



# INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

"KEY ELEMENTS FOR A SUSTAINABLE WORLD: ENERGY, WATER AND CLIMATE CHANGE"

## Investing in Clean Development Mechanism (CDM) Projects

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### Abstract

The discussion about the Clean Development Mechanism (CDM) began with the effects of global warming and its consequences. Al Gore who produced *An Inconvenient Truth*, which was granted the Oscar of Best Documentary in 2007, kept the flag of climate defender flying. 2005 International Energy Agency Statistics show that developed and developing countries like the United States (21.4%), Japan (4.5%), China (18.7%), Russia (5.7%) and India (4.%) are responsible for just about 55% of the global CO<sub>2</sub> emission. Apparently, no one is discussing the need for radical measures aiming to reduce the emission of Greenhouse Gases (GHG). Bjorn Lomborg, in his 2007 book *Cool It*, questions the practicality of CO<sub>2</sub> reduction with respectable economic arguments; he recognizes the problems, but questions the way to face them and the Kyoto Protocol (KP) itself. In this context Brazil appears as a bastion with a very small contribution of just 1.2% of the global CO<sub>2</sub> emission, especially considering its vast territorial extent. The main contribution of this research is to answer the following questions: CDM projects are profitable? What is the role of Brazil in reducing GHG emission? What is the future of the market for carbon credits after Kyoto?

*Keywords: Clean Development Mechanism (CDM), Greenhouse Gases (GHG), Kyoto Protocol, CO<sub>2</sub> emission, Carbon Credits (CC)*

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### 1 Introduction

According to the KP (1997), industrialized countries should reduce GHG emission in 5.2% until 2012, in relation to the 1990 level. In order to achieve this objective, it is possible to buy Carbon Credits (CC) from the developing countries, or the right to pollute from a company that proves to be lowering its emissions.

After the KP, the world and the companies were forced to add a new concern to their decision making processes: how to reduce the emission of greenhouse gases that are causing the greenhouse effect in the atmosphere without hampering the development? Developing countries that, according to the KP, have no obligation to reduce GHG emission can and are taking the opportunity to take advantage of this new emission target market. Brazil can become more competitive in the international scenario through the effective use of environmental management and the generation of carbon credits by means of CDM projects, generating greater flow of foreign investments to the country.

The CDM projects, that can generate carbon credits, became the financial arm of KP for developing countries, managing to attract the business community and private initiative for the causes of global warming. The CDM projects also provide opportunity for the developing countries to gain new technologies. This research

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has as its main issue: The CDM projects can be considered a good investment? The primary objective of this paper is to seek to identify, through the opinion of experts of the market, whether investments in CDM projects are profitable, adding value to the companies involved, and attracting foreign investment to the country. As secondary objectives this paper intends to analyze the Brazilian GHG reduction capacity and the future trend of the market, from 2012, when the current phase of the KP will be closed.

This paper contains the following items: i) introduction in which we attempt to define and limit the context; ii) theoretical framework which, briefly, covers fields of investment, competitiveness and sustainable development, KP and the emissions trading, focuses on the Brazilian market and the Brazilian government position, and finally, the situation after KP. Testing hypotheses are also formulated along the theoretical framework; iii) methodology and tools of qualitative research; iv) analysis of the main results through a matrix of content analysis, and; v) final considerations in which the feasibility of implementing CDM projects, and economic conditions of the reduction of GHG, is verified.

## 2 Theoretical Framework

### 2.1 Foreign Investment

#### 2.1.1. Investing in Brazil

FDI and the Risk Brazil - represented by the Emerging Markets Bond Index Plus (EMBI +) from 2001 - are reported in Table 01, in which there can be seen a movement of constant capital flow, fluctuating according to global economic movements and Brazil's Risk, as measured by the EMBI +. The entrance of foreign capital is inversely proportional to Brazil's Risk, in other words, increasing the country's risk, there is a decrease in capital flow entering the country, because capital seeks refuge in American Treasury Bills.

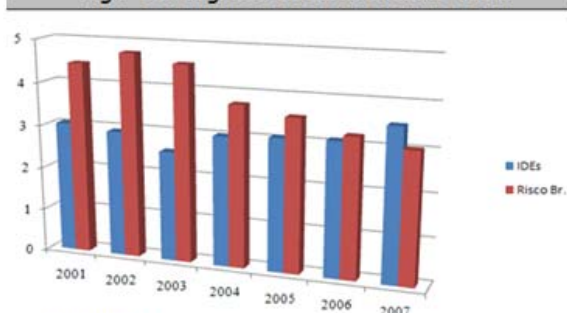
Fig. 01 shows the close relation between FDI variation and EMBI+. In order to make the scales compatible EMBI+ was divided by 10 and both variables are represented by their natural logarithms.

Table 01: FDI's x Brazil's Risk, 2001/2007

Year	R\$ (Billions)	EMBI+
2001	21,04	863
2002	18,78	1155
2003	12,9	955
2004	20,27	422
2005	21,52	346
2006	22,23	251
2007	33,7	206

Source: BACEN, 2008 e CBOND Mkt Info, 2008

Fig. 01: Ingress IDEs x Brazil's Risk\*



\* EMBI+/10, Log n

Source: BACEN, 2008, CBOND Mkt Info, 2008

The scenario for 2007 and for the future is promising, as is shown in the *World Investment Report 2007*, of the United Nations Conference on Trade and Development (UNCTAD). According to this report FDI in Brazil should go beyond the 2000 former record. The entrance of a great amount of FDI means job generation, increase in consumer income, and it is also important because it includes the country among the large worldwide production chains (INVESTIMENTOS, 2007).

The prospects for the future are that Brazil will become competitive for investors thanks to the availability of natural resources and thanks to a new and promising market: the generation of carbon credits (Senna, 2004). The capacity to generate carbon credits will be dealt with throughout this paper.

At the end of April Standard & Poor's raised the note of Brazilian sovereign bonds, which finally reached the ambitious goal of Investment Grade. Therefore a significant indirect investment entrance is expected, thus allowing reconciling the

concerns about the environment with economic growth, making the alliance between natural resources and economic development. Based on the theory and the data presented, we make the first hypothesis of this paper:

**H<sub>A, 1</sub>: Brazil will receive large foreign investments, which could be applied in environmentally responsible projects.**

## **2.2. Competitiveness and Competitive Factors**

Rodrigues (1999) notes that, because of the complexity due to a variety of interpretations and causes, authors have failed to reach a consensus on what competitiveness is. Porter (1990) makes that difficulty clear when he explains the meaning of different views on the subject: “[...]for businesses, it means the ability to compete in world markets with a comprehensive strategy, for the government, it means a surplus in trade balance and, for some economists, it means a unit of low cost of labor adjusted for exchange rates”.

Hitt (2003, p.5) states that to achieve a level of competitiveness, a strategy is needed, and strategic competitiveness is achieved only when a company is successful in formulating and implementing a strategy that generates value. Based on this, it seems that Brazil suffers from lack of a strategy to add value to the country, with the growing concern about environment, a strategy that involves preservation and conservation with social responsibility could be considered a sustainable competitive advantage. Sustainable competitive advantage, according to Hitt (2003), is achieved when other companies (in this case, countries) can not reproduce it or believe that it is too expensive to imitate it.

It is true that many changes occur because companies respond to new laws or regulations imposed by public and private organizations, but the competitive appeal that these adjustments have brought is evident (RODRIGUES, 1999). The concern with the environment, global warming, greenhouse effect and other environmental issues is global and it is becoming more and more popular with frequent news in the daily newspapers, magazines, documentaries, and in TV news. One example is the documentary by former Vice President of the United States, Al Gore, entitled *The Inconvenient Truth*, which shows with real data, the effects of global warming, and is considered a landmark in the popularization of the environmental issue. Based on the theory and the data presented above, we make the second hypothesis of this paper:

**H<sub>A, 2a</sub>: A product or service environmentally correct and responsible can be a factor of competitiveness.**

**H<sub>A, 2b</sub>: A project aiming sustainable development can be considered an investment in competitive advantage.**

### **2.2.1. Strategic Competitiveness**

The greenhouse effect and the consequences of global warming are already affecting consumer behavior; consumers are beginning to create a strong environmental awareness. According to Tachizawa (2006, p.21), the trend is that consumers in Brazil and in the world will in the future give preference to manufacturers of environmentally responsible products. Climate change represents risks, such as the risk of compliance with new regulations, but also opportunities, such as the creation of markets and improvement in energy efficiency (ROSENBERG AND FERRAZ, 2007, p. 46). The first companies to make their products environmentally correct could create competitive advantage.

The change of equipment and processes is seen as an investment and not as an expense, a new business: the EcoBusiness (BENJAMIN, 1990). This new business also has a new way of administration: environmental management. To meet this demand some mechanisms to highlight the products that do not affect the environment were developed such as: The Seal of Carbon Trust - English organization that guides companies to reduce emissions and energy costs, which aims to show consumers the reduction of emissions in products (ROSENBERG AND FERRAZ, 2007, p. 48). Thus, consumers can learn which companies are working to

preserve the environment and give preference to products and services that have been produced with respect to environmental criteria.

Rodrigues (1999, p. 80) states that there is already a tendency for organizations to adopt policies and environmental management strategies to increase competitiveness, turning to exploit market opportunities and creating new demands in the market. We then make the third hypothesis of this paper:

**H<sub>A, 3</sub>: Investing in products, services and green marketing is important to increase market-share.**

### 2.2.2. Strategic Competitiveness in Brazil

Brazil can become a great example to the world, if it creates awareness of the importance of its natural resources and stimulates growth through environmentally sound projects, that is, low carbon and clean energy. Projects with low emission of carbon are those which have their production line with emissions below the normal processes of production, while clean energy is one that does not promote the burning of fossil fuels like oil and coal.

Hydroelectric power plants are a good example, since they do not use fossil fuels and the generation of energy stems from a natural and renewable source. However, it is important to emphasize that the construction of a hydroelectric power plant damages the flora and the fauna of the region, because of flooding, and therefore, careful consideration of environment impact must be made before starting construction. The imbalance in the use of natural resources will eventually make them scarce, and mainly expensive (RODRIGUES, 1999, p 81). Examples are oil, timber and water. European consumers tend to pay 5.0 to 15.0% more for products that can certify the clean source of their raw material, such as furniture made with certified wood (OLIVETTI, 1996).

In the case of Brazil, exploring the natural factors, the clean energy matrix, and production environmentally correct could provide that differentiation and lead to extraordinary gains. We then make the fourth hypothesis of this paper:

**H<sub>A, 4</sub>: Companies that develop CDM can generate higher profit margins.**

### 2.3. Sustainable Development and Environmental Management

The survival of human beings is based on the generation of wealth, and wealth depends on raw material coming from natural resources. It could be said that natural resources are raw material and energy that nature provides for, so that humanity can survive and achieve quality of life by transforming them or using them directly.

Sustainable development is based on the rational use of natural resources. These are classified as renewable, when nature can replace them with some easy, such as farmable goods like food and wood from forests operated economically. Non-renewable resources are those whose consumption far outweighs Nature's ability to replace them; resources that may become exhausted with time, such as oil, coal, gas, and minerals. The preservation of natural resources occurs by using them in a rational way (without waste), so that renewable resources do not extinguish due to misuse and can continue the environmental cycle. The importance of the rational use of these resources is recognized in the concept of sustainable development in the Brundtland Report (Our Common Future) prepared by the World Commission on Environment and Development, which was created by a group of politicians and citizens and is chaired by the Norwegian Gro Harlem Brundtland.

One of the important contributions of the report was to define a concept of sustainable development: "[...] a process of transformation in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change is harmonizing and strengthening the present and future potential to meet human needs and aspirations" (Barbieri, 2006, P .25).

Tachizawa (2006, p. 71) states that: "The new era is characterized by a rigid attitude of customers, focused on the expectation to interact with organizations

that are ethical, with good corporate image in the market, and which act in an environmentally responsible way". This demand for more environmental and social responsibility, which is appearing not just between rebels, but also between dominant sectors, consumers and investors (MARTIN, 2002), has led countries and businesses to include in their strategies searches and actions that generate knowledge about environmental management. New sources or rationalization of generation and use of energy inspired the following hypothesis:

**H<sub>A, 5</sub>: Investing in a CDM project can improve the image of a company, even if the company is just trying to achieve its goals and/or profit.**

#### **2.4. The Kyoto Protocol and the Carbon Market**

The KP is an international treaty signed during the Third Conference of the Parties (COP 3) of the United Nations Framework Convention on Climate Change in Kyoto, Japan, in 1997. The PK defines that the industrialized countries (Annex I) would reduce at least 5.2% of their combined emissions of greenhouse gases in relation to 1990 levels. Getting to reduce levels as expected, it is estimated that the global temperature is reduced by 1.4 ° C to 5.8 ° C by 2012 (Greenpeace, 2007). The reduction should occur through several actions, among them the reform of the sectors of energy and transport, promoting the use of renewable energy sources and protection of forests and other carbon sinks.

The Protocol establishes three flexibility mechanisms that allow countries to meet the requirements for reducing emissions of gases out of their territories, an alternative way for countries to reduce their emissions without harming economic development. The three mechanisms are: Joint Implementation, Emission Trading applied to Annex I countries (developed countries) and the Clean Development Mechanism - CDM.

The CDM is the only mechanism which involves developed as well as developing countries, opening an opportunity for Brazil to generate carbon credits. Due to the CDM, new technologies and investments could enter the country and could bring economic and environmental benefits to the government and to the businesses.

##### **2.4.1. Clean Development Mechanism - CDM**

The CDM is in the financial arm of the KP because, in addition to finance and stimulate the transfer of technology, allows the issuance of Reduced Emission Certificates to be transformed into financial claims - so-called carbon credits traded on open markets. Regulating Articles of the CDM projects are in chapter 12 of the KP, where there are also the basic assumptions and a supra-national law that applies to all countries that signed the Protocol.

The issue of the REC is given after the approval of the CDM project, through the sum of efforts of three parties, involving the government of the country seat of the project, a certified consultant, and the UN. For this to occur it is necessary to: i) Reduction of emissions, compared to emissions previous to the project. ii) Long term benefits attesting that the project has a gain through several years and not just an immediate gain.

The CDM is seen - by developing countries - as a major driver of growth. Countries like China, Brazil and India, are seeking to adjust to the standards, to the accounting rules, and to the legal rules, and encouraging companies that wish to participate in this market. They also expect an investment gain and thereby demonstrating to investors that their earnings may be high in both the financial issue, and the gain for the environment (BIRTH, 2007). Herein we will give no further details of the CDM projects, because it is not scope of this paper. Interested readers may consult Perera, Kimura and Basso (2007) where the approval of projects is discussed in detail.

##### **2.4.2. Questioning Kyoto - Bjørn Lomborg**

*Cool It*, the title of book (Lomborg 2007) refers to the not so obvious relationship between two situations: i) initially, it directly refers to the need to cool the planet in

order not to suffer the endemic universal consequences, and ii) the second (less obvious) intends that global partners cool their head and promote a discussion based on logical grounds, seeking pragmatic solutions to problems that affect the earth.

Lomborg's basic argument is that climate problems should not be considered only from the perspective of reducing CO<sub>2</sub> emissions or greenhouse gases, but also under economic aspects and their possible consequences. He draws attention to the naive speech of Tony Blair in Clinton Global Initiative in 2005: "The truth is that no country will cut its growth or consumption substantially to settle a long-term environmental problem. What countries are prepared to do is to try to work cooperatively to deal with this problem in a way that allows everyone to develop science and technology in a beneficial way. " A researcher in the economic area complemented by claiming that "deep cuts in emissions will only occur if new energy technologies become available at reasonable prices."

Lomborg (2007) suggests that countries invest 0.05% of their Gross National Product (GNP) on non-carbon-emitting energy technologies research. This would allow a unique moment of universal social and technological development, with costs well below the 25 billion dollars of KP and even larger costs that would originate from Kyoto II. In short, Lomborg acknowledges the problem and the need to take effective actions to combat global warming. However, he disagrees with regard to the suggested measures arguing that the reduction in this form (including carbon credits) would not have the desired effect. He suggests the intensification of clean energy research and a balanced assessment of the reduction of CO<sub>2</sub>, with something from 5% to 10% of reduction to be achieved by the end of the XXI century. The position of Lomborg is recognized as pragmatic and has gained many prominent followers. Our next hypothesis follows from the arguments above:

**H<sub>A, 6</sub>: CDM projects are of great importance in the KP, but their efficiency in reducing GHG is questioned.**

## **2.5. Brazil in CDM Market**

Brazil can become the largest exporter of carbon credits in Latin America, thanks to its diversity of biomes, to the extent of its territory, and to its advanced industrial stage. These characteristics qualify Brazil with great potential for negotiation of CDM projects. It is estimated that Brazil could have a 25% stake in the CDM and the potential of Brazilian Agribusiness can reach 40% (ARAUJO, 2007).

Plunge ahead in this market tends to be essential in order to gain leadership in the ability to seize international resources for environmentally sustainable development (| BIRTH, 2007). Buyers or investors in carbon credits do not want to know just how much they cost or how much they are worth, because they employ a broad vision that involves a universal environmental awareness, the criteria should consider issues such as: i) management of the company, ii) operation licenses, iii) relation to other possible market segments in which the company operates, iv) management practices, among others. In this market the gap is more valuable than money (MONTEIRO, 2007). From this discussion comes the following hypothesis:

**H<sub>A, 7</sub>: Brazil has significant potential to develop CDM projects and generate carbon credits.**

### **2.5.1. Bureaucratic obstacles**

As real generation of carbon credits is concerned, the country will hardly be a market leader quantitatively speaking, for some old and new obstacles are emerging in this market. The first is the bureaucracy, because the process of credit generation under KP must be approved by the countries of origin. In this aspect, Brazil is losing ground and efficiency, because an average Brazilian project takes four months to be approved, while a Chinese one takes only two. The slowness causes major impacts by diverting the attention of the investment to Asian countries.

Another point that affects Brazil in this market is the lack of regulation of the sector in relation to the legal issues themselves, such as: i) tax on RECs ii) the accounting of them in the balance sheet of firms, and iii) regulating the flow of resources from negotiations with RECs (ABREU, 2007).

There is a crucial aspect worth mentioning; paradoxically the Brazilian clean energy matrix ends up harming negotiations on CDM. China and India have much more polluting energy matrices than Brazil, and thus any CO<sub>2</sub> emission reduction project, has a much higher impact than a similar project in Brazil. Teixeira (2007) argues that there should be much more attention and effort from the government for Brazil to occupy a prominent position in the CDM projects. The barriers and bureaucratic aspects motivated the following hypothesis:

**H<sub>A, 8</sub>: The Brazilian bureaucracy and the lack of regulation of the sector may hinder the search for a good project and/or the search for funding.**

## 2.6. The Market and the First Carbon Auction

The first stock exchange created to deal with carbon market was the Chicago Climate Exchange (CCX), an example of voluntary market. Established in December 2003, by 14 companies which together account for half of the annual emission in the UK.

The Brazilian Market for Emission Reductions (MBRE), was created according to the BM&F "[...] as a joint initiative of the BM&F and the Ministério do Desenvolvimento, Indústria e Comércio Exterior (MDIC). The MBRE (2007) "[...] aims to develop an efficient system for trading of environmental certification in line with the principles underlying the KP." It should be noted, however, that negotiations on the BM&F may be extended for projects outside the Kyoto market, like the Chicago Climate Exchange (CCX). Some Brazilian companies, the forestry sector, such as Aracruz Cellulose, Suzano Papel e Celulose, and Votorantim Klabin Celulose e Papel (VCP) have adopted voluntary targets (outside the KP) and participate in the American session.

Even with the lack of regulation, on September 26, 2007 took place the first auction of Venda of Certified Emission Reductions (carbon credits), owned by the Municipality of São Paulo. Credits corresponding to 808,450 tonnes of equivalent carbon dioxide, generated under the Clean Development Mechanism (CDM), by the Bandeirantes Project of Landfill Gas and Power Generation, and issued by the CDM Executive Board - UN (MBRE, 2007), were auctioned. The auction began at 10 a.m. and ended up 5 hours later, due to the purchase of all the lots offered by Fortis Bank NV/AS for 16.20 Euros, the price was much higher than the average of 5 to 6 Euros, practiced in the European market (ATA, 2007). The Project, the trading, and the interest demonstrated by the public generated the following hypothesis:

**H<sub>A,9a</sub>: The market for carbon credits is improving, even with the end of KP it will continue.**

**H<sub>A,9b</sub>: The price achieved at the BM&F auction was higher than expected, so prices should fall in coming auctions.**

## 2.7. Post-Kyoto - What is the fate of the carbon market?

The world worries about what will occur after the KP on December 31st 2012. It took two years (1995-1997) to negotiate the KP, eight more years to ratify it so that it came into force on February 16, 2005. Its validity ends in 2012 and there is little time to plan a new project until January 1st, 2013.

The Vice-Chairman of IPCC, Mohan Munasinghe, said that he is confident in the adoption of stricter targets for the Post-Kyoto, not to repeat the failure of the KP, which will not achieve pre-established targets. He cites that today the pressure exerted by society on the politicians regarding this matter is much stronger, and therefore he believes that the Post-Kyoto will be more successful than KP (KYOTO, 2007). This discussion generates the following hypothesis:

**H<sub>A, 10</sub> – A new agreement will be signed, with more ambitious goals.**

The propaganda made by environmentalists and supporters about the global warming issue has neglected some important aspects which are no longer discussed, ignoring some historical environmental consequences. There seems to be an accommodation to political will increasingly strong.

Another aspect which has Brazil as one of the main polluters is forest burning, a substantial reduction in the burning would contribute greatly to reducing the GHG emission. For this to happen effectively investment in areas that allow the control and monitoring of fires is needed, a huge task when considering the size of the forest area. The problem is that fire prevention is not considered a CDM project, and in turn does not generate carbon credits, which makes private investments in that area unfeasible.

The first paragraph of Article 12 of the KP, states that CDM projects aims at contributing to countries not included in Annex 1 to achieve sustainable development (PROTOCOL, 2007). The KP allows the following interpretation: "[...] to discuss and propose ways to harmonize two objectives: economic development and environmental conservation "(Development, 2006). Preventing fires is a way of preserving the environment, hence the emergence of the following hypotheses:

**H<sub>A, 11</sub>: The preservation and conservation of forests can generate carbon credits.**

**H<sub>A, 12</sub>: Investment in nuclear energy will increase.**

### 3 Methodology

The research was primarily qualitative in nature. The hypotheses were determined based on the theoretical framework and they were used in the construction of a questionnaire. Marconi and Lakatos (2002) teach that hypothesis is a proposition that is made in an attempt to verify the validity of an existing answer for a known question. They also clarify that the hypothesis has a provisional formulation that has to be tested to determine its validity.

To carry out the interviews, after the definition of the script, we chose a sample by accessibility (RICHARDSON et al., 1999), composed of 9 executives linked to the environment. There were nine respondents, three from banks, five worked in a consulting companies and one belonged to a NGO. The interviews took place after the script, the sample, and the respondents had been defined. The answers were faithfully transcribed in order not to lose any detail of the evidence. For the treatment of the data we used Content Analysis (Bardin, 1977) which considers the content of a text in which it is sought to understand the actual speech (communication) of the interviewees on the phenomenon, in this paper: their speech on investment in CDM projects.

All interviewees were at least managers. Two were PhD's, one had a master's degree, and the remaining six had bachelor's degrees. The average time in the position declared by them was six years with a median of 6.5 years. The average age reported by the respondents was 42 years with a median of 42.5. The instrument used was a semi-structured questionnaire, based on the formulated hypotheses. The technique used was the visual recorded interview, with an average duration of 45 minutes.

After the transcripts of the interviews, the content analysis was done as follows: i) identification of units of analysis according to a determined coding, ie, the source most frequently mentioned by the respondents, ii) categorization of the sources cited. In this step, the sources identified were rearranged so that the answers of each interviewee were allocated according to common categories, and iii) construction of a summary table to allow quick reading and understanding. It should be noted that the issues raised were in accordance with the research hypotheses. Thus it was possible to analyze the degree of importance that the respondents assigned to the detached elements.



#### 4 Data Analysis

The results of the interviews are discussed in an Content Analysis Matrix. According to the data in the matrix, it seems that all the professionals interviewed (8/9) perceive a change in attitude of their clients which started to recognize the need for environmental certificates that have become valuable because they represent a competitive advantage. The interviewees (8/9) also recognize that projects aimed at sustainable development are good investments and can act as cost reducing, when properly managed. Regarding the ability of CDM projects to increase market-share and be cost effective, the answers are inconclusive (4/9 and 5/9, respectively).

Regarding the capacity of reducing GHG through the CDM, the professionals consulted say that the CDM projects are good business to help improve the environment. They agree (7/9) that the measures recommended by the KP are efficient, although some (4/9) found them timid. They believe that the Brazilian credits are considered a good and profitable investment (7/9 and 6/9 respectively). Most of them (6/9) find that the portfolio of projects and the outcome of the first auction of carbon credits were positive, but disagree as to the price, some think it was high, while others believe that it was the fair market price. Most respondents (6/9) believe that Brazil has a clean matrix and for this reason China and India are in a better position to make use of CDM projects.

With regard to relations Post-Kyoto, interviewees (7/9) believe that the market will remain active. They also believe that there will be measures to preserve forests, but these measures will not generate carbon credits. As for nuclear power plants there is no definition as to its use, possibly due to the problems that can be caused and due to the atomic garbage disposal which has no satisfactory solution so far. However, they recognize that due to economic and strategic conditions, investments in this energy source should occur.

An important consideration, not revealed in the interviews, concerns the clash between the economic and planning area of the Lula government and the orthodox environmentalists. With the departure of Marina Silva decisions were left to the Ministers Minc and Unger who, clearly, were placed in their respective functions to implement the **sustainable development**. This is an abstract concept that seeks a balance between the maintenance of healthy environmental conditions and economic conditions for their support, which always involve concessions on the side of the environment. Minister Unger explaining the difficulties in implementing the Sustainable Amazon Plan (PAS), which exists only as a collection of general policies regarding sustainability, development (economic) and maintenance of the area, recognizes that such general policies are in fact different approaches to the same problem and that this problem has to be solved by a large and difficult economic project, for which he says no one is adequately prepared.

#### 5 Final Considerations

Table 2. seeks to make a summary of the hypotheses made and show the conditions of  $H_0$  rejection. Partial conclusions are made, resulting from the confrontation with Content Analysis Matrix in the Table 3.

Table 02. Hypotheses Testing			
H <sub>A</sub>	Description of the Hypothesis	H <sub>0</sub> *	Partial Conclusion
1.	Brazil will receive large foreign investments, which could be applied in environmentally responsible projects	Not Rejected	The Brazilian energy matrix and its territorial extent allows the country to receive large volumes of investment, however there is no certainty, because there are other factors interfering.
2 a.	Product or service environmentally correct and responsible can be factor of competitiveness	Rejected 3,4 e 5	The commitment to environmental preservation and social responsibility are evidenced by the certificates.
2 b.	Project that aims sustainable development can be considered investment in competitive advantage.	Rejected 8 e 9	Sustainable development in business generates credibility and differentiation to the consumer.
3	Investing in products, services and green marketing is important to increase market-share.	Not Rejected 7	This relationship is not clear to the respondents of the survey.
4	Companies that develop CDM projects can generate higher profit margins	Not Rejected 9 e 10	Although profitable, this relationship is not clear to the respondents of the survey.
5	Investing in CDM projects can improve the image of the company, even if it is just trying achieve its goals and/or profit	Rejected 3 e 11	It is believed that current investments in CDM projects will generate credibility to the consumers.
6	The CDM projects are of great importance in the KP, but their efficiency in reducing greenhouse gas is questioned	Not Rejected 14	The reduction of GHG is evidenced in CDM projects, but it is not sufficient. Questions are mounting.
7	Brazil has significant potential to develop CDM projects and generate carbon credits.	Rejected 18, 19 e 20	Although China and India have improved conditions due to their polluting energy matrix, Brazil's potential is also high.
8	Brazilian bureaucracy and the lack of regulation of the sector may hinder the progress or the funding of projects.	Rejected	Bureaucracy provides credibility, however it delays the approval of development projects such as PAC.
9a	The market for carbon credits is successful. Even with the end of KP it will continue.	Rejected 31	As the KP, the market tends to keep working, due to the global mobilization regarding environmental problems
9b	The price achieved at the BM&F auction was higher than expected, so prices should fall in the next auction	Not Rejected 21 e 22	There is no consensus regarding the price in BM&F's auction, therefore it can not be analyzed.
10	A new agreement must be signed, with more ambitious targets.	Not Rejected 27 e 28	The Post-Kyoto targets should continue but more ambitious and controversial goals as nuclear power and deforestation have not been addressed.
11	Preservation and conservation of forests can generate carbon credits	Not Rejected 27	There is a cycle for trees to the discharge O <sup>2</sup> and reduce CO <sup>2</sup> , and just keep or preserve will not generate credits.
12	Investment in nuclear energy will increase	Not Rejected 29	There is no clear definition, only speculation.

(\*) The numbers in H<sub>0</sub> correspond to the answers given by the interviewees in Table 3 – Content Analysis Matrix

The main objective of this paper was to identify the profitability of projects for CDM. It was found that CDM projects, while having their origin in measures to improve environmental conditions, supported by practices of social responsibility, like any other business, will only be implemented if they are profitable. However, CDM projects can generate additional gains in competitiveness and image since they put in evidence the company's commitments to the environment and social

responsibility. This was evidenced by the rejection of H0 and consequent acceptance of HA 2a, HA 2b, and HA 5. H0 was not rejected for HA 3, and HA 4 which means that CDM projects, despite their appeal, do not necessarily aggregate market-share or higher profits.

Regarding the secondary objective that sought to verify the role of Brazil in the reduction of GHG, rejecting H0 for HA 7, HA 8, it was found that Brazil has very favorable conditions for the development of CDM projects; this occurs, despite the competition of CDM projects with India and China - favored by their more polluting energy matrix, which allows gains of scale in reducing GHG. It was also found that the bureaucratic obstacles affecting the development of projects, not only CDM projects, but also other projects with environmental consequences, such as PAC. By failing to reject H0 for HA 1, HA 6, HA 9b, it was found that investments in CDM, depend on other economic factors, which may result in selection of more profitable projects or projects with more exposure; there are increasing doubts about the efficiency in GHG reduction, and, the carbon credits prices depend more on the law of supply and demand.

Regarding the future of the market for carbon credits after 2012 (Post-Kyoto), rejecting H0 for HA 9a, it was found that, due to international pressure the market should remain active. The experts did not reject H0 for HA 10, HA 11, and HA 12 which shows a market still undecided on the more controversial issues such as setting more rigid goals, carbon credits for forest conservation and atomic energy.

Finally, a consideration that seems increasingly present and more recognized it is the preponderance of economic factors in relation to environmental factors. Tony Blair's speech about the non-ratification of KP by the United States, China accelerating its production, and the replacement of Marina Silva have as a common measure the universal carelessness with environmental issues when these environment issues confront economic issues. Everyone wants healthier planet, everyone recognizes the effects of greenhouse gases and all are willing to cooperate, provided that they are not economically affected. The dilemma is more comfort and better health? In this troubled world, the voice of Bjørn Lomborg, seems to make sense when he strongly suggests investments in research to develop technologies aimed at producing clean energy.

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