

COMPARATIVE ANALYSIS OF CARBON OFFSET INITIATIVES IN THE LAST YEARS IN BRAZIL

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From the middle of the last century the world scenario was highlighted by industries that had inefficient production processes linked to the absence or few environmental regulations. At that time pollution was cautiously considered as synonymous with progress and development. Between the 1950s and 1990s the planet suffered major environmental catastrophes. Dramas such as Minamata (1954), Bhopal in India (1984), Chernobyl in Ukraine and the Exxon Valdez (1989) marked the need for strong environmental laws and thus the Brazilian Environmental Legislation arises. During the subsequent period there was still resistance from industry to better address this issue and the population as a whole began to exert more pressure on definitions and adjustments to environmental care standards.

However, it was in the 1990s, with the Eco-92 (Rio-92) summit, that the concept of Sustainable Development was diffused among the scientific and civil communities. With the subsequent ratification of the United Nations Framework Convention on Climate Change, environmental issues are seen as legal compliance and eco-efficiency programs emerge -and also as a business opportunity, since it can bring profit to companies and not just costs. With this new scenario, the image of companies was also associated with their actions against or in favor of the environment.

Finally, in 1997, in Kyoto, Japan, a Protocol was presented to achieve the stabilization of greenhouse gas concentrations in the atmosphere and to enable the creation of the Carbon Markets. The Kyoto Protocol called so for emission reduction trading using free market mechanisms. Fortunately, in addition to the Carbon Market, a Voluntary Market was created in which developing countries like Brazil could participate.

The mandatory and voluntary Carbon Market emerged as an opportunity to stimulate sustainable development in developing countries, helping to improve environmental management techniques, with strategies towards the common reach of climate change mitigation. The negotiations for carbon credits and initiatives for reduction or offsetting the greenhouse gas emissions (GHG) that are carried out by companies, institutions, non-governmental organizations (NGO) - that do not have targets under the Kyoto Protocol - become therefore voluntary actions.

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In addition to these two types of market, there are also the so-called Voluntary Funds, another way for financing projects to reduce emissions or carry out carbon sequestration. The main funds are the Forest Carbon Partnership Facility, the World Bank and the Amazon Fund.

The concern about the use of marketing techniques, which lead to lack of transparency and confidence, was recently indicated by FELICIANO (2013) regarding voluntary Carbon offset initiatives in Portugal. The focus of the present paper is on the analysis of initiatives, which cover such non-mandatory projects and programs in Brazilian. These initiatives do not have any link with the Market or Voluntary Carbon Funds, meaning that there is not necessarily, on the part of these initiatives, the issue of Carbon credits. This comparative analysis aims to establish some differences related to Carbon offsetting projects. While marketing initiatives may have greater global action or impact and high regulation, on the other hand, voluntary initiatives tend to be less regulated, more localized and therefore sometimes unfamiliar.

METHOD

The analysis was done through the content available on the website of each initiative. Searches were made by Google™ using the words "initiatives", "compensation", "Carbon", "Brasil". Eleven initiatives in operation in the last two years were evaluated.

For each initiative, information on the following parameters was considered: A) Management entity: type of initiative in the economic sector, which may be a private organization, a non-governmental organization (NGO), a civil society organization of public interest (OSCIP), a non-profit organization such as an university extension program; B) Foundation: year of beginning of activities; C) Current situation: active in the voluntary or non-active market; D) Calculations: inventory of GHG emissions prepared by the initiatives or by third parties; E) Own calculator (online availability or not of a calculator to quantify the emissions of GHG); F) Compensation: how the compensation of GHG emissions is carried out; G) Certification: the existence or not of issuing certificates and / or stamps; H) Visibility: existence or not of transparency regarding the quantity and the location of the trees planted for the compensations; I) Post Planting: existence of monitoring and maintenance of the planting and its duration; J) Character: environmental or social-environmental initiative; and K) Location: region of the initiative.

CARBON COMPENSATION INITIATIVES

There are few initiatives for GHG voluntary compensation in Brazil, and thus those listed that meet the above criteria are listed, with a brief description of each, to allow a comparative analysis.

1. IDESAM NEUTRAL CARBON PROGRAM: Is a GHG emissions offset program located in the Uatumã Sustainable Development Reserve in the state of Amazonas. It is linked to Idesam (Institute of Conservation and Sustainable Development of Amazonas), a non-profit non-governmental organization based in Manaus, capital of the state, and with 10 years of operation. The planting of trees for compensations are made through agroforestry systems in private degraded areas. The initiative elaborates the inventory of emissions, using its own

calculator (<http://www.idesam.org.br/calculadora2016 / Calculator2016.php>) to quantify the gases emitted and the required number of seedlings for such emissions. Customers who offset their emissions sign contracts involving all parties (initiative, client and local residents) in order to agree the compensation and that the area where the planting will take place not be burned or overturned. There is no delivery of certificates or stamps to customers.



The first compensations were made in 2010. And for the past year, eight customers are listed. The initiative monitors the agroforestry and indicates on the site the location and numbers of trees planted. By involving the local community of the municipality of Uatumã, state of Amazonas, and generating income for farmers, the initiative has a socio-environmental aspect.

2. **ECCAPLAN**: It is a private company that acts promoting sustainable development and adding socio-environmental value to the products and services of its clients. It performs the Carbon offsets of companies and events through its two programs. **A- NEUTRAL EVENT PROGRAM**: In this case the company realizes the Carbon offsets for the emissions during all the event, from its planning to completion and dismantling (see http://www.eccaplan.com.br/neutralizacao_carbono/evento-neutro) and **B- NEUTRAL CO₂ PROGRAM**: In this case the company aims the compensation for companies, offices, products and business campaigns, based on a voluntary socio-environmental responsibility program (see http://www.eccaplan.com.br/neutralizacao_carbono/evento-neutro).

The two ECCAPLAN programs are linked to projects registered in the Carbon Market. The amount of gases emitted by the clients was established through the inventory of emission sources and an emission calculation table. In 2016 there was not specifically a calculator but currently it is available at <http://calculadora.eccaplan.com.br/>. Customers are certified by the so-called Voluntary Emission Reduction (VERs), generally with three sources; pre-registration Clean Development Mechanism (CDM), Special Situations and Small-Scale Projects (see [VERs Explained](#)). For the current year a report for the certifications can be found at http://www.eccaplan.com.br/registro_neutralizacao.php.



There is transparency regarding compensations made by clients and events, whose information is available on the program site. On the other hand, it is not known if planting monitoring occurs and how long they last. The start date of the program is not clear. In any case, the programs are not only aimed at reducing environmental impacts, but also at improving the quality of income of local workers and, therefore, they are socio-

environmental programs that occur in different states of Brazil, such as the states of Mato Grosso, Alagoas and Tocantins.

3. **GREEN INITIATIVE / CARBON FREE PROGRAM:** The Green Initiative is a Civil Society Organization of Public Interest (OSCI) that acts to improve environmental quality through mitigation projects and partnership with other institutions. One of these projects is the Carbon Free Program that compensates for direct and indirect GHG emissions from companies, events, or any other human activity. The compensation is made with the planting of native trees in the Atlantic Rain Forest and whoever joins the program receives a stamp and a Carbon Free certificate. (see <http://www.iniciativaverde.org.br/index.php>). The initiative has been operating since 2005, taking stock of emissions based on the GHG Protocol, linked to



the Intergovernmental Panel on Climate Change (IPCC) and using as a tool an online calculator freely available for access and use. The compensations are made through the environmental recovery of the Atlantic Rain Forest of different Brazilian states, among which are the states of Paraná, São Paulo, Rio de Janeiro, Rio Grande do Sul and Bahia.

Online access to information on the number of trees planted and their locations is available. The initiative

offers to those who participate in the program both Carbon Free Certificate and a certificate with the number of trees planted, and the compensation resulting from this planting, although it does not act in the Voluntary Market. Of socio-environmental character, the program monitors the plantations, but does not specify the duration of the monitoring. The Program

raised recently (Feb 2017) R\$ 14,035.00 and planted 568 trees, in an Atlantic Rain Forest area (the Cantareira System) that has already received 11,670 native trees from the initiative.

4. CARBON PROGRAM (PROGRAMACARBONO): The Carbon Program belongs to the company Cia Brasileira de Florestas Tropicais (CBFT). It is a private organization that sells carbon credits, compensates GHG emissions by planting trees, certifies with green stamps and also acts on the environmental marketing, as well as producing emission inventories (see <http://www.cbft.com.br/programacarbono/ref/default.aspx>). CBFT also operates in the Voluntary Carbon Market. The inventory is performed by an outside consultant. In 2016, the website did not present a calculator as a tool to quantify carbon emissions, but is currently available (<http://www.cbft.com.br/programacarbono/ref/calculadoras.aspx>). The start date of their activities is not recorded and there is online registration of the location of each planting and the number of trees planted for the compensations.

For the year 2015, for example, they relate a medical clinic and an academic event that made respectively the compensation of 22.0 and 1.3 tons of CO₂e resulting in respectively the areas of 418.66 and 24.74m² of forest Planted. For this year the company only indicates the Carbon offset for the company Starcool Air Conditioned of 150 kg CO₂ equivalent to the recovery of 2.8m² of forests.

Green stamps are issued to those who offset their emissions in the socio-environmental program of the initiative that occurs in the state of São Paulo, especially in the Campinas region.

5. CARBON NEUTRALS INITIATIVE: It is managed by the Tivoli & Resorts hotels that are part of the Global Hotel Alliance group. It is characterized by being a voluntary Carbon management that works on two fronts: the reduction and the offset of GHG emissions. The compensations are made through planting of seedlings in the Tapada D. Fernando II area, in Portugal and in the city of Várzea Paulista, in Brazil, an Atlantic Rain Forest region. The initiative has social and environmental concern, generating income for the local population (see <http://www.tivolihotels.com/en/menu-de-rodape/sustentabilidade/noticias/iniciativa-neutros-em-carbono.aspx?Action=1&PID=302480>)

This private initiative is operating since 2008, but much information is missing in the electronic address. They do not report how the GHG emission inventories are made and no calculator is available. There is also a lack of information on the delivery of certificates or stamps, as well as the monitoring and maintenance of the plantations and their durations. There is no transparency as to the number of seedlings planted for the offsets and their locations. From the beginning of the initiative in June 2008, a total of 21,949 Tivoli Hotels &

Resorts customers have already joined the initiative and contributed to offset 1,567 tons of CO₂e. To participate in this campaign the client contributes € 2 per night (up to a maximum of € 10 per stay).

6. **MiX CARBON OFFSET INITIATIVE (discontinued)**. Associated with MiX Telematics, a global provider of vehicle tracking and fleet management solutions, the Initiative has dedicated exclusively and exclusively to the emissions generated by its customers' road fleets, generating them compensation certificates of Carbon (see [IOC](#)). In the current days (July 2017) the Initiative is no longer included in the 'Services' of Mix Telematics in Brazil. The site has a link to 'Benefits' or 'Solutions' but no longer works with the Carbon Initiative (see <http://www.mixtelematics.com/>).

This Carbon offset initiative prepared emission inventories and, although it does not have its own calculator available online, the emissions calculation was described on the site, based on the mileage traveled and the fuel consumed, taking into consideration the vehicle, the engine and the type of fuel used.

Unlike other initiatives, the compensations were made through the purchase of Carbon credits in the Voluntary Market and the respective certificates issued. Since they did not plant trees, there were no records on the quantity and location of the trees planted or local environmental benefits. It is not clear when its operations began and when it ended.

7. **CARBON AND WATER PROJECT (CarbonO₂ & Água)**: The initiative is managed by Tropical Flora, a private socio-environmental company. It aims to offset total or partial GHG emissions by planting tree seedlings for the recovery of springs and riparian forests, areas of permanent protection. The clients of this initiative come from the most varied sectors of the

economy and receive, as soon as their emissions are offset, a certificate proving the action taken.

The calculation of GHG emissions is done by the initiative itself based on the IPCC guidelines. A calculator for quantifying Carbon emissions is available on the website (figure).

From the issuance of certificates the initiative proves to its customers the compensations and the quantity of trees planted is declared. However, the

The image shows a screenshot of a web browser displaying the 'Calculadora' (Calculator) page of the 'Projeto Carbono & Água' website. The browser's address bar shows 'projetcarbonoagua.com.br/carbonoagua/st/index.php'. The page features a header with the 'Tropical Flora' logo and a navigation menu with links for 'Sobre o projeto', 'Projetos de Compensação', 'Calculadora de emissão de CO2', and 'Fale Conosco'. The main content area is titled 'Calculadora' and includes a small house icon. Below the title, there are several input fields for calculating emissions: 'Quantidade de moradores', 'Consumo de Energia (kWh/mês)', 'Consumo de Água (l/mês)', 'Consumo de Gás (litros/mês)', and 'Consumo de Gás (litros/ano)'. Each field has a radio button to select between 'R\$' and 'm³'. There are also fields for 'Resumo (por mês)', 'Semana (por semana)', 'Água (litros por mês)', 'Energia (kWh por mês)', and 'Gás (litros por mês)'. The page includes explanatory text about the calculator's purpose and a note about the currency used.

location of the plantations cannot be located through the links provided. Each planting is monitored for three years and the initiative operates in the state of São Paulo. The date of the initiation of the initiative is not indicated. The web site lists compensation for the 12th Cosmo Beauty Congress (June 2011) and 18th Congress of Medicine and Aesthetics (May 2011). They do not mention compensations in the most recent years (see <http://www.projetocarbonoeagua.com.br/carbonoeagua/en/index.php>).

8. MAX AMBIENTAL (carbononeutro) - CARBON MANAGEMENT AND SUSTAINABILITY: Max Ambiental is a private company active in the Carbon Market and a pioneer in Carbon credit projects. Its activities for Carbon offsets are carried out by two projects: CARBON NEUTRO and CARBON ZERO. Both are socio-environmental projects that go beyond GHG compensation and reduction. They are also characterized by environmental education, income generation and social inclusion. Compensation is achieved through planting trees, conserving adult forests and reducing emissions that can cover part of an industrial or service activity, up to the entire production process (see <http://www.maxambiental.com.br/>).

The initiative indicated for the last years several clients and cases (see <http://www.maxambiental.com.br/clientes.php>), created and maintained a Carbon neutral calculator (Figure; see http://www.maxambiental.com.br/carbononeutro_ferramenta/), but unfortunately the page about the Programs is deactivated, probably because since 2012 Max

Ambiental S/A has been waging a legal dispute with the industry of cosmetics 'Natura Cosméticos S/A' and the bank HSBC regarding to the ownership of the "Carbon Neutral" brand (See: [Companies dispute 'carbon neutral'](#)).



The company web site does not refer to a start date of its activities, nor if there is any action within the Voluntary Market. It is also unclear whether there are green certificates or stamps issued to customers, whether or not there is monitoring

and maintenance of the plantations and for what period of time. There is no transparency as to the quantity and location of planted trees or conserved forests, nor reference on the Brazilian states where the initiative operates.

9. **JURUEMA CARBON WELL (discontinued)**: It was developed by the Juruena Rural Development Association (ADERJUR), sponsored by the Brazilian Oil company Petrobras through the Petrobras Environmental Program. It is an initiative for agro-forest systems (AFS) implantation in central Brazil, at the municipality of Juruena, MT, aiming at the fixation of Carbon and generation of income to small and medium farmers. It was a non-profit socio-environmental project that aimed to sell Carbon credits to improve local productivity and make it more sustainable and less impacting. It was available at http://www.carbonojuruena.org.br/www/lt_institucional/ when accessed in June, 2015 and is still on Facebook (see <https://pt-br.facebook.com/carbonojuruena/>) with last post in February 2015. There is nothing on the Internet about the project for the last two years.



The initiative began its activities in 2010, with the goal of planting 1.5 million seedlings of fruit and forest species native to the Amazon. It did not act in the Voluntary Market, and did not deliver certificates or green stamps. It was not found if there was monitoring and maintenance of the planting and its duration. There was no transparency as to the quantity and location of planted trees or conserved

forests.

10. **SOCIALCARBON (discontinued)**: It is an initiative from the Ecológica Institute, a Civil Society Organization of Public Interest (OSCIP) that aimed at the sustainable development of communities by reducing and compensating GHG emissions. One of the project sites was at the Island Bananal in the state of Tocantins, northern Brazil (see [http://www.ecologica.org.br/index.php?Option=com_k2 & view = item & layout = item & id = 3 & Itemid = 52](http://www.ecologica.org.br/index.php?Option=com_k2&view=item&layout=item&id=3&Itemid=52)).

The initiative started in 2000. The inventory was carried out by its own methodology, but there was no an available calculator for emission at the electronic address. GHG emissions are offset by supporting for carbon offset projects and issuing an international standard certificate that the initiative developed, the SOCIALCARBON Standard.

In 2015 the ‘News/Events’ link at the web site presented an agreement with APX, Inc. allowing for the issuance of Verified Carbon Units (VCUs). And the first project was a hydropower project (4.5MW) owned by a company in the state of Karnataka, India that generates about 13 GWh/year helping the carbon emission reduction.

Due to the fact that they do not work with tree plantations, data regarding whether or not there is transparency regarding the quantity and location of the trees planted in the compensations

and regarding the existence of monitoring and maintenance of the planting and its duration cannot be considered. The initiative developed as of 2008 the Carbon Seal in order to attest to the process of sustainable production of products originating from local communities. The Status of the project today is as: "Completed" and the Capture Status: "Closed" (see: [Carbon Seal](#)).

11. LEPAC OFFSET CARBON: The Lepak Carbon project started with students of the Environmental Education course (BE-597) of UNICAMP, in Paraty, state of Rio de Janeiro, southeastern Brazil. The initiative aims to involve voluntaries in offsetting GHG emissions by financing trees plantation along the coastal Rio-Santos highway (BR-101) and at the Cabral Quilombo, a peculiar community in Latin America (see Quilombo or Palenque <https://en.wikipedia.org/wiki/Quilombo>). Both areas are in the Atlantic Rain Forest, in the so-called Costa Verde Fluminense (ANDRADE et al., 2013). The plantings at the BR-101 road have drastically reduced road side fires that every year burned many hectares of dry grass. And the plantings on the Cabral Quilombo have involved local community and with the aim of income generation in AFS. Offsets are made by volunteers such as tourists, boats owners,

inns, offices, hotels, a transport company, restaurants and marines, manly from the local society. The individual or legal entity receives a certificate and a stamp confirming its participation (see figures below and http://www.lepac.preac.unicamp.br/?page_id=8).

LEPAC
LABORATÓRIO DE EDUCAÇÃO
E CONSCIENTIZAÇÃO AMBIENTAL
UNICAMP - PARATY

CARBONO COMPENSADO

ESTIMATIVAS BASEADAS E ADAPTADAS DO The Greenhouse Gas Protocol, E USANDO AS FERRAMENTAS ESTABELECIDAS PELO World Business Council for Sustainable Development (WBCSD) E PELO World Resources Institute (WRI)

Energia Elétrica
Insira o consumo médio mensal em kWh:
[input] kWh
Esses dados podem ser encontrados na fatura de energia elétrica.
0 ton de CO₂ 0 árvores

Gás Natural e GLP
Insira o consumo médio e selecione o tipo de gás utilizado:
[input] [radio] Gás Natural (m³/mês) [radio] GLP (kg/dia)
*Para o gás natural, esse dado pode ser encontrado na sua fatura de gás.
**Para o GLP, um botijão doméstico tem 13kg e um botijão industrial 45kg.
0 ton de CO₂ 0 árvores

Lixo
Insira a quantidade de lixo produzida:
[input] kg/semana
*Desconsidere o lixo encaminhado para reciclagem.
0 ton de CO₂ 0 árvores

Motor de Popa e Roçadeira
Insira o tempo de uso, categoria e tipo de motor de popa:
[input] [input] [input]
0 0

The Lepak Carbon project is a university extension program linked to the State University of Campinas ([UNICAMP](#)) that emerged in 2009. It does not operate in the Volunteer Market. The inventory of emissions is carried out on its own initiative with a calculator available on the website (see figure and <http://www.lepac.preac.unicamp.br/carb>

[ono](http://www.lepac.preac.unicamp.br/carb)). The compensation is made with the planting of native Atlantic Rain Forest tree seedlings by local partners. Forestry inventories are in course by consultants from the partner company Resiliência Consultoria Ambiental (see http://www.resilienciaconsultoria.com.br/a_empresa).



The initiative issues certificates and stamps to those who adhere to its Carbon offset program. It has socio-environmental character and transparency as to the quantity and location of the planted trees, besides the monitoring of the plantation. The program is dedicated to the municipality of Paraty, state of Rio de Janeiro chosen by the United Nations Environment Programme (UNEP) as pilot city of the



global [Green Passport](#) campaign. The Lepac Carbon project is part of the set of activities of the Municipal Agenda 21 (see <http://agenda21.paraty.com/certificacao-das-acoes-sustentaveis-2014/>). Records for the plantations in recent years can be found on YouTube ([2016](#)) and for the planting in Quilombo do Cabral ([2017](#)).

Being originally and essentially an educational initiative, the Lepac Carbon project has also issued certificates for avoided GHG emissions, such as for the PROVE project (Do not Throw Your Oil Down the Drain) in the state of Rio de Janeiro. For the years 2015 and 2016 the PROVE project was respectively certificated for avoided emissions of about 168,000 and 152,000 liters of cooking oil processed as bio-diesel and soap, resulting on the emissions avoided of respectively 64.5 and 57,2tonCO₂e.

In the last years the Lepac Carbon project has also issued certificates for avoided GHG emissions for a company that developed and install Hydrogen fuel enhancement equipment (see https://en.wikipedia.org/wiki/Hydrogen_fuel_enhancement). In the last year this company install such devices in more than 450 vehicles (see <https://www.youtube.com/watch?v=Hz09DzOS8L4>) resulting in estimated 3,700,000 Km traveled, 10% fuel economy and consequent avoided emission of 67.4 tonCO₂e.

DISCUSSION

It can be noted a complete autonomy in the Carbon initiatives in Brazil resulting in a freedom to choose management strategies and methodologies. The positive aspect of this is the absence of bureaucratic obstacles that could hinder the emergence and continuity of these initiatives. The negative aspect is that it results in great contrasts between the initiatives, their functions and obligations before society and clients. Both aspects are discussed in an article by The Nature Conservancy, where some questions and doubts about compensation of GHG emissions are raised (see Reference The Nature Conservancy).

In Brazil, laws and resolutions consider Carbon offsets initiatives to be important, but do not regulate projects at the federal or state level. On the contrary, since 2008 some regulation has been proposed and voted on in the State of California, where the national market for voluntary

compensation exceeds \$ 100 million and represents an estimated reduction of more than 25 million metric tons of CO₂e (BURGERT, 2008). In 2007, the House of Commons Environmental Audit Committee, England, was conducting an inquiry into the voluntary offsetting market, with regulation as a strong theme of the inquiry (see <http://www.parliament.uk/documents/post/postpn290.pdf>) but it seems that there is not a tendency to the federal governments to regulate the subject.

According to HAMRICK, K. & GOLDSTEIN (2016) the recent Paris Agreement set the tone for ambition, cooperation, and action at all scales. The voluntary carbon markets have always embodied these sentiments, with hundreds of market participants acting ahead of regulation to offset their unavoidable emissions. The authors inform that last year, demand for offsets increased 10% as individuals, corporations, and governments voluntarily invested in clean energy, forest protection, methane reduction, and other projects around the world - really good news.

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