologies.

FIGURE 6
Geographic distribution of registered methane CDM projects by number of projects and typology – by region (2004-2012)



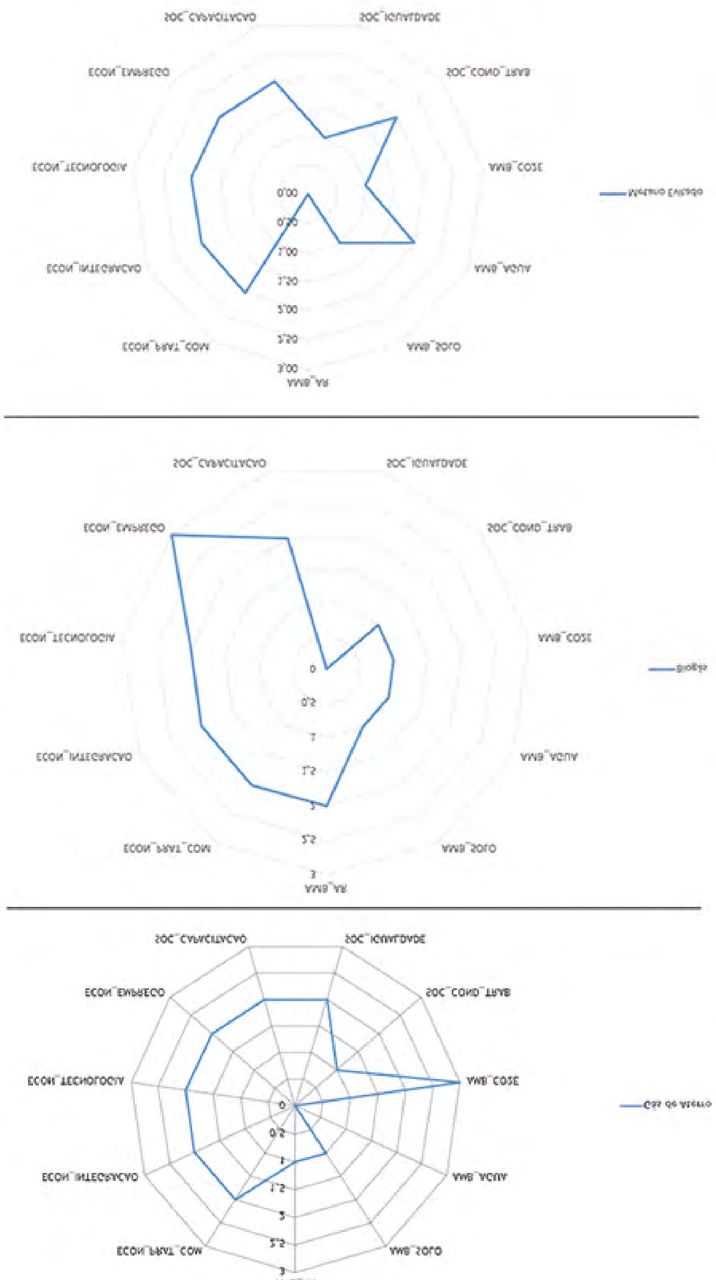
Regiao	Biogás	Gás de Aterro	Metano Evitado
Sudeste	24	28	3
Centro Oeste	23	1	1
Sul	13	4	3
Nordeste	1	5	1
Norte	1	2	

Source: MCTIC. Available at: https://goo.gl/J2z76j.
Obs.: Figure displayed in low resolution and whose layout and texts could not be formatted and proofread due to the technical characteristics of the original files (Publisher's note).

Methane projects were implemented in all regions of Brazil. For landfill gas projects, the Southeast region stands out, with twenty-eight projects registered. The Northeast region has five projects of this type and the South region has four. Therefore, the geographic distribution of the projects reflects the sanitation infrastructures in the country with clear leadership of the Southeast region. It should be noted that the projects initially developed prioritized landfills in operation for decades, since they have the greatest biogas generation potential

FIGURE 7

Contribution to sustainable development – projects for methane, landfill gas, biogas and avoided methane



Prepared by the author.

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It should be emphasized that the data presented do not include, in a disaggregated way, the program of activities (PoAs) developed for landfills (Ref. 6573),[15] composting (Ref. 7760) and pig farms (Ref. 2767). PoAs were introduced in 2007 during the 32nd and 33rd meetings of the CDM Executive Board. A program allows to register, as a CDM project, the coordinated implementation of policies, measures and objectives that lead to emission reductions. After the registration of a PoA, an unlimited number of project components (CPAs) can be added to the program. Therefore, PoAs aim, first and foremost, at the scalability of small-scale emission reduction actions within a single CDM project. It is emphasized, therefore, that for all purposes, a PoA is considered a project activity. For methane projects, programs played an important role in swine farming by adding 1,050 methane reduction activities to pig farms.

Landfill gas projects have not reported any impact on water quality and only nine have provided evidence of contribution to soil and air quality. On the other hand, this type of project has great potential to reduce emissions of greenhouse gases, which is reflected in the high score of the environmental criterion of GHG emissions. The other indicators had a medium score, with a high concentration of indicators with 2, with the only exception being the social indicator of contribution to working conditions. In addition, the internalization of the technology did not actually happen, and although the projects use active biogas suction systems produced abroad, there was not enough scale of projects to foster the national industry and the transfer of technology.

In the case of biogas projects, the contribution of these projects to the local air quality stands out in the environmental dimension. In the specific case of these projects, the contribution was to the reduction of odors, not of gaseous pollutants. This contribution was systematically observed in Annexes III. In addition, above-average scores are observed for indicators of job creation, technology and common practice. In the case of job creation, there is a clear confusion between swine activity and the emission reduction project. It is understood that, for the execution of the CDM project, the emission baseline already existed, and so did the farm, jobs and revenues from this economic activity. In this scenario, it is difficult to agree with the argument that the installation of biodigestors generates direct jobs in a relevant way.

Finally, in relation to avoided methane projects, it is observed that the lowest scores in the environmental dimension were from the effluent projects. Similar to the swine situation, the implementation of an aerobic treatment stage does not imply significant environmental gains since the baseline plant was operating at the efficiency levels required by the legislation. The highest environmental score

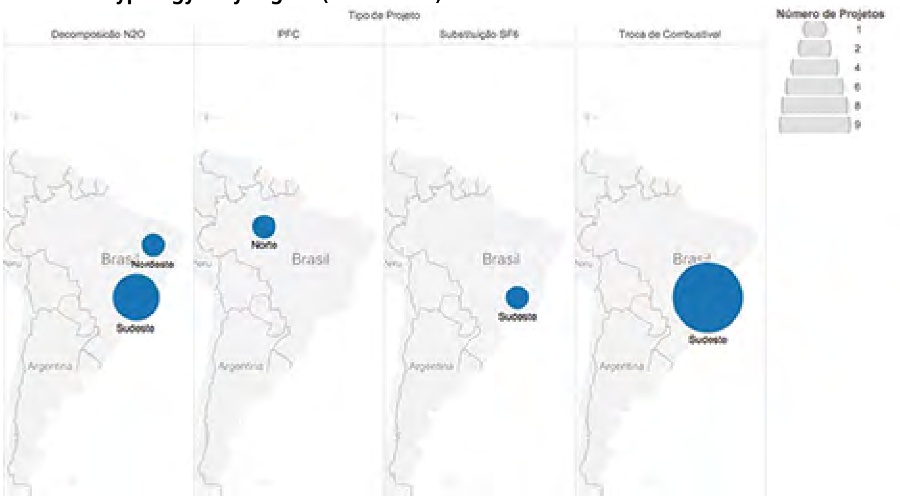
15. Registration number under the UNFCCC.

was achieved by the Queiroz Galvão carbonization project in Maranhão, mainly because it is a project with high emission reduction potential (AMB_CO_2). Here, the confusion between carbonization activity throughout its cycle, including planting, handling, cutting and production of coal, is also highlighted, with the CDM project activity exclusively dealing with the replacement of traditional kilns by industrial kilns. Thus, the environmental benefits derived from the production of renewable energy biomass should not be accounted for by the project, but were presented as contributions of the project to sustainable development. In the social dimension, carbonization projects stand out because they are known to contribute to the improvement of working conditions, income generation and equality, and training and capacity building. Finally, the economic dimension received higher-average scores than social contributions. The avoided methane projects contributed mainly to the exchange of common practices in industry, charcoal production and waste treatment.

6.1.3 Industrial projects

The industrial projects constitute 5.33% (sixteen projects) of the Brazilian portfolio in number of projects and 14.26% of the estimated reductions (50,302 $MtCO_2e$). Industrial gas destruction projects, such as N_2O, SF_6 and PFC, have been heavily criticized for being projects with little or no impact on sustainable development. The industrial CDM projects are divided into four types: *i*) decomposition of N_2O; *ii*) PFCs; *iii*) replacement of SF_6; and *iv*) exchange of fossil fuel. The first three are quite specific to some segments of the industry while fuel substitution activities can be performed in any major energy-consuming industrial activity, primarily thermal energy in the form of heat or steam.

FIGURE 8
Geographic distribution of CDM industrial projects registered by number of projects and typology – by region (2004-2012)



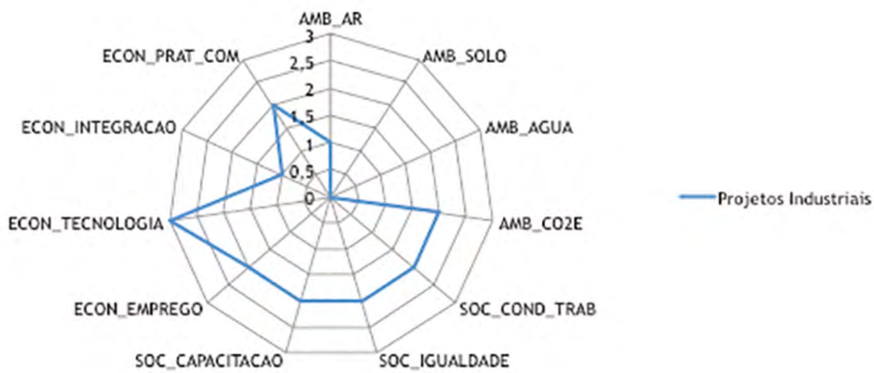
Tipo de Projeto

Regiao	Decomposicão N2O	PFC	Substituição SF6	Troca de Combustivel
Sudeste	4		1	9
Nordeste	1			
Norte		1		

Source: MCTIC. Available at: https://goo.gl/J2z76j.
Obs.: Figure displayed in low resolution and whose layout and texts could not be formatted and proofread due to the technical characteristics of the original files (Publisher's note).

As observed, the Southeast region, due to having a more developed industrial park, registered fourteen of the country's sixteen industrial projects, including 100% of fuel substitution activities. The Northeast holds, at the petrochemical complex of Camaçari, one of the N_2O decomposition projects.

FIGURE 9
Contribution to sustainable development – industrial projects



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Due to the smaller number of industrial projects, it was decided not to present the evaluation by type of project (figure 9). The low contribution of these projects to national sustainable development is confirmed, especially in relation to the environmental dimension. The indicators score is only average, with variations between one and two scores and two environmental indicators, soil and water quality, with a score of 0. The industrial projects reached a maximum mark in the technology item. Firstly, by the implementation of technology not available in Brazil, in the case of projects for the destruction of industrial gases, and also due to the contributions and demonstrative effects of registered fuel replacement projects, which represented the first wave of large-scale industry, mainly benefited by the country's newly deployed natural gas distribution infrastructure.

6.1.4 Forestry projects

Forestry projects constitute only 1% of the Brazilian portfolio in number of projects, with three projects registered and 0.67% of the estimated reductions (2,363 $MtCO_2e$). The forest CDM projects registered in Brazil include two groups of activities, the reforestation of energy forests for use in the pig iron chain and the activities of reforestation of native forests for recovery of riparian forests and permanent preservation areas (APPs) around reservoirs.

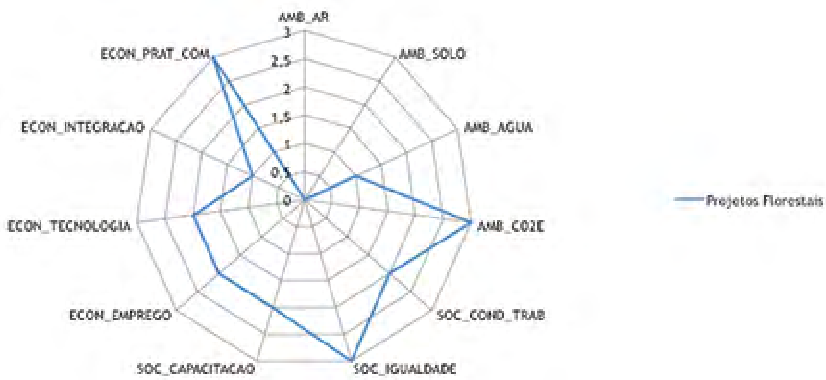
The forestry CDM projects are composed of two activities in Brazil: *i*) reforestation of energy forests; and *ii*) reforestation of native forests. Only three forestry projects were registered in Brazil, two in the state of Minas Gerais and one in the state of São Paulo (figure 10). It highlights the great potential of Brazil for the development of these projects and, at the same time, the low number of registered projects. Of course, much of the justification for this fact concerns the technical demands for execution and registration of forestry CDM projects and the costs associated with the implementation of the monitoring plan.

FIGURE 10
Geographic distribution of forestry CDM projects registered – by region (2004-2012)

Source: MCTIC. Available at: https://goo.gl/J2z76j.
Obs.: Figure displayed in low resolution and whose layout and texts could not be formatted and proofread due to the technical characteristics of the original files (Publisher's note).

The maximum environmental score was only achieved by the emission reduction indicator. In fact, no project has stated positive environmental impacts to air or soil. On the other hand, the social and economic performance of the projects was high, including a maximum score in the social and economic dimension and an average score in the economic dimension above 70% in the aggregate of projects.

FIGURE 11
Contribution to sustainable development – forest projects



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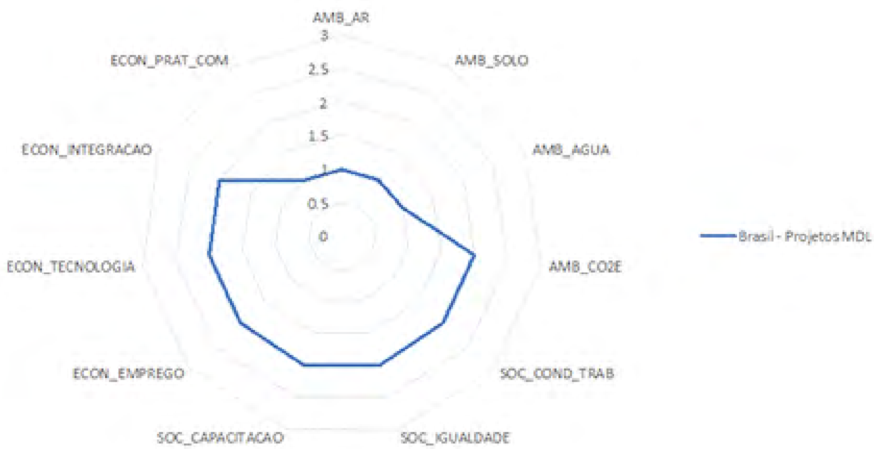
6.2 Aggregated score of Annex III evaluations

This section presents the aggregate assessment of Brazil's contribution to sustainable development derived from the evaluation of Annexes III. On the average, the contribution to environmental indicators was worse evaluated, both from the point of view of air, water and soil quality. Given the average emission reduction volume of Brazilian CDM projects, the emissions indicator received a slightly higher score.

FIGURE 12
Average score of sustainable development indicators in Brazilian CDM projects



Prepared by the author.
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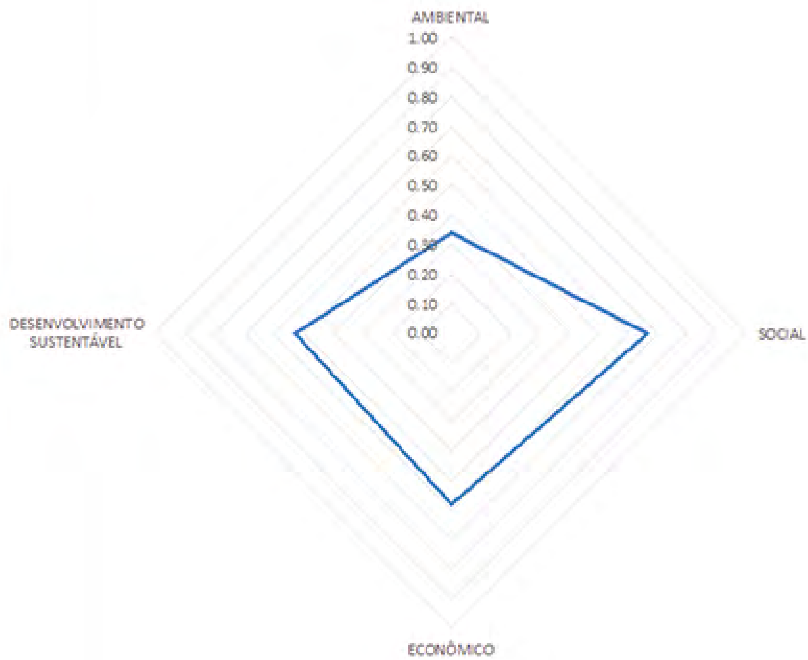
In the average of the projects, the social indicators totaled 2 points. This indicator was the one that presented the greatest variation among the types of projects reflecting the scale of the project. Finally, the economic dimension also presented an average score 2 in its indicators.

For the set of projects, the indicators were aggregated in their respective dimensions, allowing another look at the contribution of the CDM to the sustainable development in Brazil (figure 13). In the aggregate, the environmental dimension was the worst evaluated, adding up a score of 0.34. The social dimension score was 0.67, the highest among the three dimensions of sustainable development. The economic dimension obtained a score of 0.58.

FIGURE 13

Scores of the environmental, social and economic dimensions and general score of the contribution to the sustainable development of Brazilian CDM projects



Prepared by the author.

Obs.: Figure displayed in low resolution and whose layout and texts could not be formatted and proofread due to the technical characteristics of the original files (Publisher's note).

Table 3 summarizes the environmental, social and economic dimensions of the typologies of projects evaluated by this report. As a final observation, it is noteworthy that in the environmental field the lowest score was obtained by hydroelectric projects (0.25), while fuel, landfill gas and biogas projects reached the highest scores (0.42). In the social sphere, the lowest score was for biogas projects (0.33) and the highest scores were obtained by wind, biomass and forestry projects (0.78). Finally, in the economic dimension, the lowest score was obtained by fuel replacement projects (0.33) and the highest score by wind, biomass and biogas projects (0.75).

TABLE 3
Summary of scores in assessing the contribution to sustainable development

	Environmental	Social	Economic
Hydroelectric	0.25	0.67	0.50
Wind	0.42	0.78	0.75
Energy biomass	0.25	0.78	0.75
Fuel replacement	0.42	0.56	0.33
N_2O decomposition	0.25	0.56	0.67
Landfill gas	0.42	0.56	0.67
Biogas	0.42	0.33	0.75
Avoided methane	0.33	0.56	0.67
Forestry	0.33	0.78	0.67
Brazil	0.34	0.67	0.58

Prepared by the author.

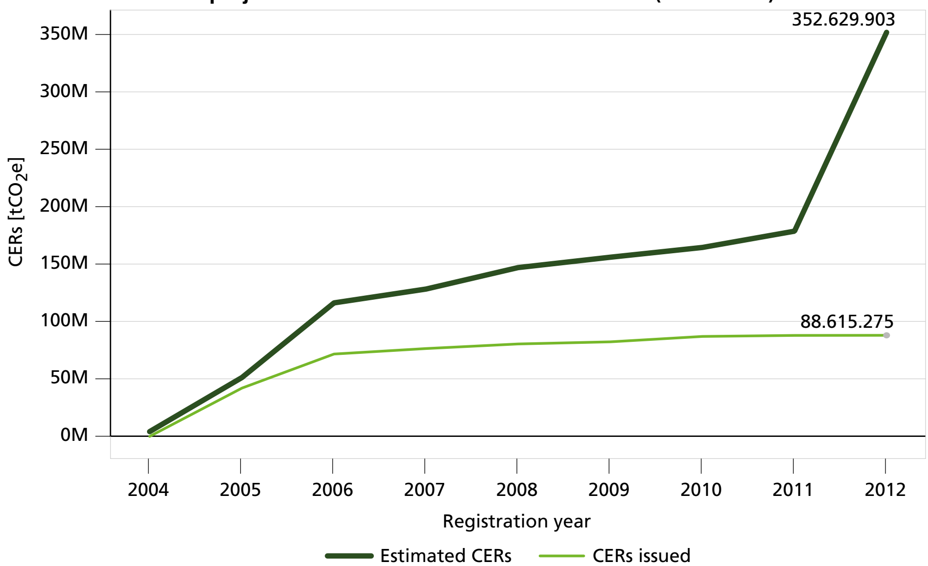
Before moving on to the final section of this discussion, two other relevant results to the CDM's contribution to sustainable development will be presented below. First, the capacity of CDM projects to effectively contribute to national emission reductions was evaluated, and then data were collected from the Central Bank of Brazil (BCB) to provide a look at the CDM contribution to the balance of payments in Brazil.

6.3 Emission reductions achieved during the analysis period

The three hundred projects that have been registered have, together, an emissions reduction potential of 352.629.903[16] tCO_2 according to the project design documents (PDDs). Out of this potential, 88,615,275 certified emission reductions (CERs) were issued in 2012, representing approximately 25.13% of emission reductions expected for the review period. Graph 3 shows the evolution, between 2004 and 2012, of estimated emission reductions in the registered PDDs and the CERs issued per year in the same period.

16. MCTIC data calculated for the first crediting period registered in the first commitment period of the Kyoto Protocol.

GRAPH 3
Brazilian CDM project CERs estimated ex-ante CERs issued (2004-2012)



Source: MCTIC. Available at: https://goo.gl/J2z76j.

The value presented is relevant, since according to the analysis presented previously, the main contribution of the CDM projects to the environmental dimension is the estimated GHG emission reduction volume. It should be noted that, even excluding this sudden increase, the average CERs issuance performance of Brazilian CDM projects in the period from 2004 to 2010 was 49.36% of the volume of expected reductions.

6.4 International currency inflows

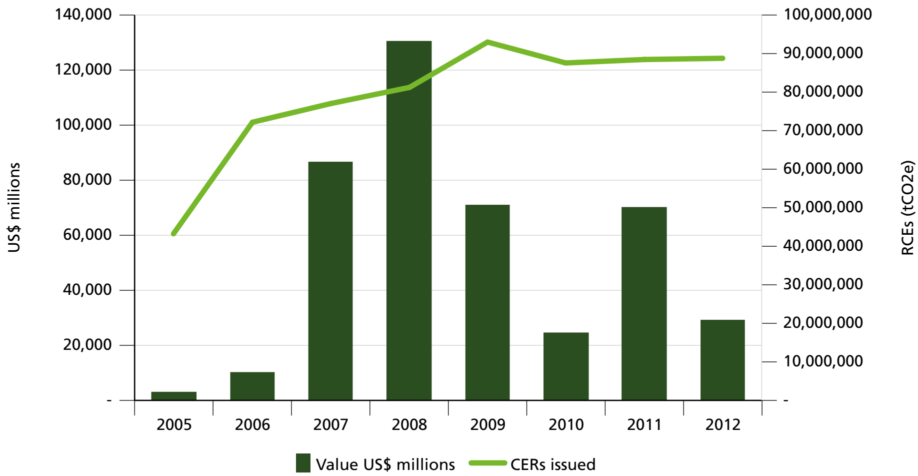
Another important factor that must be considered is the inflow of financial resources into the country through the trading of CERs. However, the nature of contracts does not allow this information to be readily available because they are bilateral negotiations between private entities. Moreover, the efforts needed to accurately collect this information go beyond what was initially anticipated by this analysis. Thus, in order to advance this information in some way, and contribute to the proposed debate, we opted to work with national aggregated data provided by the Central Bank of Brazil.

Since 2005 (Circular Letter 3291), the Central Bank of Brazil has established a classification code for the closing of foreign exchange related to the sale of carbon credits. The current legislation (Circular Letter 3690) is of December 2013 and presents the code under various services – carbon credits/rights issue (47939). From the request made directly by the Ministry of Science Technology and Innovation to the Central Bank of Brazil, the total value of inflows (in dollars) was provided for the period from January 1st, 2004 to December 31st, 2012.

GRAPH 4

Foreign currency inflow for the trading of carbon credits and annual emissions of CERs (2005-2012)

(In US$ millions)



Source: Central Bank and MCTIC.

During the first commitment period of the Kyoto Protocol, US$ 425.4 million entered Brazil identified by the Central Bank as revenue from the sale of carbon credits. In the same period, 631.5 million CERs were issued by Brazilian projects. If we assume that all CERs issued in the period were traded, we will have an average price per CERs of $0.70. However, it is known that the average market prices in the period were well above this value. It is true that part of sales revenue never reached the country, especially in the case of multinational companies projects and in the cases in which the projects, mainly in the swine industry, received advances in equipment and provision of services, causing the first trading revenues of CERs to be retained by financing agents and consultants, many of them with operations abroad.

7 DISCUSSION

Once an outcome has been envisaged, which adds to the evaluation efforts of Annexes III, this section seeks to discuss practical implications of gaps, challenges, lessons learned and best practices. The main conclusions of this study are presented below.

7.1 Overview of outcomes

Firstly, it should be noted that Annexes III constitute a self-declaration provided by project proponents. Therefore, these submitted annexes are documents that present the intended contribution to sustainable development by the project and not its real concrete contribution.

From an environmental perspective, the results demonstrate a limited contribution of CDM projects to sustainability. The criteria established by the CIMGC are focused on local environmental impacts. This analysis sought to identify contributions to improve air quality, soil and water resources management, as well as to include an additional component of GHG emission reduction. In general, the projects do not declare relevant contributions to environmental sustainability and this dimension is the least important in the analysis. Also, it can be noted that most CDM projects have a non-impact or low-environmental impact profile, and do not necessarily contribute to the improvement of environmental quality.

From the social perspective, it can be concluded that projects that are capital-intensive, such as renewable energy projects, end up having a better score since they systematically invest in the training of their collaborators and contribute to better working conditions. Also, large-scale projects are able to present the generation of direct and indirect jobs, the number of people impacted by the training process, and the positive impacts on local communities in a recurrent, objective and quantitative way.

From an economic perspective, the most controversial issue identified is the contribution of CDM projects to national integration. Often the projects stated that they would contribute to national integration, however, without presenting evidence to that effect. This is the case of projects that produce energy for the electricity grid, which have consistently claimed to contribute to national integration. The limited role of the CDM for technology transfer and the contribution to changing common practices stands out. It is noted that the CDM played an important role in the introduction of emission reduction technologies in the country without necessarily constituting transfer of technology. This is the case with landfill gas projects and N_2O destruction. The N_2O projects, in fact, implemented unconventional technology in the country, but it cannot be considered as technology transfer since the replicability of this activity is limited. Technology transfer can be identified for wind and biogas projects.

Finally, the low performance in achieving the estimated GHG reductions (figure 3) is largely explained by the phenomenon of the *race for the registration*, observed in 2011 and 2012. Some projects, especially in the electric sector, reached historical milestones in terms fast registration in these two years. This race was caused by the pressing risk of exclusion of CERs from CDM projects registered after

December 2012 in the post-Kyoto negotiations. Therefore, the observed increase reflects emission reductions of projects registered at the end of the commitment period that did not have time to issue their certificates, either because they had not completed a monitoring cycle, usually of 12 months, or because they were still in the implementation, as in the case of most wind farms registered as CDM projects in the period.

7.2 Absence of a completeness and objectivity procedure

Annex III lacks a completeness and objectivity procedure. In providing a set of open-ended questions, Annexes III have become a compilation of statements that do not necessarily reflect the CIMGC's assessment interest, such as the assessment of the contribution of a given project to national sustainable development. Similarly, the lack of a completion procedure also imposes limitations on the evaluation team and the learning curve over the years has led to a series of understandings and changes in approaches to the approval of CDM projects in Brazil.

These changes include the obligation, in the CDM's first years, to declare the contribution of the project to all dimensions of sustainable development. Such a decision has even impacted the evaluation proposed by this study since the projects registered in the first three years tend to present a more extensive list of contributions in its annexes III simply to fulfill the procedural demands.

The lack of completeness and objectivity procedure is clearly observed in the variability of project sample scores. The various interpretations of the project proponents are evident to present the contributions of the projects submitted in annexes III. Undoubtedly the results should present scores with variations associated with the typology of different projects, and the regions of implementation. In turn, there should be some harmonization of contributions to sustainable development among project typologies, with more consistent scores. Otherwise, it is not possible to identify any scoring pattern by region or by project typology, even in cases where the contribution of a project (or technology) to sustainable development is quite evident.

7.3 What is (and what is not) a CDM project

There is a recurring confusion over what is, in fact, a CDM activity. The objective of the CIMGC's Annex III is to evaluate exclusively the contribution of the CDM project to the sustainable development of Brazil. For example, in renewable energy projects, the generating plant is the component that allows the reduction of GHG emissions. Therefore, evaluating the contribution to the sustainable development of the project is the same as evaluating the contribution to the sustainable development of the renewable generation plant. This is, for example, the case of wind farm projects and the implementation of new SHPs.

However, there are situations where the CDM activity is only one component of a broader activity or project. For example, cogeneration activities with sugarcane bagasse are mainly interventions in existing plants and involve the installation and operation of more efficient equipment in a thermoelectric plant that had already been operating. Similarly, the repowering of SHPs under the MDL approach addresses the activities that led a SHP in operation to produce more energy. The contribution of the CDM to sustainable development, in these cases, has no relation with the generation plant in a broad context, since it deals exclusively with the exchange of equipment such as boilers, turbines and generators. In many cases, the CDM project was analyzed from the larger context, which does not reflect the real contribution of the activity to sustainable development.

This inconsistency in the declarations of Annex III of the CIMGC has been recurrently identified, but are especially relevant for methane projects. To put it in another way, most methane CDM projects do not relate to the construction and operation of landfills or effluent treatment systems or pig farms, but rather to the installation and operation of capture and burning systems. methane with or without energy recovery. Annexes III should reflect the impacts of the biogas capture activity and its subsequent destruction or energy use and not the landfill or pig farm, for example.

7.4 Annex III as a phase of a bureaucratic process

The ultimate goal of CIMGC's Annex III is to enable the Brazilian DNA to assess whether CDM projects are meeting a central requirement of the mechanism that is contributing to national sustainable development. However, it has been widely observed that for project proponents, this is only one step within a complex bureaucratic process. There is no genuine effort to ensure that CDM project activities actually contribute to sustainable development. Undoubtedly, the costliest situation to reflect this situation is the fact that many "Annexes III" present the same wording, that is, exact textual copies were frequently used for similar projects or developed by the same proponent.

7.5 Annex III as a summary of environmental licensing

An inherent trend of the environmental licensing process stands out, in which many projects do not argue in favor of positive impacts, focusing, instead, on reducing or mitigating any negative social and environmental impacts. Thus, it was identified that CIMGC's Annex III, in most part, reflects, in a summarized way, the registration contained in studies for environmental licensing.

Surprisingly, this fact produced a perverse incentive for this study: projects with greater socio-environmental impact end up having a greater number of licensing constraints that increase the score in the social and economic dimensions of the evaluation. This fact also corroborates the assertion that the contribution of the CDM to the Brazilian sustainable development was limited, since the implemented actions, mainly those considered initially as voluntary, can originate from environmental licensing constraints.

However, it is understood that positive impacts could have been listed and presented by project proponents mainly in situations where the CDM project contributed to a better environmental control of the activity or in situations where the project has clear environmental co-benefits such as cases of fuel replacement projects or projects that use waste for energy generation.

7.6 CDM limitations towards sustainable development

The results of this study corroborate the arguments of Lohmann (2006) and Boyd et al. (2009), concluding that the contribution of the CDM to sustainable development is limited. This research provides additional evidence as to why the mechanism does little to contribute to local sustainable development.

First, one conclusion is that the intensions of the mechanism are too great. The Marrakesh Agreement levels up GHG emissions reductions and the contribution to sustainable development. One must recognize the ultimate goal of the mechanism: to produce economic incentives for the execution of emission reduction activities. A scenario was constructed, based on the north-south dichotomies, that the mechanism would be enough to generate not only financial but also technological flows, human resources, knowledge and good practices. There is no evidence to prove that this scenario materialized in Brazil.

The evaluation indicates, however, that the CDM in Brazil was an important driver of change. Thus, the role of the mechanism was, at first, a demonstrative effect in which the private sector assumes great risks seeking larger marginal returns on its investments. It is also noted that the Brazilian potential for the mechanism is significantly higher than that exploited and that the registered emission reduction activities aimed at the most obvious opportunities and effective costs. Unequivocally, the restructuring of the electricity sector places renewable generation activities as one of the most obvious opportunities for the CDM in Brazil and, in fact, this type of project is more representative in the portfolio of Brazilian projects. It is argued, therefore, that the CDM provides evidence that public policies aimed at fostering the transition of the Brazilian economy to a low-carbon economy could be strengthened if integrated with carbon pricing mechanisms.

Because it is a market-based mechanism, there must be no innocence in relation the mechanism's developments. The main consultancy firms operating in Brazil were foreign and were capitalized. Thus, a business model was adopted in which CDM projects (PDDs, validation, registration and verification fees) were taken over by these consultants, in exchange for a contract guaranteeing the purchase of CERs for pre-established values. Thus, the maximization of the return on investment is exclusively related to the emission reduction performance of the CDM project. In other words, these consultancy firms were only interested if the project was operational and the monitoring system was in perfect functioning. That is, the contribution to sustainable development has never been a priority for economic agents operating in the market.

Finally, the impacts of the CDM on sustainable development can also be considered as limited, as some CDM projects tend to discontinue their activities due to low prices and uncertainty over demand. Therefore, even if relevant contributions to sustainable development actually existed, they may not persist in the long run. In this context, CDM projects can be separated into two distinct groups: *i)* those that require large capital investment and have other revenues than the CDM; and *ii)* those whose initial investment has already been redeemed and do not have additional revenues beyond the CDM. The first case includes renewable energy projects, some industrial projects and forestry projects. Most likely, these activities will remain operational even if the CDM is no longer a relevant financial incentive. In the second scenario, it is virtually certain that activities, mainly methane capture and destruction, will cease to operate, thus disregarding the perennial contribution to sustainable development identified by this study.

7.7 Demand for monitoring

A very straightforward lesson learned with this publication is the need to implement a monitoring mechanism of contributions to sustainable development. According to Teri (2012), no country monitors the long-term contributions to sustainable development. As it is a self-declaration of a claim to contribute to sustainable development, the content of Annex III of the CIMGC, or any tool that may replace it, must be monitored.

Monitoring can be sporadic or by sampling, as long as it is done. In order to reduce costs and increase the number of projects monitored annually, the DNA may request evidence of the implementation of the activities listed in the CIMGC's Annex III or of the aforementioned sustainable development contributions.

7.8 Uncertainties may determine the end of the mechanism

Finally, as an innovative mechanism, barriers and lessons learned about the CDM were expected to be observed throughout the first commitment period of the Kyoto Protocol. However, it was verified that the history of changes in the rules of the mechanism, such as revisions of procedures and methodologies, together with the current market uncertainties, established a scenario of acute crisis of confidence. A view shared by all sectors evaluated is that much time and money has been invested and that this investment has been lost. In this context, the discussion on future procedures becomes irrelevant if the Brazilian engagement in the construction of the climate regime is not necessarily followed by the establishment of clear and long-term rules that can guarantee both market security (in the case of a market-based mechanism) and legal and institutional security. The crisis of confidence created may result in the non-participation of the private sector, either in a new CDM cycle or in a new *offseting* mechanism.

Finally, it should be borne in mind that the CDM represented an innovative milestone in environmental regulation and that the period under review carries a strong learning component for both the UNFCCC and the CIMGC. Consequently, the implications for public policy and the subsidy of future procedures are mostly a set of lessons learned. As discussed, the procedure adopted by the Brazilian DNA was the most commonly adopted in the world (Olsen and Fenhann, 2006) and, in general, this procedure was evaluated as more objective than that adopted by most DNAs, which were limited to evaluate the content of the PDD of the projects (Schneider and Grashof, 2007).

From the perspective of this international discussion to review the mechanism, it is understood that a revision of the method and procedures for the evaluation of the contribution of emission reduction projects to sustainable development in the future is necessary. A clear definition of the indicators will, for example, allow documentary evidence to be provided by project proponents to support their self-declarations. Also, once the objective criteria for quantifying the contribution of GHG emission reduction projects to sustainable development have been established, clear rules can be established for the approval of the projects, which may include the achievement of a minimum overall grade or a grade sustainable development.

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ANNEX A

TABLE A.1
Projects registered by December 31, 2012

SEXEC/CIMGC Reference number	EB Reference number	Registration date (MM/DD/YY)	Project name
14	108	12/9/2005	Becker Farm GHG Mitigation Project
15	47	1/30/2006	GHG capture and combustion in manure management systems of Faxinal dos Guedes and Toledo farms – Sadia project – Brazil
48	337	5/25/2006	AWMS GHG BR05-B-07 Mitigation Project, Minas Gerais, Mato Grosso and Goiás – Brazil
43	364	6/18/2006	AWMS GHG BR05-B-02 Mitigation Project, Minas Gerais and São Paulo – Brazil
49	365	6/18/2006	AWMS GHG BR05-B-09 Mitigation Project, Goiás and Minas Gerais – Brazil
47	409	7/8/2006	AWMS GHG BR05-B-06 Mitigation Project, Bahia – Brazil
74	417	7/9/2006	AWMS GHG BR05-B-10 Mitigation Project, Minas Gerais, Goiás, Mato Grosso and Mato Grosso do Sul – Brazil
82	420	7/9/2006	SMDA GHG BR05-B-14 Mitigation Project, Espírito Santo, Minas Gerais and São Paulo – Brazil
46	412	7/9/2006	AWMS GHG BR05-B-05 Mitigation Project, Minas Gerais and São Paulo – Brazil
81	419	7/9/2006	SMDA GHG BR05-B-13 Mitigation Project, Minas Gerais and Goiás – Brazil
83	421	7/9/2006	SMDA GHG BR05-B-15 Mitigation Project, Paraná, Rio Grande do Sul, Santa Catarina – Brazil
45	411	7/9/2006	AWMS GHG BR05-B-04 Mitigation Project, Paraná, Santa Catarina and Rio Grande do Sul – Brazil
84	422	7/15/2006	SMDA GHG BR05-B-16 Mitigation Project, Bahia, Goiás, Mato Grosso, Minas Gerais, Rio de Janeiro and São Paulo – Brazil
42	335	8/29/2006	AWMS GHG BR05-B-01 Mitigation Project, Minas Gerais – Brazil
98	466	9/10/2006	SMDA GHG BR05-B-08 Mitigation Project, Paraná, Paraná and Rio Grande do Sul – Brazil
99	472	9/11/2006	SMDA GHG (Greenhouse Gas) BR05-B-12 Mitigation Project, Mato Grosso, Mato Grosso do Sul, Minas Gerais and São Paulo – Brazil
106	469	9/29/2006	MASTER Agropecuária: GHG capture and combustion of GHG in swine farms in Southern Brazil
100	467	9/30/2006	SMDA GHG BR05-B-17 Mitigation Project, Espírito Santo, Mato Grosso, Mato Grosso do Sul and Minas Gerais – Brazil
44	336	10/16/2006	AWMS GHG BR05-B-03 Mitigation Project – Brazil
154	1,158	2/1/2008	SMDA BR06-S-21 Methane Recovery Project, Goiás – Brazil
149	1,154	2/1/2008	SMDA BR06-S-19 Methane Recovery Project, Goiás – Brazil
157	1,162	2/1/2008	SMDA BR06-S-27 Methane Recovery Project, Goiás – Brazil
155	1,159	2/1/2008	SMDA BR06-S-24 Methane Recovery Project, Mato Grosso and Mato Grosso do Sul – Brazil
150	1,157	2/1/2008	SMDA BR06-S-20 Methane Recovery Project, Minas Gerais – Brazil

SEXEC/CIMGC Reference number	EB Reference number	Registration date (MM/DD/YY)	Project name
153	1,161	2/1/2008	SMDA BR06-S-26 Methane Recovery Project, Minas Gerais, Brazil
156	1,160	2/1/2008	SMDA BR06-S-25 Methane Recovery Project, Minas Gerais, Brazil
168	1,164	2/1/2008	SMDA BR06-S-29 Methane Recovery Project
164	1,163	2/1/2008	SMDA BR06-S-28 Methane Recovery Project, Santa Catarina – Brazil
152	1,234	2/4/2008	SMDA BR06-S-23 Methane Recovery Project, Mato Grosso and Goiás – Brazil
165	1,529	3/17/2008	SMDA BR06-S-30 Methane Recovery Project
151	1,528	4/7/2008	SMDA BR06-S-22 Methane Recovery Project, Minas Gerais – Brazil
169	1,532	4/10/2008	SMDA BR06-S-33 Methane Recovery Project
192	1,534	4/10/2008	GHG Mitigation Projects of Farms included in DPPs BR07-S-34
148	1,521	6/5/2008	SMDA BR06-S-18 Methane Recovery Project, Paraná, Rio Grande do Sul and Santa Catarina – Brazil
191	1,531	6/5/2008	GHG Mitigation Projects of Farms included in PDDs BR07-S-31
209	1,968	1/12/2009	COTRIBÁ Project to Treat Swine Manure
224	2,316	3/10/2009	Amazon Carbon Project to Treat Swine Manure 03
215	2,335	3/10/2009	Amazon Carbon Project to Treat Swine Manure 02
222	2,318	3/16/2009	BRASCARBON Project to Recover Methane BCA-BRA-01, version 5, May 26th, 2008 – Brazil
212	2,249	6/9/2009	Perdigão – Swine Sustainable Production 01 – Methane capture and combustion
246	3,454	8/7/2010	BRASCARBON Methane Recovery Project BCA-BRA-03
248	3,456	8/21/2010	BRASCARBON Methane Recovery Project BCA-BRA-07
247	3,455	8/21/2010	BRASCARBON Methane Recovery Project BCA-BRA-05
262	3,538	8/28/2010	Agroceres – methane capture and combustion project at Granja Paraíso Composting Project at Organoeste Dourados & Andradina
245	3,220	11/8/2010	BRASCARBON Methane Recovery Project BCA-BRA-02
249	3,222	11/8/2010	BRASCARBON Methane Recovery Project BCA-BRA-08
273	3,984	2/26/2011	Batavo Cooperativa Agroindustrial: reduction of gas emissions in swine farming through the installation of better manure treatment systems
285	4,212	10/13/2011	GHG reductions from an improved treatment of industrial residual waters in Embaré – Lagoa da Prata, Minas Gerais – Brazil
280	5,494	6/12/2012	BRASCARBON Methane Recovery Project BCA-BRA-13 BRASCARBON Methane Recovery Project BCA-BRA-14
281	5,496	6/12/2012	BRASCARBON Methane Recovery Project BCA-BRA-14
304	6,411	6/18/2012	BRASCARBON Methane Recovery Project BCA-BRA-15
227	2,939	8/24/2012	Ecobio Carbon Treatment and use of swine manure – Swine culture no 1
278	5,492	11/1/2012	BRASCARBON Methane Recovery Project BCA-BRA-09
276	5,484	11/6/2012	BRASCARBON Methane Recovery Project BCA-BRA-04A

SEXEC/CIMGC Reference number	EB Reference number	Registration date (MM/DD/YY)	Project name
277	5,478	11/6/2012	BRASCARBON Methane Recovery Project BCA-BRA-06A
323	7,635	11/19/2012	Small Thermoelectric Power Plant at ETE Arrudas in COPASA MG
279	5,488	12/5/2012	BRASCARBON Methane Recovery Project BCA-BRA-10
352	8,832	12/27/2012	Methane Recovery Project in Waste Treatment
75	418	7/9/2006	GHG AWMS BR05-B-11 Mitigation Project, Mato Grosso, Minas Gerais and São Paulo – Brazil
22	187	3/3/2006	Cogeneration Project with Bagaço Jalles Machado (PCBJM)
63	211	4/6/2006	Cogeneration of Itamarati Plants in Brazil
54	185	3/3/2006	Cogeneration Project with Bagaço Coruripe (PCBC)
61	208	3/3/2006	Cogeneration Project with Bagaço Campo Florido (PCBCF)
71	206	3/3/2006	Cogeneration Project with Bagaço Usinas Caeté Sudeste (PCBUCSE)
325	7,577	12/28/2012	Use of Charcoal from Renewable Biomass Plantations as a Reducing agent in pig iron mill in Brazil
23	43	3/3/2006	Cogeneration Project with Bagaço Lucélia (PCBL)
24	65	2/24/2006	Cogeneration Project with Bagaço Santa Cândida (PCBSC)
28	178	2/20/2006	Cogeneration Project with Bagaço Santa Elisa (PCBSA)
29	199	3/3/2006	Cogeneration Project with Bagaço Vale do Rosário (PCBVR)
30	190	3/9/2006	Cogeneration Project with Bagaço Moema (PCBM)
31	205	3/9/2006	Cogeneration Project with Bagaço Equipav (PCBE)
32	179	2/20/2006	Cogeneration Project with Bagaço Nova América (PCBNA)
33	203	3/3/2006	Cogeneration Project with Bagaço Cerradinho (PCBC)
34	180	3/3/2006	Cogeneration Project with Bagaço Colombo (PCBC)
37	216	3/6/2006	Cogeneration Project with Bagaço Cruz Alta (PCBCA)
38	181	2/20/2006	Cogeneration Project with Bagaço Alta Mogiana (PBCAM)
50	201	3/3/2006	Cogeneration Project with Bioenergy (Santo Antônio Power Plant – United States)
51	209	3/9/2006	Cogeneration Project Central Energética do Rio Pardo (Cerpa)
52	200	3/6/2006	Santa Adélia Thermoelectric Project (TSACP)
53	202	3/6/2006	Cogeneration Project with Bagaço Zillo Lorenzetti (PCBZL)
60	213	3/3/2006	Cogeneration Project with Bagaço Serra (PCBS)
62	207	3/4/2006	Cogeneration Project with Bagaço Alto Alegre (PCBAA)
67	215	3/3/2006	Cogeneration Project with Bagaço Coinbra-Cresciumal (PCBCC)
70	212	3/4/2006	Cogeneration Project with Bagaço Iturama (PCBI)
193	4,810	9/9/2011	Cogeneration Project at Usina Interlagos
87	1,062	6/22/2007	Cogeneration Project Santa Terezinha – Tapejará
73	485	8/28/2006	Cogeneration Project with Bagaço Cucaú (PCBC)

SEXEC/CIMGC Reference number	EB Reference number	Registration date (MM/DD/YY)	Project name
20	168	5/12/2006	Pesqueiro Energia, S.A Small Hydroelectric Plant in Brazil
241	3,487	1/12/2011	Paragominas CDM Project
214	2,319	8/4/2009	INPA Fuel Replacement Project
66	529	9/29/2006	Guará da Bunge Biomass Project
9	114	9/29/2006	Electricity Generation Project from Biomass Rickli
17	403	8/31/2006	Electricity Generation Project from Biomass in Inácio Martins
18	401	11/30/2006	Electricity Generation Project from Biomass in Imbituva
7	404	7/7/2006	IRANI Project for Electricity Generation from Biomass
58	228	2/11/2006	Piratini Energy Project – Brazil
72	231	2/11/2006	Biomass Electricity Generation Project CAMIL Itaqui
167	1,089	7/19/2008	GEEA Project of 5 MW Biomass Power Plant
170	1,202	11/5/2007	Burning of solid biomass for the generation of process steam in the production of beers
357	8,128	11/19/2012	Energia Barueri CDM Project Activity
39	268	4/23/2006	Metano Lages no Brazil Methane Emissions Reduction Project
25	116	12/25/2005	N_2O emissions reductions in Paulínia SP
141	1,011	6/2/2007	N_2O reduction project at the plant in Paulínia
203	1,784	11/13/2008	Nitrous Oxide Reduction Project in PAN2 Fosfertil Piaçaguera
208	2,257	3/21/2009	Nitrous Oxide Reduction Project in PAN4 Fosfertil Cubatão
226	1,731	10/29/2009	Nitrous Oxide Reduction Project in Petrobras FAFEN-BA
171	1,067	7/12/2007	Grupo Rede CDM Project
8	143	1/22/2006	UTE Barreiro S.A. Renewable Electricity Generation Project
68	184	5/15/2006	o – Generation of Electric Power through the recovery of LDG - CST – Brazil
266	3,921	12/24/2010	Residual gas recovery for the generation of thermal energy in the Três Marias Plant – Project Activity
306	6,453	8/16/2012	Coqueria da SOL Electricity Generation Project through a heat recovery process
158	1,908	2/19/2009	Landfill emissions reduction project activity at Aterro SANTECH Resíduos
2	52	8/15/2005	Vega Bahia Project – Landfill project in Salvador da Bahia
76	893	4/8/2007	Canabrava Landfill Gas Project – Salvador-BA – Brazil
202	1,626	7/12/2008	Landfill Gas Project in Feira de Santana
162	1,165	1/30/2008	PROBIOGÁS-JP Project
360	7,637	10/17/2012	BioLandfill Project for Energy in Natal
288	4,211	7/8/2011	Landfill Project in Manaus
80	888	4/30/2007	Aurá Landfill Gas Project
4	137	1/23/2006	Landfill Project for Energy of the company MARCA

SEXEC/CIMGC Reference number	EB Reference number	Registration date (MM/DD/YY)	Project name
198	1,491	5/28/2008	Emissions reduction project at the Vila Velha Landfill
242	3,464	6/4/2011	Biogas Collection and Combustion Project at the Landfill of the Solid Waste Treatment Plant – CTRS / BR-040
358	7,110	9/4/2012	Uberlândia I and II Landfill Projects
1	8	11/18/2004	NovaGerar Project – Energy Project from Landfill Gas
291	4,657	8/11/2011	Itaoca Landfill Project
428	9,087	12/24/2012	Gramacho Landfill Project
5	91	5/15/2006	Landfill Conversion Project in the Lara Landfill - Mauá – Brazil
6	27	11/24/2005	ONYX Tremembé Landfill Recovery Project – Brazil
10	165	3/3/2006	ESTRE Landfill Recovery Project – Paulínea (PROGAE)
11	171	3/9/2006	Biogas Emission Reduction Project, Caieiras – Brazil
13	164	2/20/2006	Bandeirantes Landfill and Power Generation Project in São Paulo – Brazil
16	226	12/15/2006	Anaconda Landfill Gas Project
21	373	7/2/2006	São João Landfill Project and Power Generation in Brazil
89	1,179	10/15/2007	Bragança Landfill Gas Project – EMBRALIXO/Araúna
109	1,636	5/29/2008	Alto-Tietê Landfill Gas capture project
114	1,133	5/6/2008	Environmental Landfill Project (PROGATA)
115	911	8/17/2007	Itapevi ESTRE Landfill Project – (PROGAEI)
116	912	5/27/2007	Quitaúna Landfill Project (PROGAQ)
138	1,134	2/12/2008	CDR Pedreira Landfill Project (PROGAEP)
182	1,247	10/14/2008	URBAM/ARAUNA – Landfill Gas Project (UAPGAS)
234	7,799	12/21/2012	TECIPAR – PROGAT Landfill Project
298	6,553	7/18/2012	CGR Guatapará Landfill Project
302	5,947	5/8/2012	CTL Landfill Project
363	8,011	11/9/2012	ENGEP & BEGREEN CDM project at UTGR Landfill – Jambeiro
376	8,603	12/11/2012	Controeste Biogas project for energy
390	8,751	12/20/2012	390/2012 – CGA Iperó Project for Landfill and Power Generation of Proactiva
407	8,213	12/26/2012	ESTRE Piratininga Landfill Project
295	3,958	9/29/2011	CTR Candeias Landfill Project
93	648	12/31/2006	SIL (PROGAS) Landfill Project
397	9,290	12/27/2012	ITVR São Leopoldo Landfill Project
180	1,506	8/13/2008	Tijuquinhas da Proactiva Project for Capturing and Burning Landfill Gas
255	3,002	4/2/2010	São Domingos II Hydro Power Plant Project
104	891	7/31/2007	Buriti and Canoa Quebrada Small Hydroelectric Power Plant Project

SEXEC/CIMGC Reference number	EB Reference number	Registration date (MM/DD/YY)	Project name
147	1,317	2/11/2008	Paraíso Small Hydroelectric Power Plant Project
65	530	12/15/2006	ARAPUCEL – Small Hydroelectric Power Plant Project
123	809	7/31/2007	Garganta da Jararaca Small Hydroelectric Power Plant Project
296	4,996	4/2/2012	Pampeana and Terra Santa (Graça Brennand) Small Hydroelectric Power Plant Project
368	9,042	12/21/2012	Santa Gabriela and Planalto Small Hydroelectric Power Plant
125	693	12/31/2006	CDM project of the Hydroelectric Plant with existing reservoir "Pedra do Cavalo" of Votorantim
185	1,843	10/20/2008	Primavera Small Hydroelectric Power Plant Project
423	9,226	12/26/2012	Jirau Hydropower Plant
434	9,282	12/27/2012	Santo Antônio Small Hydroelectric Power Plant Project
144	1,342	5/2/2008	São João Small Hydroelectric Power Plant
145	1,232	5/26/2008	Mascarenhas HPP Energy Repowering Project
57	520	10/2/2006	Cachoeira Encoberta and Triunfo – Brascan Energética Minas Gerais S.A (BEMG) Small Hydroelectric Power Plant Project in Brazil
230	2,606	12/25/12009	CDM Project Activity of the Piedade Small Hydroelectric Power Plant
265	3,922	4/5/2011	Baguari Hydropower Plant CDM Project Activity
269	3,898	1/4/2011	Guanhães Energia, Minas Gerais – Brazil CDM Project
292	4,788	5/12/2011	Cachoeirão (JUN1092) CDM Project
320	6,382	12/6/2012	Pipoca Small Hydroelectric Power Plant Project Activity
347	7,071	8/31/2012	Serra das Agulhas Small Hydroelectric Power Plant Project Activity
370	7,685	12/27/2012	DAS Pequenas Centrais Quartel I, II, and III CDM Project
289	4,676	6/15/2011	SHP Malagone, Minas Gerais – Brazil CDM Project
342	7,035	8/20/2012	PCHs Energisa Rio Grande
69	489	12/15/2006	SHP repowering in the state of São Paulo – Brazil
251	3,316	12/22/2010	Queluz and Lavrinhas Renewable Energy Project
294	4,937	10/11/2011	Anhanguera SHP Project
91	773	4/8/2007	CDM Project Activity of Monte Claro Water Power Plant CERAN
205	1,829	4/9/2009	CERAN 14th July Hydroelectric Power Plant
220	2,375	1/7/2010	CERTEL SHP Project – Cooperativa Regional de Eletrificação Teutônia Ltda.
223	2,500	1/11/2010	Moinho and Barracão SHP CDM Project
293	4,936	7/25/2012	Ouro SHP Project – Brennand CDM Activity Project
300	6,041	10/22/2012	Complexo Carreiro II CDM Project Activity
310	6,464	12/19/2012	Criúva and Palanquinho SHP CDM Project Activity
328	7,612	10/18/2012	Serra dos Cavalinhos I SHP CDM Project Activity
330	7,483	10/11/2012	Pezzi SHP CDM Project Activity

SEXEC/CIMGC Reference number	EB Reference number	Registration date (MM/DD/YY)	Project name
362	7,739	10/22/2012	Quebra Dentes SHP CDM Project Activity
366	8,018	11/26/2012	Jorge Dreher and Henrique Kotzian SHP CDM Project Activity
393	8,512	12/7/2012	393/2012 – Toropi Complex SHP CDM Project Activity
181	1,279	5/25/2008	Fundão-Santa Clara (PCEFSC) Energy Complex Project
260	3,895	7/3/2012	Arvoredo and Varginha SHP Generation of energy from renewable sources
309	6,208	7/25/2012	Ibirama SHP Project – Brennand CDM Activity
349	7,858	12/21/2012	Salto Góes SHP Generation of electricity from renewable sources
235	3,486	1/24/2011	Goiandira, Pedra do Garrafão, Pirapetinga and Sítio Grande SHP Project Activity
430	9,301	12/27/2012	Teles Pires Hydroelectric Power Plant Activity
59	519	10/2/2006	Passo do Meio, Salto Natal, Pedrinho I, Granada, Ponte and Salto Corgão – Brascan Energética S.A. SHP Project
210	1,999	3/22/2009	Piabanha River SHP Project
86	831	4/2/2007	Santa Edwiges II SHP Project
94	830	12/26/2006	Santa Edwiges I SHP Project
213	2,165	8/7/2009	Rialma Companhia Energética III S / A - Santa Edwiges III Small Hydroelectric Power Plant - Small scale project
90	627	12/15/2006	Aquarius SHP Project
112	663	11/25/2006	Santa Lúcia II SHP Project
113	668	11/25/2006	Braço Norte IV SHP Project
124	667	11/25/2006	Braço Norte III SHP Project
200	3,270	6/11/2010	ARS SHP
236	2,793	1/11/2010	Santana I SHP CDM Project
378	8,474	12/7/2012	Maracanã SHP Project
136	1,378	6/26/2008	Martinuv Espigão Hydroelectric Power Plant Project
187	1,526	3/16/2009	Saldanha SHP Project
35	477	8/28/2006	Ivan Botelho II (Palestina) SHP– Brascan Energética Minas Gerais S.A. (BEMG)
36	543	9/24/2006	Nova Sinceridade SHP – Brascan Energética Minas Gerais S.A. (BEMG)
219	2,570	8/27/2009	Jaguari-Mirim River SHP Project
19	242	2/26/2006	Pesqueiro Energia S.A. Small Hydroelectric Power Plant Project
195	1,800	12/15/2008	Cristalino SHP Project
405	8,500	11/30/2012	Itaguaçu (JUN 1146) – Brazil SHP CDM Project
26	229	4/22/2006	BT Geradora de Energia Elétrica S.A. Small Scale CDM Project.
40	480	9/8/2006	Jaguari Energética S.A. – Furnas do Segredo SHP Project
301	6,042	4/16/2012	Santa Carolina SHP CDM Project

SEXEC/CIMGC Reference number	EB Reference number	Registration date (MM/DD/YY)	Project name
316	6,465	7/2/2012	Albano Machado and Rio dos Índios (JUN1115) SHP CDM Project
128	1,146	8/11/2007	Alto Benedito Novo SHP Project
131	860	3/2/2007	Spessatto, Santo Expedito and Barra do Leão SHP Project
240	2,994	6/1/2010	Estelar CDM Project
264	3,669	5/20/2011	Rodeio Bonito SHP Project
374	8,023	11/3/2012	São Sebastião SHP CDM Project
77	968	4/27/2007	"Incomex" Brazil SHP Project
371	9,125	12/23/2012	Salto do Cafesoca SHP Project
297	5,483	4/26/2012	Caquende and Juliões SHP Project
189	1,410	1/19/2008	Irani Avoided Methane Project
232	2,555	9/18/2009	Avelino Bragagnolo Project – effluent treatment using an aerobic system
217	2,610	2/26/2010	JBS S.A. Project – Aerobic Treatment of Slaughterhouse Effluents – Vilhena Unit
286	4,262	12/23/2010	Grupo Queiroz Galvão – Maranhão –- Brazil Green energy carbonization project - Mitigation of methane emission in the production of charcoal
163	1,051	8/9/2007	Plantar Green energy carbonization project - Mitigation of methane emission in the production of charcoal
218	2,609	3/23/2010	JBS S.A. Project - Aerobic Treatment of Slaughterhouse Effluents –Barra do Garças Unit
369	8,067	12/5/2012	GHG Emissions Reductions in pig farming through the installation of composting systems
263	3,517	12/21/2010	Organoeste Dourados & Andradina Composting Project
166	1,092	9/14/2007	GEEA Project – SBS Biomass Treatment
206	1,860	1/4/2009	PFC Emissions Reductions in ALBRAS, Alumínio Brasileiro S.A.
318	7,258	9/12/2012	Vale Florestar Project – Reforestation of degraded tropical areas in the Brazilian Amazon
228	2,569	7/21/2010	Reforestation Project as a Renewable Source of Wood Supply for Industrial Use in Brazil
271	3,887	1/7/2011	AES Tietê CDM Reforestation Project in the State of São Paulo
426	9,056	12/21/2012	Generation of electricity from renewable sources connected to the electric grid: Sete Lagoas Solar Power Plant
56	429	7/2/2006	"Replacement of Fuel Oil for Natural Gas in Klabin's Piracicaba Boilers" in Brazil
41	484	10/20/2006	Project for Replacement of Fuel Oil for Natural Gas at Solvay Indupa do Brazil S.A.
101	755	12/28/2006	Project for Replacement of Fuel Oil for Natural Gas at Votorantim Cimentos, Cubatão
111	828	3/9/2007	Quimvale Project for Replacement of Fuel for Natural Gas
132	889	3/10/2007	Rima in Bocaiúva Project for Replacement of Fuel for Natural Gas
55	1,037	5/19/2007	Aços Villares Project for Replacement of Fuel for Natural Gas

SEXEC/CIMGC Reference number	EB Reference number	Registration date (MM/DD/YY)	Project name
137	1,224	1/10/2008	Nobrecel Project for Fuel Replacement in the black liquor boiler
139	1,117	5/16/2008	Replacement of fuel oil by sebum at Companhia de Fiação and Tecidos Santo Antônio
274	3,849	12/9/2010	Fuel replacement project at Samarco Mineração S. A.
102	698	3/9/2007	Raudi Sais Químicos Project
229	2,486	7/2/2009	Conversion of SF_6 to alternative SO_2 cover gas in the production of magnesium at RIMA
303	6,571	9/4/2012	Seabra, Novo Horizonte and Macaúbas Wind Farm CDM Project
313	8,834	12/24/2012	Pedra do Reino Wind Farm Project
319	8,905	12/26/2012	Pedra do Reino III Wind Farm
324	7,597	10/18/2012	Renova Área 6-8 Wind Farm Project
413	9,192	12/31/2012	Cristal II Wind Farm
414	9,075	12/28/2012	Serra Azul Wind Farm
415	9,064	12/21/2012	Cristal, Primavera e São Judas Wind Farm
416	9,069	12/31/2012	Curva dos Ventos Wind Farm
333	7,065	12/13/2012	Mel 2 Wind Farm CDM Project Activity
334	7,021	8/24/2012	Guajiru Wind Farm Project
336	7,027	8/24/2012	Porto do Delta Wind Farm CDM Project
337	7,026	8/24/2012	Mundaú Wind Farm CDM Project
338	7,023	8/24/2012	Trairi Wind Farm CDM Project
364	8,219	11/21/2012	Faísas CDM Project Activity of Wind Power Complexes
380	8,122	12/22/2012	Acaraú II Wind Farm – 39 MW – Brazil
381	8,493	12/14/2012	Acaraú I Wind Farm – 147 MW – Brazil
382	9,110	12/22/2012	Aracati Wind Farm – 25,5 MW– Brazil
391	9,325	12/27/2012	Dunas de Paracuru Wind Farm
394	8,586	12/10/2012	Generation of electricity from renewable sources connected to the grid: Bons Ventos da Serra I Wind Farm
326	7,878	10/31/2012	Aeolis Beberibe Wind Farm
327	7,879	10/31/2012	Aeolis 2011 Wind Farm Project, Aracati
417	9,072	12/31/2012	Fontes dos Ventos Wind Farm
335	7,017	8/24/2012	Fleixeiras I Wind Farm CDM Project
340	8,021	11/21/2012	Delta do Parnaíba Wind Farm CDM Project
305	6,350	11/8/2012	Generation of electric energy from renewable sources project Macacos, Juremas, Pedra Preta and Costa Branca Wind Farms
314	8,904	12/24/2012	Cabeço Preto IV Wind Farm
322	7,196	9/17/2012	Generation of electricity from renewable sources connected to the grid: União dos Ventos Wind Farm Complex, Serveng Civilsan S.A.

SEXEC/CIMGC Reference number	EB Reference number	Registration date (MM/DD/YY)	Project name
331	7,059	11/8/2012	Arizona 1
332	7,769	12/21/2012	Renova 2010 Wind Farms
339	7,802	11/5/2012	Generation of electricity from renewable sources - Campo dos Ventos II Wind Farm
344	7,157	12/3/2012	Lagoas de Touros CDM Project Activity of wind electric power plants
346	9,149	12/26/2012	Riachão III and V CDM Project Activity of wind electric power plants
354	7,725	10/23/2012	Generation of electricity from renewable wind sources – Morro dos Ventos Wind Farm
367	9,328	12/28/2012	Pelado Wind Farm
403	8,253	12/26/2012	Generation of electricity from renewable wind sources –Morro dos Ventos Wind Park phase 2
418	9,077	12/31/2012	El Modelo Wind Farm
350	7,012	8/31/2012	Calango and Caetité CDM Wind Farm Project Activities
95	603	12/28/2006	Osório Wind Farm Project
307	6,609	12/28/2012	Palmares (PCEEP) Wind Power Plant Project
308	6,607	12/28/2012	Osório 2 (PCEEO2) Wind Power Plant Project
345	7,109	10/17/2012	REB Cassino CDM Wind Farm Project Activities
359	7,964	12/27/2012	Santana do Livramento Grid connected to the generation of electricity from renewable sources
384	8,012	11/9/2012	Generation of electricity from renewable sources connected to the grid: Santa Vitória do Palmar and Chuí Wind Farm Complex
424	9,375	12/31/2012	Corredor dos Senandes CDM Project
299	5,495	5/15/2012	Generation of electricity from renewable sources –Santa Clara I, II, III, IV, V, VI e Eurus VI Wind Farms
140	843	3/9/2007	Petrobras Wind Energy Project for Oil Pumping in Macao
78	575	9/30/2006	Água Doce (PGEEAD) Wind Power Generation Project
79	486	8/28/2006	Horizonte (PGEEH) Wind Power Generation Project

ANNEX B

CRITERIA FOR THE EVALUATION, BY SIZE, OF SUSTAINABLE DEVELOPMENT

TABLE B.1
Environmental Indicators

AMB_AR	Contribution of the project to the improvement of local air quality
Note	Criteria
0	Not declared by project proponent.
1	Project states that it contributes to the reduction of at least one air pollutant (MP, NOx, SOx, VOC, NMVOC) in addition to reductions of greenhouse gases (GHGs).
2	Project states that it contributes to the reduction of at least one air pollutant (MP, NOx, SOx, VOC, NMVOC) in addition to GHG reductions, specifying the contribution to air quality in a place of low saturation of atmospheric pollutants.
3	Project states that it contributes to the reduction of at least one air pollutant (MP, NOx, SOx, VOC, NMVOC) in addition to GHG reductions, specifying the contribution to air quality in a place of high saturation of atmospheric pollutants.
AMB_ÁGUA	Contribution of the project to the improvement of water quality
Note	Criteria
0	Not declared by project proponent.
1	Project states that it has no negative impact on water availability.
2	Project states that it contributes positively to water availability through higher quantity or quality of water.
3	Project states that it contributes positively to water availability through higher quantity or quality of water in regions with water stress.
AMB_SOLO	Contribution of the project for the reduction or mitigation of soil pollution
Note	Criteria
0	Not declared by project proponent.
1	Project states that it has no negative impact on soil quality.
2	Project states that it reduces risk of negative impact on soil quality compared to the baseline scenario.
3	Project states that it has a positive impact on soil quality compared to the baseline scenario.
AMB_CO_2E	Evaluates the contribution of the project or technology to the achievement of GHG emission reductions in Brazil
Note	Criteria
0	Not declared by project proponent.
1	Reductions by 60,000 tCO_2e per year.
2	Reductions between 60,001 and 100,000 tCO_2e per year.
3	Reductions above 100,001 tCO_2e per year.

TABLE B.2
Social indicators

SOC_COND_TRAB	Project commitment with social and labor responsibilities, health and education programs, and civil rights
Note	Criteria
0	Not declared by project proponent.
1	Project abides by social and labor laws.
2	Project abides by social and labor laws, and implements a voluntary program in the areas of health, education or civil rights.
3	Project abides by social and labor laws, and implements more than one voluntary program in the areas of health, education or civil rights.
SOC_IGUALDADE	Contribution of the project to reduce inequality and quality of life of low-income populations
Note	Criteria
0	Not declared by project proponent.
1	Project states that it contributes to the increase of the municipal, state or federal public tax collection.
2	Project states that it gives preference to the hiring of unskilled local labor guaranteeing professional qualification.
3	Project states that through the project activity, infrastructure improvements and access to public services (for example, energy, sanitation, education and health) are feasible and thus have a positive impact on reducing inequality.
SOC_CAPACITACAO	Degree of knowledge and training internalized by the project, evaluation of the capacity to reproduce technology, observing its demonstrative effect
Note	Criteria
0	Not declared by project proponent.
1	Project builds employees' capacities with basic fundamentals, such as literacy or safety at work and environmental education.
2	Project presents a training program for employees with internalization and diffusion of knowledge about the process or technology employed by the project.
3	Project uses unconventional technology for the industry, with replication potential, scalability and proven demonstrative effect.

TABLE B.3
Economic indicators

ECON_EMPREGO	Contribution of the project to net generation of direct and indirect jobs
Note	Criteria
0	Not declared by project proponent.
1	Annex III mentions the generation of direct, indirect or permanent jobs.
2	Annex III quantifies direct or indirect job creation.
3	Annex III quantifies permanent job creation in the region.
ECON_TECNOLOGIA	Assesses the degree of technological innovation and the technologies employed, especially the cases of technology transfer
Note	Criteria
0	Not declared by project proponent.
1	Project contributes to the diffusion of technology in its sector of activity.
2	Project employs low penetration technology in its sector, contributing with the demonstrative effect and helping to change common practices.
3	Project states to use technology that is not available nationally or not applied to its sector, demonstrating international or intersectoral technology transfer.
ECON_INTEGRACAO	Assesses project's contribution to regional development
Note	Criteria
0	Not declared by project proponent.
1	Project is developed in developed regions or has limited impact of regional integration.
2	Project is developed in less developed regions.
3	Project states to contribute to regional integration (e.g. grid-connected power generation, infrastructures, transfer of skilled labor etc.) or articulates cooperation between sectors.
ECON_PRAT_COM	Assesses project's contribution to structural sectoral changes and changes in common practices
Note	Criteria
0	Not declared by project proponent.
1	Project states that it follows a sectoral trend using technology that is not common practice, but has been expanding in its sector.
2	Project states that it uses an innovative or unusual technology or process in its industry leading structural sectoral changes and changes in common practices.
3	Project is the first of its kind, demonstrating the use of innovative technology, or has systematic research and development activities contributing to the demonstration of new technologies or processes.