Juma Sustainable Development Reserve: The First REDD Project In The Brazilian Amazon
JUMA SUSTAINABLE DEVELOPMENT RESERVE: THE FIRST REDD PROJECT IN THE BRAZILIAN AMAZON

Special Thanks

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To the inspiring vision of J. Willard Marriott Jr, Chairman and CEO of Marriott International, and his entire team goes our special thanks and deepest gratitude.

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This publication was produced based on the Project Design Document (PDD) of the Juma Sustainable Development Reserve, which is the official documentation used for the project validation on the Climate, Community and Biodiversity Alliance (CCBA). The PDD is available for download at www.climate-standards.org.
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1. EXECUTIVE SUMMARY

The Juma Sustainable Development Reserve Project for Reducing Greenhouse Gas Emissions from Deforestation (“Juma RED Project”) aims to address deforestation and its resulting emission of greenhouse gases (GHG) in an area of the State of Amazonas, which is under great land use pressure. Its implementation is part of a wide strategy planned and initiated in 2003 by the current Government of the State of Amazonas to halt deforestation and promote sustainable development in Amazonas, based on giving value to the environmental services provided by its standing forests. (Viana, 2003; Braga & Viana et al., 2003; Amazonas, 2002).

The most advanced models for simulating deforestation indicate that the rate of deforestation in the State of Amazonas will increase rapidly in the coming decades. Many experts consider the Soares-Filho et al. (2006) deforestation simulation model, SimAmazonia I, designed by the program “Amazon Scenarios,” and led by the Institute for Environmental Protection of the Amazonas State (IPAM), The Federal University of Minas Gerais and the Woods Hole Research Center, to be one of the most refined models for the Amazon region. SimAmazonia I indicates that there will be a strong deforestation trend in the near future, which could result in a loss of up to 30 percent of Amazonas' forest cover by 2050. If concrete measures to prevent deforestation are not undertaken, deforestation in the protected areas of the State of Amazonas could emit about 3.5 billion tons of CO₂ into the atmosphere.

According to the SimAmazonia I model, the southern region of Amazonas is one of the areas under higher risk of deforestation. Under the “business as usual” scenario, the paving of large roads (BR-319, BR-230 and AM-174) will result in the loss of large expanses of forest by 2050. These deforestation forecasts were strongly considered by the Government of Amazonas when it established the Juma Sustainable Development Reserve in 2006. The objectives of creating the reserve were to protect forests with high conservation value. The reserve seeks to protect species in risk of extinction while also preserving the quality of life of the hundreds of families that live in these areas.

The Juma RED Project begun with the establishment of a Protected Area in a region that would be almost completely deforested under the “business as usual” scenario if the current land use practices in the region continued. The Juma Reserve was created in an area of 589,612 hectares of Amazonian forest located near the BR-319 road and crossed by the AM-174 road. Its creation and effective implementation was only possible due to the perspective of the Government of the State of Amazonas’ plan to create a financial mechanism for generating a financial compensation from activities reducing emissions from deforestation (RED). The resources raised from the sale of these credits will permit the Amazonas Government to implement all of the measures necessary to control and monitor deforestation within the project site, enforce the law, and improve the welfare of local communities.
The Juma RED Project is the first project of its kind implemented under the State Policy on Climate Change Law (Amazonas, 2007) and the State System of Protected Areas (Amazonas, 2007). This legislation, enacted in 2007, provides the legal framework necessary to implement RED projects in the Amazonas State.

The project expects to prevent the deforestation of about 329.483 hectares of tropical forests that would release 189.767.027,9 tons of CO2 into the atmosphere on the baseline scenario until 2050. It will only be possible to implement the project if the RED financial mechanism proves viable and capable of generating the resources necessary to cover the operational costs of implementing the activities to protect the Juma Reserve. In addition to the climate change mitigation benefits associated with the reduction of greenhouse gas emissions (GHG), the project expects to generate a variety of social and environmental benefits in the project area. These benefits will come from the following programs and groups of activities:

1. Strengthening of environmental monitoring and control by making: improvements in the existing monitoring system managed by the local communities and by making large investments in the work of the environmental protection infrastructure and staff and the land titling agencies, as well as in advanced remote sensing monitoring techniques. The costs of monitoring remote areas like the Juma Reserve are very expensive because the area is very difficult to access. The RED mechanism will provide the resources necessary to overcome the great deficiencies of the State’s ability to monitor such areas.

2. Income Generation Through the Promotion of Sustainable Businesses1: Community organization and business training will be combined to improve the local capacity in forest management and forest product extraction. Research and development of new technologies will allow for innovation in the quality and types of products local communities produce. Furthermore, market development activities will be undertaken to improve market access. This combination should enhance the production of forest products from the local communities involved in the project.

1 Marginalized communities are more likely to participate in the illegal exploitation of natural resources. The lack of training in forest management results in the use of destructive practices that produce low quality products with limited market demand.
3. Community Development, Scientific Research and Education: Education centers will be constructed to train and transmit scientific information on conservation efforts to local communities as well as to provide opportunities for the training of professionals specializing in biology, forest management, environmental education, etc. The engagement of local communities will only be possible through the existence of solid and active organizations, which are also necessary for organizing and strengthening local populations.

4. Direct Payment for Environmental Services (Forest Allowance Program / “Bolsa Floresta Program”): The communities will receive direct benefits for their contributions to conservation, such as access to clean water, healthcare, information, productive activities and other improvements in their quality of life. Furthermore, a portion of the financial resources generated by the project will be paid to traditional communities in the Juma Reserve for environmental services through the establishment of all four components of the Forest Allowance Program: I) Family Forest Allowance (Bolsa Floresta Familiar); II) Social Forest Allowance (Bolsa Floresta Social); III) Forest Allowance for Association (Bolsa Floresta Associação); and IV) Income Forest Allowance (Bolsa Floresta Renda). This translates into concrete and direct benefits for some of the most marginalized and vulnerable populations, who are dependent on the forest for their survival.

The “Juma RED Project” is being implemented by the Amazonas Sustainable Foundation (Fundação Amazônicas Sustentável, FAS) in partnership with the State Secretariat of the Environment and Sustainable of Amazonas (Secretaria de Estado do Meio Ambiente e Desenvolvimento Sustentável do Amazonas, SDS/AM) with technical assistance from the Institute for Conservation and Sustainable Development of Amazonas (Instituto de Conservação e Desenvolvimento Sustentável do Amazonas, IDESAM).

The project implementers provide investors and donors with the guarantee that the execution and completion of the project comply with all of the relevant legal, governmental and regulatory structures. The project was designed through a transparent process involving participatory workshops and political consultations in order to guarantee the involvement and commitment of all the local stakeholders. Marriott International is supporting the project implementation, with an annual investments of US$500,000 per year, for four years, combined with revenues from hotel guests to offset their carbon emissions (US$1/room/day).

Because the influence and deforestation pressure normally comes from outside the protected areas, it is essential to help the communities living inside these areas, especially helping the future generations of decision makers understand the importance of Forest conservation.
On September 30th the Juma RED Project received the validation by the Standard CCBA – Climate Community and Biodiversity Alliance – issued by the German audit company Tüv Süd. The project earned the top score in the category Gold, the first in the world to be included in that standard. Moreover, the Juma Reserve is the first in Brazil and in the Americas to be certified for avoided deforestation. Until the end of the first period of certification, in 2016, it is expected to avert the emission of at least 3,611,723 tons of CO2e. The project will end its activities in 2050, when it is likely to have generated credits of 189,767,027 tons of CO2e.

The Brazilian Amazon is under increasing pressure. An estimated 17 percent of the original forest coverage have already been lost. From 2000 to 2007, more than 150,000 square kilometers of the region’s forests were deforested, an area equivalent to 3.7 percent of the total area of the Legal Amazon (INPE, 2008). In contrast, during the same period the State of Amazonas, the largest Brazilian State (1.5 million square kilometers), lost only 0.4% of its forested area (INPE, 2008). Historically, Amazonas has always had the lowest deforestation rate in the Brazilian Amazon with ninety-eight percent (98%) of the State’s original forest cover still intact. Amazonas has 157 million square kilometers, which corresponds to 1/3 of the Brazilian Amazon.

However, over the past few years the decline in forest cover and the lack of available land resulting from the intense historic deforestation in the other states of the Brazilian Amazon, such as Acre, Mato Grosso, Pará and Rondônia, have pulled a trend of deforestation in the State of Amazonas. Agriculture and cattle production expansion makes the large expanses of sparsely populated forests of the Amazon even more vulnerable to deforestation. The scenario for the future is clear: if the historic trends of deforestation in the Amazon continue, then millions of hectares in the State of Amazonas will be deforested and replaced by large areas of pasture and agricultural crops.
Figure 01 – Deforestation in 2005 (based on Soares-Filho et al., 2006); (PRODES, 2006)

Figure 02 – Deforestation predicted by the Simamazonia I model for 2012 (based on Soares-Filho et al., 2006)
Figure 03 – Areas claimed by land titles In the region of the Juma Reserve
2. THE JUMA RESERVE

2.1 Location

The Juma Sustainable Development Reserve RED Project is located 227.8 km south of the city of Manaus. The urban area of the city of Novo Aripuanã is found about 10 km East of the Northern boundary of the reserve, which runs along the right bank of the mouth of the Aripuanã river.

The western boundary of the reserve is defined by the Mariepauá river, which forms the frontier between the municipalities of Novo Aripuanã and Manicoré. The southern boundary is defined by Federal land (100 km north of Transamazon Road – BR-230), and the Eastern boundary is defined by the left bank of the Acari river (Figure 13).

Figure 13 - Location of the Juma Reserve RED Project, showing also the BR-319, AM-174 and BR-230 roads and the municipalities of Novo Aripuanã, Manicoré and Apuí.
2.2 Communities

In accordance with the last census done in July, 2008, there are 339 families living in 35 communities inside de Juma reserve and in its surroundings (figure 05). The process of identification of the communities was carried out in two occasions: (i) during the elaboration of the study for the creation of the Juma reserve and, (ii) during the process of registering the families for the BF Program.

Figure 05 – Communities living inside the Juma Sustainable Development Reserve
2.2.1 Social Aspects

According to the latest social inventory taken in July 2008, there is an estimated population of 339 families living in 35 communities within the Juma Reserve and its surrounding area (Figure 05).

All of the communities depend on subsistence agriculture (manioc and fruit production) and extractive activities, such as fruit collection, fishing and hunting to supplement their diets. Usually, subsistence practices are related to fishing and hunting, with fish providing the major source of protein in the communities.

The majority of the families living in the Juma Reserve do not have land titles or personal documentation.

The houses are generally made of wood with roofs made of palm thatch or asbestos panels. Before the project, none of the communities had a basic sanitation system or garbage collection.

There is no organized system of health care provided by formally trained health professionals. Basic emergency assistance is provided by community members and is based on traditional knowledge or training provided by the local municipality. The most common health problems and illnesses are malaria, diarrhea, verminosis, malnutrition, influenza and hypertension. The treatment of more serious problems requires transportation to the hospital in the city of Novo Aripuanã in “rabetas” (wooden canoes with small outboard motors).

Students of different levels compose the school classes, what makes the teacher’s work more difficult, since she must teach all the students at the same time in the same classroom.

2.2.2 Economy

In the preliminary study undertaken as part of the process for establishing the Juma Reserve, more than half of the families reported their income was below the average minimum wage in Brazil (R$ 200 to R$ 400, or US$ 118 and US$ 235, respectively). A limited number of family members reported having an income higher than three times the minimum wage (up to R$ 1200, or US$ 706)). The most important economic activities are the extraction and sale of Brazil nuts (Bertholletia excelsa), copai-
ba oil (Copaifera landesdorffy) and timber and the production of manioc flour (SDS, 2005). Some families have hen houses and raise chickens for domestic consumption and others raise sheep on a small scale (SDS, 2007). The communities are extremely dependent on the regularity of the regional boats that travel along the Aripuanã river selling, buying and exchanging goods. Rabetas are the normal mode of transportation for short trips.

2.2.3 Private Properties

The preliminary evaluation of private lands within the Juma Reserve undertaken by the Amazonas Land Institute (Instituto de Terras do Amazonas, ITEAM) found that within the project site there are approximately twenty private land title claims in a total of 15,038 hectares (see Figure 06). A large number of those properties are not legally recognized because they do not have complete documentation or may have been acquired illegally and should be formally registered or appropriated by the state. A full analysis of the legality of the documentation behind these claims has been a high priority for the project since project implementation.
Since these private areas do not belong to the State of Amazonas, they are excluded from the project, and the carbon contained in their forests will not be accounted. However, ongoing activities in these areas can impact the project area inside the reserve, and thus will receive special attention in the activities included in the monitoring plan.

2.3 Deforestation

The deforested areas within the Juma Reserve were limited to 6,493 hectares (1.1% of the Juma Reserve area) until June 2006 (INPE, 2008). The methodology used to quantify deforestation within the project area using the PRODES system is described in the Annex VIII of the Project Design Document (for more details, see full PDD at www.fas-amazonas.org).

The actual patches of deforestation in the project area result basically from medium to large scale deforestation in areas illegally occupied by land grabbers and cattle ranchers along the sides of the road connecting Novo Aripuanã to Apuí (AM-174), which crosses the project area in a North to South direction (Figure 07); and land clearing for small scale agriculture practiced by the local communities.

Figure 07 – Deforested Areas in The Juma Reserve until 2006 (based on LandSat imagery, INPE 2008)
The project used a participatory process to identify and map the land use dynamics of the land directly managed by the traditional populations dwelling in the Juma Reserve. This activity has already been started and will be carried out continuously as a central part of the development process for the Reserve's management plan.

Specifically, these activities include:

1. Specific modeling of the dynamics of land clearing for plantations within the reserve;

2. Modeling of the process of forest succession after the abandonment of agricultural fields and;

3. Fine-scale zoning of the areas currently in use and determination of the impacts of the land use patterns on the carbon stocks of the area.
2.4 Vegetation types and carbon stocks

The Juma Reserve RED Project is covered almost entirely by well-preserved tropical forest. According to the phyto-ecological classification established by the RADAMBRASIL Project (RADAMBRASIL, 1978), there are three major forest types in the project site: Submontane Ombrophylous Dense Forest; Lowland Ombrophylous Dense Forest; and Ombrophylous Dense Alluvial Forest.

The RADAMBRASIL Project was a extensive government program carried out between 1973 and 1983, which installed 2,719 sample plots in the Brazilian Legal Amazon for biomass inventories (Figure 08). Of these plots, 13 were located inside the Juma Project boundaries (RADAMBRASIL, 1973-1983). The measurements that were taken in each plot to calculate the biomass of the different forest phyto-physiognomies included all trees with a Circumference at Breast Height (CBH) greater than 100 cm (i.e., a Diameter at Breast Height (DBH) greater than or equal to 31.83 cm).

Figure 08. Juma Reserve’s vegetation types. White circles and red dots indicating the sampled plots of the inventory described in RADAMBRASIL (1978)
Due to the broad scale of the RADAMBRASIL classification (1:1km²), the boundaries of the original vegetation classes were appropriately adjusted to the on-site conditions of the project using LandSat images and a GIS guided flyover filming. It was also decided to re-classify two of the vegetation classes to simplify the *ex-ante* carbon estimates. The Submontane Ombrophyllous Dense Forest and Lowland Ombrophyllous Dense Forest were grouped into a new class called Dense Forest. This grouping was made because no clear difference was detected in the vegetations during the flyover, and because the carbon stocks presented in the literature for the two vegetation classes, (submontane = 186.8 tC/ha; lowland = 184.3 tC/ha) are equivalent. The corrected map is shown in Figure 095.

5The methodology used to classify the vegetation is presented in Annex VI of the Juma Reserve Project Design Document (PDD), available at www.fas-amazonas.org.
The sources used to define the carbon stocks in the vegetation classes of the project are derived from MCT (2006) and Nogueira *et al.* (2008), based on the RADAMBRA-SIL Project (1978).

Although there is consensus for using RADAMBRASIL phyto-physiognomy classification for the Amazon forests, there exist differing opinions about the estimates for the biomass stocks that should be used to calculate the total amount of carbon existing in the Brazilian Amazon. Until recently, the values provided by the First Brazilian Inventory of Anthropogenic Greenhouse Gases Emissions (Primeiro Inventário Brasileiro de Emissões Antrópicas de Gases de Efeito Estufa) (MCT, 2006) were considered the most reliable data.

However, since the publication of the Brazilian Inventory in 2006, the scientific community has made significant advances to improve the carbon stock estimates for biomass and for carbon in the Amazonian forest. Among this work, it is worth mentioning Nogueira *et al.* (2005, 2006, 2007, 2008a,b, c), which inventoried 602 additional trees for Central Amazonia and Southern Amazonia (Nogueira *et al.*, 2007), and in which details of the study area and correction procedures are described.

The estimates of Nogueira *et al.* (nd, p. 8) and MCT (2004, p. 23) both used the allometric equation from Higuchi *et al.* (1998) from the Central Amazon, to calculate bole biomass of tree datasets from the RADAMBRASIL Project (the trees inventoried had a circumference at chest height (CCH) greater than 100 cm, or 31.7 cm of diameter at chest height (DH)), as follows:

\[
\begin{align*}
\text{5} < \text{DBH} \geq 20 \text{ cm} \\
\ln(\text{fresh mass}) &= -1.754 + 2.665 \times \ln(\text{diameter})
\end{align*}
\]

\[
\begin{align*}
\text{DBH} > 20 \text{ cm} \\
\ln(\text{fresh mass}) &= -0.151 + 2.17 \times \ln(\text{diameter})
\end{align*}
\]
However, the carbon stocks considered in the biomass estimates of Nogueira et al. (nd) combined allometric equations and inventoried wood volume in order to adjust the biomass estimates for different types of Amazonian forests. A new biomass equation was developed from trees harvested on relatively fertile soils in the Southern Amazon and new bole-volume equations were developed from trees in dense and open forests. These allometric relationships were used to assess uncertainties in previous estimates of wood volume and biomass.

In the case of the usual biomass model, based on inventoried wood volume, the study evaluated whether the factors currently used to add the bole volume of small trees (volume expansion factor) and the crown biomass (biomass expansion factor) are adequate for the biomass conversion. To assess the performance of the equations developed in the study as compared to previously published models, Nogueira and colleagues used the deviation (%) between the directly measured sum of the mass of the trees and the mass as estimated by each of the previous equations, both for sampled trees and as an extrapolation per hectare. Finally, all corrections were applied to generate a new biomass map for forests in the Brazilian Amazon from the RADAM-BRASIL plots, and the biomass stocks by forest type were calculated for each of the nine states in the Brazilian Legal Amazon.

For the MCT (2006) biomass and carbon estimates, the sum of the carbon from all trees was divided by the area of the sample plot. Then, a correction was applied for the carbon content to include the trees with a DCH less than 31.7 cm, according to a Meira-Filho personal communication of a circumference histogram. For the below ground biomass, an expansion factor of 21% was then applied, as suggested by the authors.

Table 01 provides the different carbon stocks estimates according to the various published sources, and comparing with the default values for tropical forests provided by the IPCC GPG for LULUCF. The carbon pools considered for the project are the same used by the studies of MCT (2006) and Nogueira et al. (2008), as described in Table 01: (I) above ground live biomass, (II) dead wood, (III) litter, and (IV) belowground biomass.
Table 01 - Comparison of the different carbon stocks for above and below ground biomass in the vegetation types found within the Juma Reserve (by author³)

<table>
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<tr>
<th>Author</th>
<th>Forest type</th>
<th>Above Ground Biomass</th>
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<th>Below Ground Biomass</th>
<th>Total Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Live Biomass</td>
<td>Dead Biomass</td>
<td>Tons of C/ha</td>
<td>Tons of C/ha</td>
</tr>
</tbody>
</table>
| Nogueira et al | Ombrophyllous Dense Alluvial Forest | 127.71              | 15.69          | 29.55     | 172.95
|            | Lowland Ombrophyllous Dense Forest | 136.09              | 16.72          | 31.49     | 184.30
|            | Submontane Ombrophyllous Dense Forest | 136.39              | 16.76          | 31.56     | 184.71
| MCT        | Ombrophyllous Dense Alluvial Forest | 115.28              | 0.00           | 24.21     | 139.49
|            | Lowland Ombrophyllous Dense Forest | 115.28              | 0.00           | 24.21     | 139.49
|            | Submontane Ombrophyllous Dense Forest | 112.21              | 0.00           | 23.56     | 135.77
| IPCC Default Value for Tropical Forests (IPCC XXX) |                     |                     |           | 131.00          |               |

* Dead biomass includes both dead wood and litter  ** Except Organic Soils Carbon

Although the IPCC can be considered the most conservative data among the three compared sources, these values underestimate the carbon stock values for the Amazon forests, as they were generated through an average of different tropical forests in many regions of the world. Thus, as Nogueira et al (2008) and MCT (2006) provide credible and "onsite specific" values for the existing types of vegetation in the project area, they were preferred rather than the IPCC default values. As a conservative approach, it was made a mean average from both sources to estimate the carbon stocks in the forest classes present in the project area.

As presented earlier, the Lowland and Submontane Dense Forest classes were grouped into a single category of carbon density, defined only as “Dense Forest.” This value was obtained by the arithmetic mean of both values (Lowland and Submontane carbon stocks), resulting in the final value per author. This procedure was done on both the Nogueira and the MCT values, as shown in Table 02.

³MCT did not include the pools litter and dead wood since it followed the methodology guidance provided by IPCC (2000), which predicts only the consideration of aerial biomass for emissions due land use change
Table 02 – Carbon stocks estimates by Nogueira et al (2008) and MCT (200$)
for the vegetation classes inside the project boundaries

<table>
<thead>
<tr>
<th>Author</th>
<th>Forest type</th>
<th>Above Ground Biomass</th>
<th>Below Ground Biomass</th>
<th>Total Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Live Biomass Tons of C/ha</td>
<td>Dead Biomass Tons of C/ha</td>
<td>Tons of C/ha</td>
</tr>
<tr>
<td>Nogueira et al</td>
<td>Alluvial Forest</td>
<td>127.71</td>
<td>15.69</td>
<td>29.55</td>
</tr>
<tr>
<td></td>
<td>Dense Forest</td>
<td>136.24</td>
<td>16.74</td>
<td>31.52</td>
</tr>
<tr>
<td>MCT</td>
<td>Alluvial Forest</td>
<td>115.28</td>
<td>0.00</td>
<td>24.21</td>
</tr>
<tr>
<td></td>
<td>Dense Forest</td>
<td>113.74</td>
<td>0.00</td>
<td>23.88</td>
</tr>
</tbody>
</table>

* Dead biomass includes both dead wood and litter  ** Except Organic Soils Carbon

Afterwards, to define the final carbon stocks by vegetation types inside the Juma Project boundaries, an arithmetic mean was calculated for each carbon estimate from the different authors. The values are shown in Table 03.

Table 03 - Carbon stocks estimated “ex-ante” by forest classes existent inside the Juma Project boundaries

<table>
<thead>
<tr>
<th>Forest type</th>
<th>Above Ground Biomass</th>
<th>Below Ground Biomass</th>
<th>Total Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Live Biomass Tons of C/ha</td>
<td>Dead Biomass Tons of C/ha</td>
<td>Tons of C/ha</td>
</tr>
<tr>
<td>Alluvial Forest</td>
<td>121.50</td>
<td>7.84</td>
<td>26.88</td>
</tr>
<tr>
<td>Dense Forest</td>
<td>124.99</td>
<td>8.37</td>
<td>27.70</td>
</tr>
</tbody>
</table>

* Dead biomass includes both dead wood and litter  ** Except Organic Soils Carbon

It is important to mention that these values are “ex-ante” carbon estimates, and will be validated and adjusted “post-facto” through the forest inventories that will be carried out as part of the monitoring plan before the first project verification, as described in Annex VIII of the Project Design Document (www.fas.amazonas.org).

The calculation of the carbon stocks of the Juma Reserve by vegetation type inside the project boundaries is presented in Table 04.

Table 04 - Total Carbon Stocks at the Juma Reserve RED Project

<table>
<thead>
<tr>
<th>Type of Forest</th>
<th>Carbon Stocks (TC/HA)</th>
<th>Area(Hectares)</th>
<th>Total (Tons of C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alluvial Forest</td>
<td>156.22</td>
<td>3,603</td>
<td>562,860.66</td>
</tr>
<tr>
<td>Dense Forest</td>
<td>161.06</td>
<td>469,074</td>
<td>75,549,058.44</td>
</tr>
<tr>
<td>Total</td>
<td>472,677</td>
<td>76,111,919.1</td>
<td></td>
</tr>
</tbody>
</table>
2.5 Biodiversity

During the studies for the creation of the Juma reserve, rapid inventories and diagnostics of the biodiversity were undertaken within the Reserve. The PDD provides a summary of these studies. Logically, with the start of the project, these inventories will be expanded as part of the planned research program into the diverse ecosystems of the reserve.

The area where the Juma Sustainable Development Reserve was created has been identified as an extremely important area for biodiversity, especially for reptiles, amphibians and mammals. The region is also considered of high biodiversity importance due to its aquatic flora and fauna (ISA et al., 1999; Capobianco et al., 2001).

The Juma Reserve region has been identified as one of the areas of greatest interest for biodiversity conservation in the Amazon (SDS, 2007), and one of the least studied areas in the Amazon (Oren & Albuquerque, 1991). One of the most relevant characteristics of the region of the Reserve is the high degree of species richness due to the high heterogeneity of habitats, being considered one of the world’s richest regions in bird species diversity (Cohn-Haft et al., 2007). In recent years, numerous new species have been described scientifically, with a high degree of endemism along the Aripuanã riverbanks and some patches of unique vegetation (SDS, 2007).

Twenty one species of primates have been catalogued in the region, which represents one of the areas with the highest primate diversity in the world (SDS, 2007). At least three new species of fish and three species of birds have been recently discovered in the region and more than one third of the bird species (430 birds) found in Brazil have been reported within the Juma Reserve’s boundaries (Cohn-Haft et al., 2007).

There is also a special part of the Juma Reserve, the riverbank of the Aripuanã river, which is described as a high value conservation region, where a series of new species was recently discovered and scientifically catalogued (van Roosmalen et al., 1998; van Roosmalen et al., 2000; van Roosmalen et al., 2002; Roosmalen & van Roosmalen, 2003; van Roosmalen et al., 2007).
The Aripuanã river has been identified as an important boundary for fauna, representing the limit of geographical distribution of some species, especially primates (SDS, 2007). For example, the wooly monkey (*Lagothrix sp.*), howler monkey (*Alouatta sp.*), white-fronted capuchin (*Cebus albifrons*), ashy-grey titi monkey (*Callicebus cinerascens*) and the red agouti (*Dasyprocta cristata*) occur exclusively on the right bank of the Aripuanã river, while the dwarf-saki monkey (*Callibella humilis*) and a distinct species of titi monkey (*Callicebus bernhardi*) are only found on the left bank (SDS, 2007).

These patterns coincide with those found for birds. There is a group representing sister species that reproduced, creating a new hybrid species, but that maintained the species or subspecies separated by the opposing banks of the Aripuanã River (Cohn-Haft *et al.*, 2007). This finding reinforces the theory that the river plays a role as a barrier to the dispersion of the species and a potential factor in the evolutionary diversification of the biota (Wallace, 1852).

During the studies for the creation of the Juma reserve, rapid inventories and diagnostics of the biodiversity were undertaken within the Reserve. The following items provide a summary of these studies. Logically, with the start of the project, these inventories will be expanded as part of the planned research program into the diverse ecosystems of the Reserve.

### 2.5.1. Threats To Regional Biodiversity

The major imminent threats to the natural ecosystems are illegal logging, mining, land grabbing for agriculture and cattle ranching, and overfishing. These threats have the potential to cause great damage to the integrity of the Juma Reserve, since the Federal Government recently announced its plan to pave the roads that will directly affect the project area (Brasil, 2007). Historically in the Brazilian Amazon, a sharp increase in deforestation follows the paving of roads, due to the illegal logging, mining and hunting that occur as a result of the new access to natural resources that the road provides (Nepstad *et al.*, 2001, 2002; Laurence *et al.*, 2004; Fearnside, 1987).

The most important driver of deforestation will be the paving of BR-319 and BR-230. Due to the proximity of the roads to the Juma Reserve, the paving of these roads will cause an increase in deforestation in the area of the Aripuanã River. Proper vigilance and law enforcement can prevent the threat of deforestation from secondary roads. Therefore, these monitoring and enforcement activities are a priority for the Juma RED Project.
3. TECHNICAL ASPECTS

3.1 Baseline projections

Today, as in the past, 70% of the deforestation in the Amazon is still resulting from the conversion of the forest into extensive low profit pastures. Historically this deforestation has mainly occurred in the municipalities of Pará, Mato Grosso, Rondônia, Tocantins and Maranhão, which constitute the region of the frontier that is called the “Amazonian arc of deforestation” (Ferreira et al., 2005; Fearnside et al., 2003) (Figure 10).

Figure 10 – Deforestation and protected areas in the brazilian Amazon. Source: Greenpeace, 2007
However, the decline in forest cover and the lack of available land due to the dense population of the region within the "arc of deforestation" has been driving a visible tendency of migration towards the central Amazon region, principally the State of Amazonas. The increasing rates of agricultural and cattle production are the principal drivers of deforestation, as these activities are heading towards areas with few human occupants in the State of Amazonas. According to Stickler et al. (2007), this pressure will increase as 40% of all soils in tropical regions suitable for sugar cane, palm, pasture and soy plantation are located in the Amazon. The future scenario is clear: if the infrastructure predicted for the State of Amazonas, such as the paving of roads, is implemented, and if the historic trends elsewhere in the Amazon continue, the state of Amazonas will rapidly be occupied by large expanses of pasture and agricultural fields, and millions of hectares of forest will disappear in the process.

According to the SimAmazonia I model, the region where the Juma Project is located, in the municipality of Novo Aripuanã, is extremely vulnerable to deforestation. The paving of roads could cause the complete loss of large extensions of forest by the year 2050 under the conventional “business as usual” scenario. The lack of roads connecting Amazonas to other regions of Brazil is one of the major reasons for the State's low deforestation rates (Stone, 2007). However, the dynamics of an expanding deforestation frontier, a low supply of timber for exploitation, and the consolidation of agriculture and cattle production in other states in the Amazon increases migration and, consequently, the conversion of its forests. Year after year, the areas with historically high rates of deforestation are advancing towards the State of Amazonas.

The projections of SimAmazonia I forecast eight scenarios for the entire Amazon in 2050. One of these scenarios, the baseline scenario or conventional “business as usual” (BAU), with low government intervention, projects deforestation trends across the Amazon basin, and is based on historical deforestation rates, adding in the effect of macroeconomic drivers such as the planned paving of roads, growth in cattle and agricultural production, population growth and similar factors. The other seven scenarios include an increase in governmental activity. These scenarios are more optimistic and consider the paving of roads as also leading to a gradual increase in the government's influence and law enforcement in the region.
In the “business as usual” scenario, the paving of roads follows a pre-determined program and the resulting deforestation effects are empirically estimated using data analyzed at the municipality level from PRODES (INPE, 2008b) (Soares-Filho et al., 2006). Specifically, the southern region of Amazonas and the municipality of Novo Aripuanã, and the pavement of roads BR-230 (Trans-Amazonian) and BR-319 (between Manaus and Porto Velho) will have a large role in determining the incursion of deforestation into the Juma RED Project area.

The Juma Reserve RED Project used the BAU scenario of the simulation generated by SimAmazonia I as the baseline scenario, extracting the Juma reserve area and providing the corresponding deforestation for each year up to 2050. Because the simulation in Soares-Filho et al. (2006) was produced before the Reserve’s creation, the “business as usual” scenario is faithful to the reality, since it does not reflect the impact of creating the Juma Reserve, as is described in Figure 11.

![Figure 11 – Forecasted deforestation in the Amazonas state by the year 2050 under the conventional “business as usual” (bau) scenario.](image)

Source: map is based on data obtained from the model Simamazonia I (Soares-Filho et al., 2006)

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1 Deforestation data from 2006
3 The model is also available for consultation at [http://www.csr.ufmg.br/simamazonia](http://www.csr.ufmg.br/simamazonia)
The SimAmazonia I projections indicate that the region where the Juma Reserve is located is highly vulnerable to deforestation. The simulations indicate that up to 62% (366,151 hectares) of the forest within the project area would be deforested by the year 2050 (Figures 11 and 12). The PDD presents a detailed description and discussion of the functioning of the SimAmazonia I, and its applicability to the project conditions.

Figure 12 – Forecasted deforestation to the Juma Red Project area under different scenarios for 2008 to 2050, compared to the conventional "business as usual" (bau) scenario

Source: map is based on data obtained from the Simamazonia I model (Soares-Filho et al., 2006)
3.2 Additionality

Until 2002, the business as usual scenario for land use in Amazonas was characterized by incentives to agriculture and cattle raising, instead of forest conservation. The deforestation rates at that time were escalating. As an example, the former Governor of Amazonas State at the time used to distribute chainsaws in political campaigns to promote deforestation.

In January 2003, the current Governor of Amazonas, Eduardo Braga, made an official commitment, which was published and notarized before the beginning of his first term (Amazonas, 2002). The basis of his commitment – the Green Free Trade Zone Program (Programa Zona Franca Verde - ZFV) – was to reduce deforestation and promote sustainable development in the State by adding value to the environmental services in relation to the Amazonas’ forests (Braga & Viana, 2003).

The implementation of sustainable development policies that have positive impacts on the reduction of deforestation is costly and compete for very limited governmental resources. Given the huge demand for social program funding (human development rates vary between 0.4 and 0.6 in Amazonas) – mainly health and education – investing in activities directly aimed at reducing deforestation was a huge challenge with high political risks.

Governor Braga took the risks and put in place a program for creating new State Protected Areas as central focus at ZFV. This program generated a 133% increase in the area of state protected areas (increased from 7.4 million ha in 2003 to 17 million ha in 2007). Deforestation was reduced by 53% (decreased from 1,585 ha/year in 2003 to 751 ha/year in 2006) (INPE, 2008). Such results and an intense process of political articulation both in national and international levels were the foundation of the first proposal of a compensation mechanism for ecosystem services provided by the State of Amazonas.

This first proposal was presented by the Government of Amazonas at the 11th Conference of the Parties of the UN Framework Convention on Climate Change (UNFCCC), held in Montreal in 2005 (Viana et al. 2005). At the time, REDD was first discussed as an official agenda at the COP/MOP. In November 2006, the “Amazonas Initiative” was presented in Nairobi, at the UNFCCC’ COP 12 (Viana et al. 2006).

10 This section is based on the additionality test of the Juma RED Project, present in Annex I. This tool was adapted by Idesam (2008) for application on REDD project activities, and was based on the original AM Tool 01: “Tool for the demonstration and assessment of additionality V05.1”, designed by the CDM Executive Board (available at: http://cdm.unfccc.int/Reference/tools/index.html).

11 This proposal was crafted during a workshop held in Manaus - organized by the Government of Amazonas and Institute for the Conservation and Sustainable Development of Amazonas (IDESAM) - with the presence of various Brazilian governmental institutions, scientists, and NGO’s.
The creation of the new protected areas in Amazonas was only possible with the perspective of implementation of the financial mechanism under construction through the activity of the Amazonas Initiative. The creation of the Juma Reserve (in 2006) and the construction of this PDD (as the first RED pilot-project of Amazonas) are the ultimate steps of the long-term commitment started in 2003 by the Government of Amazonas.

Therefore, for the addition assessing purposes, the start date of the activities of RED project is 2003 – when the ZFV Program was launched. However, regarding the definition of the project crediting period, the project start date is the date of the creation of the Juma Reserve (2006), when the project’s boundaries were clearly delimited and the Juma RED Project started being implemented “on the ground”.

There was no legal requirement for the Government of Amazonas to create the Juma Reserve, at the date it was created in 2006. The most likely scenario for the land (state land) would be the creation of rural settlements for cattle ranching or agriculture, or its occupation by land-grabbers. This situation can be confirmed as the business as usual scenario for land use observed in all the other states of the Brazilian Amazon in recent years.

The consideration of carbon finance in the decision of creating the Juma Reserve (as well as the other protected areas newly created by the actual Government of Amazonas) was always considered in the process of creating the policies and programs of the ZFV program for forest conservation and payment for environmental services, envisioned by the Government of Amazonas in 2003 (Braga & Viana, 2003) This had to follow a chain of events which takes time and follow a slow and bureaucratic politic process as: the creation of new laws, convincement of parliaments, modification of the annual state budgets, articulation with national and international stakeholders, contacts with donors and investors, etc.

At the time this process started, in 2003, there was no mechanism for compensating reduction of emissions from deforestation (REDD), nor in the perspective of the UNFCCC negotiations, nor in the global voluntary markets, so the consideration of carbon finance in the process was not straightforward.

The now so called “REDD carbon benefits” were considered in the light of “payment for environmental services” and is extensively documented in Braga & Viana (2003) and in Amazonas (2002).
Afterwards, the Government of Amazonas was very active and had a key role on influencing the whole process of the REDD agenda in the UNFCCC negotiations, and the actual promising development of REDD activities in the voluntary markets (Viana & Cenamo, 2005, Viana et al., 2006, Amazonas, 2007).

All these steps were fundamental and correct in time, to conduce to the creation of the Juma Reserve RED Project (2006), the Climate Change and PA’s laws (2007), the Amazonas Sustainable Foundation – FAS (2008), and finally the contract with Marriott international – which concludes the long cycle of a “learn by doing” process that was necessary for the Government of Amazonas to establish the actual existent framework for marketing ecosystem services to promote forest conservation and reduction of deforestation within State lands.

3.3 Project Implementation

3.3.1 Project Area and Lifetime

For the purpose of the reductions in greenhouse gas emissions that result from the implementation of the project, the Juma Reserve was divided into two areas:

Carbon Credit Area of the RED Project: the entire forest area that would be deforested under the baseline scenario and in which the carbon stocks are fully known at the baseline and at the start of project implementation (Figure 13).

Excluded Areas of the RED project (Figure 15 and Table 10): characterized by areas that would be deforested under the baseline scenario, but due to different and particular situations of previous land use, forest cover and land tenure, will not be included as areas eligible for RED crediting, as described below:

Deforested areas: areas that have already been deforested before the beginning of the Project. The data for the image classification was obtained from PRODES (INPE, 2008).

• Titled lands: areas that have title registry, claims or that are in the process of land tenure normalization, according to the Amazonas Land Institute (Instituto de Terras do Amazonas - ITEAM), which is the official state organization dealing with land tenure issues, and which provided the GIS shape-files necessary for the classification.

12 The Appendix presents a memory with the whole chain of events and that configured the construction of the Amazonas Initiative, and the implementation of the Juma Reserve RED Project.

13 For the communities where was not possible to estimate the use are, it was estimated from the participative mapping performed during the Study for the Creation of the Reserve, considering the number of families in the community.
• Areas under influence of the Apuí – Novo Aripuanã road (AM-174): areas with forest cover, but which have potentially undergone any kind of disturbance, such as selective logging, deforested areas in regeneration, etc. To delimitate these areas, the most distant area with deforestation along the road was identified on PRODES’s Image Classification and then a buffer was established for both sides of the road. This was also checked with the GIS flyover in 2008.

• Community use areas: areas currently under use by the communities or that will be potentially used in the future for small-scale agriculture, logging, forest management and other uses that can potentially affect the carbon stocks inside the Reserve. The source of this data is SDS (2006); it was collected through a community participative mapping process for the Studies for the Creation of the Juma Reserve.

Non-Forest areas: natural areas on which vegetation is not classified as forest; not reaching the Brazilian definition of forest
- A single minimum tree crown cover value of 30 percent
- A single minimum land area value of one (01) hectare
- A single minimum tree height value of five (05) meters
The sources of the respective data layers used are presented below on Table 06

Table 06 – Source of the data layers used to define the project excluded areas

<table>
<thead>
<tr>
<th>Data Layer</th>
<th>Source</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boundaries of the Reserve</td>
<td>SDS (2005)</td>
<td>Study for the Creation of the Reserve</td>
</tr>
<tr>
<td>Private Land Titles</td>
<td>ITEAM (Personal Communication, 2006)</td>
<td>Database for private lands and titles in the State of Amazonas</td>
</tr>
<tr>
<td>Communities</td>
<td>FAS (2008)</td>
<td>Field Survey for the Bolsa Floresta Program</td>
</tr>
<tr>
<td>Communities use area</td>
<td>SDS (2005)</td>
<td>Study for the Creation of the Reserve</td>
</tr>
<tr>
<td>Road AM -174</td>
<td>IBGE (2008)</td>
<td><a href="http://www.ibge.gov.br">www.ibge.gov.br</a></td>
</tr>
<tr>
<td>Areas Under Influence of the Road AM-174</td>
<td>IDESAM (2008)</td>
<td>Juma PDD</td>
</tr>
<tr>
<td>Deforestation</td>
<td>PRODES (INPE) + Image Classification</td>
<td><a href="http://www.obt.inpe.br/prodes">www.obt.inpe.br/prodes</a></td>
</tr>
</tbody>
</table>

The Juma RED Project crediting period lasts until 2050, which is the date when the selling of carbon credits ends. However, the main role of the project is to improve the livelihoods of the communities, in addition to strengthening their production capacity, improving their health and education, and providing them with the necessary tools to allow them to generate their income from the sustainable use of natural resources. For this reason, even though the project specific activities end in 2050, it is expected that the project activities will be at an advanced level of implementation that makes the project activities self-sustainable in the long term.
The starting date of the Juma RED project is the day the Reserve was created (July 3, 2006), as well as the project crediting period:

- **Start of the crediting period: July 3, 2006**
  Justification: The crediting period starts on the same date that the Project starts. This date was defined as the first action of the Project, which corresponds to the creation date of the Reserve.

- **First crediting period: 2016**

- **End date for the crediting period: January 2050**
  Justification: This is the end date for the baseline projections used in calculating the carbon stocks and dynamics (i.e., the end date for the SimAmazonia I, Soares-Filho et al., 2006). This end date also corresponds to the date when, according to the Fourth IPCC AWR, the world must have reduced its GHG emissions by 50% if it is to avoid dangerous climate changes (IPCC, 2003).

For the purposes of assessing additionality, the starting date of the RED project activity is 2003 – when the ZFV Program was launched. However, as for defining the project crediting period, the starting date of the project is the date of creation of the Juma Reserve (2006), when the project boundaries went clearly delimited and the Juma RED Project started to be implemented “on the ground”. For additionality issues, please check the “Additionality Test”, on Annex III of the Project Design Document.

Throughout the crediting period there will be periodic certifications performed by an accredited CCB certifying organization. These certifications will verify that the carbon remaining in the reserve is in keeping with the values expected at the start of the project. These certifications will be performed one year after obtaining the initial validation and every two years thereafter.
3.3.2 Net Carbon Benefits

As an illustration, the equation below presents the logic to calculate the quantity of reduced CO$_2$ emissions expected with the implementation of the project. The methodology used by the IPCC GPG (2003) assumes that the net emissions are equal to the changes on the carbon stocks on the existing biomass between two different points in time. The logic used in the project is the same used by the MCT (2006) methodology used for the first Brazilian National GHG Inventory), and is explained in details on the Juma PDD.

\[
C_{RED} = C_{baseline} - C_{project} - C_{leakage}
\]

Where:

- $C_{RED}$ = Net Reduced Emissions from Deforestation
- $C_{baseline}$ = CO$_2$e emission in the baseline
- $C_{project}$ = CO$_2$e emission in the project scenario
- $C_{leakage}$ = CO$_2$e emission in consequent from leakage

The $C_{baseline}$ is the emissions resulting from the activity data per hectare multiplied by the remaining carbon stocks on each vegetation type after deforestation (original carbon stocks minus 14.25 tC/ha – vegetation at equilibrium) plus 6.6% addition of “non- CO$_2$” GHG emissions (N$_2$O and CH$_4$) originated during the “slash and burn” process of deforestation. These values are calculated derived from the CO$_2$ emissions and accounts for 6.6 – 9.5% of the total GHG emissions. Conservatively, it was used the value of 6.6% as suggested by Fearnside, 2000 and Andreae et al., 2001.

The values presented above are the sum of emissions of CO$_2$ and CO$_2$e. The formula used to calculate the non-CO$_2$ emissions provenient from forest fires, according to Fearnside (1996) is:

\[
C_{baselineCO2e} = 0.066 \times C_{baseline}
\]
Where:

\[ C_{\text{baseline}} = \text{CO}_2 \text{ emissions in the absence of the project} \]

The \( C_{\text{project}} \) are the project emissions originated from deforestation measured by PRODES, for the years 2006 and 2007. For the consequent years, it is estimated that the project may not avoid up to 10% of the total deforestation predicted on the baseline, thus this emissions must be accounted as “project emissions”.

The \( C_{\text{leakage}} \) are the emissions happening outside of the project boundaries that are attributable to the project. As explained ahead, the project does not expect to generate leakage emissions.

**Ex Post Calculations**

The calculation of \( \text{ex post} \) net anthropogenic GHG emission reductions is similar to the \( \text{ex ante} \) calculation with the only difference that the \( \text{ex ante} \) projected emissions for the project scenario and leakage are replaced with the \( \text{ex post} \) emissions calculated from measured data. In case it is verified differences in the \( \text{post facto} \) adjusted carbon baseline (due \( \text{ex post} \) improvements of carbon stocks data, factoring-out of the impact of natural disturbances, etc.) the \( \text{ex ante} \) estimated baseline will be replaced by a \( \text{post facto} \) baseline, as describes:

\[ C_{\text{RED}} = C_{\text{baseline}} - C_{\text{project}} - C_{\text{leakage}} \]

Where:

\( C_{\text{RED}} = \text{ex post net anthropogenic greenhouse gas emission reduction; tonnes CO}_2\text{e} \)
\( C_{\text{baseline}} = \text{ex ante (or post facto) baseline greenhouse gas emission within the project area; tonnes CO}_2\text{e} \)
\( C_{\text{project}} = \text{ex post actual greenhouse gas emission within the project area; tonnes CO}_2\text{e} \)
\( C_{\text{leakage}} = \text{ex post leakage greenhouse gas emission within the leakage belt area; tonnes CO}_2\text{e} \)
## Table 7 – Carbon and non CO2 GHG emissions for the Juma Project

<table>
<thead>
<tr>
<th>Project year</th>
<th>C_BASELINE</th>
<th>C_ACTUAL**</th>
<th>C_RED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>annual</td>
<td>annual</td>
<td>annual</td>
</tr>
<tr>
<td></td>
<td>tCO2e</td>
<td>tCO2e</td>
<td>tCO2e</td>
</tr>
<tr>
<td></td>
<td>cum</td>
<td>annual</td>
<td>tCO2e</td>
</tr>
<tr>
<td></td>
<td></td>
<td>cum</td>
<td>tCO2e</td>
</tr>
<tr>
<td>0</td>
<td>2006</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1</td>
<td>2007</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>2008</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>3</td>
<td>2009</td>
<td>32.964.40</td>
<td>1.617.15</td>
</tr>
<tr>
<td>4</td>
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*According to Feasimide, to obtain the CO2e value is needed additional adjustment for trace-gas effects of 6% relative to the impact of CO2 release alone (Feasimide, 1999).
These numbers were generated based on the deforestation predictions made by the SimAmazonia model. The model is able to predict the quantity and location of the deforestation inside the Juma Reserve. The explanation of how the deforestation quantity was assessed is described in Annex I of the Juma PDD.

However, adopting a conservative approach and assuring the benefits of the project, the project commits to reduce 90% of the ongoing deforestation. In this way, the other 10% can be kept as “security carbon,” in case small areas of deforestation occur inside the Reserve.

The corresponding emissions and stocks are subject to change on two occasions:

I - After the first verification period and the new vegetation carbon stocks are defined; II - In 2016, ten years after the start of the project, when the baseline will be revised.

Even though the baseline estimation is considered robust and conservative, there are uncertainties that can affect the carbon credits generation. As a measure to deal with the model uncertainties the baseline will be re-validated at the end of each “baseline assessing period” (10 years). At this time, if the baseline deforestation is verified as different than predicted the emission reductions for the previous period shall be recalculated.

If baseline deforestation is verified as lower than the originally predicted, the project shall discount the respective amount of VERs from the next “baseline assessing period”. If baseline deforestation is verified as higher than the originally predicted, the project will be able to issue the respective amount of VERs for this period.

The other GHG emissions sources, and their respective inclusion/exclusion and the reasons to do so are presented on the table below:
These data were not included considering the difficulty in measuring these emissions on the baseline. So, both as a conservative measure and to avoid imprecision on the calculations, these data were not included.

Therefore, the cumulative amount of greenhouse gases that would be released in the crediting areas under the “business as usual” (i.e., without the implementation of the project) scenario for 2006 to 2050 would be of approximately 210,885,604 tons of CO₂.

<table>
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<th>Sources</th>
<th>Gás</th>
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<th>Justification / Explanation of choice</th>
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<tr>
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<tr>
<td>CO₂</td>
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<td>Excluded as a conservative approach *</td>
</tr>
<tr>
<td>CH₄</td>
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<td>Not a significant source and excluded as a conservative approach*</td>
</tr>
<tr>
<td>N₂O</td>
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<td>Not a significant source and excluded as a conservative approach*</td>
</tr>
<tr>
<td><strong>Use of fertilizers</strong></td>
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<tr>
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<td><strong>Livestock emissions</strong></td>
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</tbody>
</table>

* These data were not included considering the difficulty in measuring these emissions on the baseline. So, both as a conservative measure and to avoid imprecision on the calculations, these data were not included.
3.3.3 Offsite Climate Impacts ("Leakage")

It is not expected that the implementation of project activities generates any off-site decreases in carbon stocks. The project implementation, rather, is expected to additionally reduce deforestation outside the project boundaries, compared to the baseline scenario. Recent studies on deforestation dynamics indicate that the single measure of creating a Protected Area promotes reduction of deforestation in the surrounding areas. This effect was observed in the great majority of the protected areas created in the Brazilian Amazon, and the offsite “reduction of deforestation” that was generated varied from 1 to 3% of the size of the PA (IPAM, 2008). For this reason, we consider that the implementation of the Juma RED Project will not result in negative leakage, but rather a “positive leakage” since there will be a reduction in deforestation rates outside of the reserve.

The project activities to be carried out on the offsite project area will directly address the drivers and dynamics of deforestation in the region, as illegal logging and grazing, land grabbing, mining, among others, that could be considered as a leakage effect from the project implementation – even though they cannot be attributable to the project activities, since they would occur anyway.

The use of the reserve’s “surrounding zone” will be subject to specific terms and conditions, established by law (SEUC, 2007).

The physical boundaries of the “surrounding zone” will be determined as part of the Reserve’s management plan during the initial years of the project implementation. Usually, this area is defined as at least a 10 km buffer surrounding the reserve’s perimeter (i.e., in the Juma Reserve the zone would be of at least 494,318 ha).

The entire surrounding area will be also monitored as part of the project’s monitoring plan. Migrations from the communities inside the Juma Reserve to other forest areas, in addition to immigrations, will be monitored by the Bolsa Floresta Program annual activities.

As a mitigation measure to guarantee that the offsite carbon stocks will not decrease, the project will commit to an investment of at least 10% of the annual budget generated through the sales of RED credits.
3.3.4. Permanence

The carbon credits benefits from this project will be entirely destined to the voluntary carbon market of emissions compensation, which is being developed in partnership with Marriott International.

Specific reserves will be created to guarantee the final delivery of the RED credits that will be used on the partnership with Marriott International. These reserves will keep on hold most part of the carbon credits during the crediting periods, making these credits available as the carbon credit certificates are emitted for the subsequent periods.

This way, a non-permanence buffer will be created, as an “Investment Risk Management Strategy”. This buffer was dimensioned based on the Risk Assessment of the Voluntary Carbon Standard – VCS, that asses a range of questions to rate the level of risk among low, medium and high. By applying this Risk Assessment specifically for the Juma Project, the final value obtained for the buffer was 10%, which are applied to the final reduced emissions generated by the project and are presented below.

3.3.5 Monitoring

For the reservoirs of CO₂, the project will use the most recent data and images from INPE/PRODES to conduct an analysis of the real deforestation rate. The SimAmazonia I model establishes the scenario (i.e., the “business as usual” scenario) that will be compared to what is actually happening on the ground. To follow the deforestation and the carbon dynamic it will be necessary to (i) monitor by satellite and (ii) perform in loco monitoring. This site-level monitoring of the carbon stocks will involve both local communities and researchers. The overall monitoring strategy comprises the following four components:

Monitoring by satellite: Brazil has developed one of the most advanced deforestation monitoring system in the world (with a resolution of 812 m²). INPE makes its images available to the public, and, through the use of this system, FAS, in addition to any interested citizen, is able to monitor deforestation using the data available on the INPE website. (http://www.obt.inpe.br/prodes/index.html). SIPAM provides Landsat images for selected areas of the Amazon.
Monitoring of the carbon dynamic and forest carbon stocks: A partnership between FAS/SDS and the National Institute for Amazon Research (Instituto Nacional de Pesquisa da Amazônia, INPA) will be established. This partnership will involve the development of analytical studies to quantify the carbon flux and carbon stocks of the different reservoirs of biomass in the forest, including aboveground and belowground biomass, leaf litter, fine woody debris, coarse wood debris and soil carbon. Dr. Niro Higuchi’s team will be responsible for the development of this work. Dr. Niro Higuchi is a member of the IPCC and a participant in the Coordination of Tropical Silvicultural Research (Coordenação de Pesquisas em Silvicultura Tropical, CPST - INPA). Higuchi’s team comprises professionals with extensive experience in tools for measuring forest inventories, carbon stocks and carbon dynamics.

Participatory Monitoring “in loco” (SDS-ProBUC/IPAAM): SDS developed the Biodiversity and Natural Resource Use Monitoring Program in State Protected Areas of Amazonas (ProBUC) (SDS, 2006). ProBUC is a system for monitoring natural resources and biodiversity that is being implemented in the State protected areas. The premise of this program is to involve local communities in monitoring as a way to increase local conservation awareness and to make monitoring more efficient. It also serves to give local communities a sense of responsibility for maintaining the integrity of local ecosystems upon which their livelihoods depend. This program will be implemented in the Juma Reserve starting in 2009.

Surveillance Program: The surveillance program aims to involve the communities in mapping the threatened areas, identifying the risks which they are exposed to and identifying which risks are the most aggressive. Then, control measures will be implemented by the managing institution to guarantee the control and protection of these areas, with the support of the Amazonas State Institute for Environmental Protection (Instituto de Proteção Ambiental do Estado do Amazonas – IPAAM).

All the carbon credits generated by the Juma Reserve RED Project belong to FAS, and afterwards will be sold to Marriott International. This relationship of carbon rights will remain the same until the end of the project, so it is not necessary to monitor this variable.
3.3.6 Project stakeholders

The Juma Reserve RED Project was created to serve different demands. Local communities identified the creation of the Reserve as a way to protect their forests and to improve their welfare and quality of life. Throughout the process of creating the Juma Sustainable Development Reserve, there was participation by all types of local residents, involved in many lines of work (fishermen, extractivists, farmers, ranchers, etc.). The process also included informal community associations (mothers, professors, artisans, etc).

On March 15, 2006, two public hearings were held, one being in Novo Aripuanã city. These meetings brought together the community leaders and major local stakeholders, with representatives from City Hall, the City Council, local churches, and local civil society organizations in attendance, to express their interest in the Project’s implementation. Inhabitants from all communities within the Reserve were interviewed to obtain their perspectives on the social, economic and environmental context of the Reserve, most being favorable to the project’s implementation, and thus a better understanding and knowledge of the direct stakeholders of the project was obtained.

The use of participatory methods in all of these meetings, workshops and public hearings throughout the Reserve creation process was very important to increase the understanding on the level of community organization and to communicate the modus operandi to the local communities. This is an important input for establishing the dynamics and process for developing the Reserve’s management plan.

The local communities and stakeholders are involved in the development and implementation of the Reserve’s management plan, and in the management decisions regarding the Juma RED Project through its Deliberative Council (Conselho Deliberativo).14

All of the project activities as well as the technical and administrative processes are consistently being made public available at the project’s operational bases located inside the Juma Reserve and in the Novo Aripuanã City office. All efforts are constantly made in order to inform the communities and other stakeholders that they can access project information and comment on and influence its management. These documents will also be made available in the Amazonas Sustainable Foundation website (www.fas-amazonas.org).

14 The Deliberative Council is in charge of deliberating on the running of the protected area, and has the right to speak and vote on foreseen activities. The people who live inside the protected area make up 50% of it, and the other 50% consists of institutions acting in the PA, being either from the government or not. Included among its main roles are approving the budget for the PA, following up and approving the management plan, and reporting on actions that may have significant impact inside and around the area, among others.
The Project field coordinator is always “on-site” available for receiving comments and grievances and for clarifying any doubts related to the project implementation, according to the project management procedures (explained in CM1.3a in the Project Design Document), forwarding any requests for information or conflicts to the Project Coordinators. The community members will also be informed about this open forum with the field coordinator for directing any doubts or queries related to the project.

The Project account is audited by PriceWaterhouseCoopers and, after approved by FAS’ boards, is submitted to the State Public Consultancy (Ministério Público Estadual).

3.3.7 Legal basis

The Juma RED Project was created under the auspices of the Amazonas State Policy on Climate Change (PEMC-AM, Law 3135 of June 2007 – available at www.fas-amazonas.org) and its implementation will occur in accordance with existing legal requirements, including those related to the operation of a mechanism for financial compensation for environmental services based on the Reduction of Emissions from Avoided Deforestation (Amazonas, 2007b).

The Governor of the State of Amazonas signed Decree no. 26.010, which created the Juma Sustainable Development Reserve on July 3, 2006 (Amazonas, 2006). Its implementation will follow the rules of the State System of Protected Areas (Sistema Estadual de Unidades de Conservação, SEUC) (Assembléia Legislativa do Estado do Amazonas, 2007), as well as the rules established by the National System of Protected Areas (Sistema Nacional de Unidades de Conservação, SNUC) as set forth in Federal Law no. 9,985 of July 18, 2000. According to the SEUC law, the effectiveness of the Juma Reserve must follow directives set forth in the Management Plan – a document that must be developed by a technically competent team coordinated by the State Center for Protected Areas (Centro Estadual de Unidades de Conservação, CEUC), and has been approved by the Reserve Deliberative Council (Conselho Deliberativo da Reserva). The Reserve Council is a judicial body for the management of a protected area that is constituted by law and has the final authority over decisions made regarding the Reserve. The Reserve Council comprises all the relevant local institutions and actors in the area of the Reserve, including representatives of the communities located within the reserve, municipal governments around the Reserve, government agencies and the local business community, among others, with the presidency of the Council occupied by the State Center for Protected Areas (Centro Estadual de Unidades de Conservação, CEUC).
During the process of creating the Juma RED Project, a consultation was undertaken to consult all of the relevant legal institutions in the project area. The entities consulted included the State Secretariat of the Environment and Sustainable Development of Amazonas (SDS), the State Secretariat for Planning and Economic Development (SEPLAN), the State Public Prosecutor (Ministério Público Estadual, MPE) and other entities within the Government for the State of Amazonas. In addition to these consultations, an independent legal analysis was commissioned to determine if there were any potential conflicts between the State Legislation (PEMC-AM and SEUC), and other State and Federal rules and regulations.

The conclusion of this analysis determined that there was no conflict between the Juma RED Project and the relevant State and Federal regulations (Lopes, 2007). The fact that the project is being proposed in partnership with the Government of the State of Amazonas provides a guarantee and obligation to comply with the law.

4. SUSTENTABILITY STRATEGY

The community members and local stakeholders are already involved in the implementation of the project activities and will continue to participate throughout the entire process of developing the project. The project will provide organizational, management and technical capacity building activities to underscore the ownership of the local people’s management of the Reserve, as well as to insure their involvement in decision-making and implementation of programs and in conservation and sustainable development efforts. Workshops, training sessions and events for sharing experiences will be organized to provide community people and local stakeholders with the necessary tools to improve their ability to manage their environment in a lasting and sustainable way.

The Management Plan will include community-strengthening activities aimed at promoting the organization of community groups and the training of community members in sustainable production methods to improve their earning capacity. Other activities will be done to improve the quality of life in the Reserve, including training communitarian Health Agents to assist others in case of any first aid is needed.

The activities and trainings already planned for promoting capacity building for the project communities are better described below:
• Voluntary Environmental Agents Program: The voluntary environmental agents are individuals without authority who are committed to the conservation of natural resources. These agents act as multipliers of the awareness within the community and communicate with the authorities when there has been an infraction of the Reserve's rules and regulations. The Voluntary Environmental Agents Program is envisioned as a way of providing individuals interested in participating in environmental education, conservation, preservation and protection of natural resources of the protected area.

• Health Agents: Community members will be selected or will volunteer to receive training in healthcare assistance, in terms of emergency care (first aid), basic treatment of the most common health problems and treatments based on traditional knowledge. The intent is to provide sufficient knowledge for community representatives to rapidly assist other members in case of emergencies, and, if necessary, to forward the case to an appropriate assistance facility. This training will be organized and provided by FAS, with the support of qualified professionals from the area.

• Biodiversity and Natural Resource Use Monitoring Program in State Protected Areas of Amazonas (ProBUC): The ProBUC program prepares and accredits community members and inhabitants of the protected areas to participate and collaborate in natural resource monitoring activities. This program will generate information about the status of biodiversity, its uses and threats. The duties of these monitors are as follows:
  
  • Census monitor – performs a weekly collection of information about natural resource use.
  • Fishing monitor – collects data about the production, marketing and selling of fish at the major docks in the municipality.
  • Boat monitors – collects data on the transit of boats at strategic points in the protected area.
  • Fauna monitor – monitors the presence and quantity of animals in the forest.
  • Road Monitor – monitors the road traffic and types of goods transported.

• Forestry Management: It is crucial for project success that good practices in Forestry Management are developed with the community. Some material (i.e., the publication “Sustainable Forest Management for Wood Production in the State of Amazonas”) has already been distributed, and workshops are being planned in order to provide sufficient knowledge so that the community people can continue their forestry activities, without damaging the natural resources.
• Environmental Awareness: A program will be implemented at the public schools to train teachers and distribute material, so they can understand and disseminate information related to their reality, such as sustainability and climate change. It is believed that this measure will increase people’s knowledge about their reality, situation and responsibilities related to sustainable development and nature conservancy, also increasing the success of the project in reducing deforestation.

• Association: Workshops were already held in order to provide knowledge and to promote the association to the representatives of the Reserve. A Council for gathering these representatives was already founded and the members are being chosen. Other workshops will be also set up in order to help them develop management rules.

4.1 Forest Allowance Program | Programa Bolsa Floresta

The Forest Allowance Program is a positive set of actions aimed at offering a reward to the forest keepers committed to the environmental conservation and the sustainable development in the Amazonas Conservation Units.

The Amazonas Sustainable Foundation has signed a cooperation agreement with the Amazonas State Government to implement the Forest Allowance Program. The main justification for this agreement is the Foundation’s competence to implement a long-term program in an efficient and transparent way, independently from political party interests. The institutional stability and credibility offers new opportunities for financially funding the Forest Allowance Program through partnerships with institutions and companies with strong socioenvironmental engagement. This program’s implementation is defined under the terms of a Cooperation Agreement established between FAS and SDS.

4.1.1 Family Forest Allowance

The first component, the Family Forest Allowance, consists on the payment of a monthly grant of R$50, to the mothers of families living inside Conservation Units, willing to commit to environmental conservation and sustainable development. It is an important way to get the population involved in the deforestation combat activities. The Allowance is not intended to be the main source of income for these families. It is just an income complement, granted as a reward for forest conservation.
4.1.2 Forest Allowance for Associations

The second component is the Forest Allowance for Associations, directed to the associations of people living in the State Conservation Units. It corresponds to 10% of all the Family Forest Allowances granted. Its purpose is to strengthen the organization and social control of the Program. This is one of the most important programs in the history of the Amazon in terms of strengthening the community based organizations. The allowance stimulates the social control of the Program, aiming at following its rules and agreements.

4.1.3 Social Forest Allowance

The third component is the Social Forest Allowance. It corresponds to R$350,00 per family a year. This portion is destined at improving education, sanitation and health conditions, communication and transportation; basic parts for building better life conditions for the forest keepers. The actions take place with the participation of the responsible government bodies and collaborating institutions.

4.1.4 Income Forest Allowance

The fourth component is the Income Forest Allowance. It corresponds to R$350,00 per family a year. This portion is destined to supporting sustainable production: fish, vegetal oil, fruits, native honey, among others. All legalized activities, which do not result in deforestation and smoke generation, are eligible.

Differently from other social programs, the Forest Allowance presents clear and objective compensations. The main examples being both the commitment to zero net deforestation and the support to implementing State Protected Area.

According to the Program’s strategic view, the main source of income for the families in the Forest Allowance Program is not the Family Forest Allowance (Bolsa Floresta Família), but the Income Forest Allowance (Bolsa Floresta Renda). From a social indicators’ perspective, the main component is the Social Forest Allowance Program (Bolsa Floresta Social), especially to foster education, health conditions, communication and transportation. From a governance and participation standpoint, the Forest Allowance for Associations (Bolsa Floresta Associação) is the main tool for the empowerment of local communities and participation in the Program’s management.
5 NET BENEFITS WITH THE PROJECT

5.1. Climate

Table 09 – Net Climate Benefits with the Juma Reserve RED Project

<table>
<thead>
<tr>
<th>Area</th>
<th>Situation without the project</th>
<th>Program/Activity</th>
<th>Net Benefits</th>
<th>Indicators</th>
<th>Budget US$</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deforestation control</td>
<td>No deforestation control within the Reserve area</td>
<td>Creation of one surveillance base equipped with boat and vehicle, construction of 3 communication</td>
<td>Increase in control of deforestation</td>
<td>Controlled deforestation in the Reserve area</td>
<td>574,588</td>
<td>FAS</td>
</tr>
<tr>
<td>Carbon monitoring</td>
<td>No control or measure of carbon dynamics within the project area</td>
<td>Implementation of carbon monitoring program through permanent plots</td>
<td>Carbon Dynamics under control</td>
<td>Implementation and monitoring of permanent plots</td>
<td>141,176</td>
<td>INPA</td>
</tr>
<tr>
<td>Climate Awareness</td>
<td>Small or no knowledge about climate change and its implications by the communitarians</td>
<td>Workshops and material to increase awareness</td>
<td>Higher environmental consciousness</td>
<td>Workshops presented and materials developed</td>
<td>79,412</td>
<td>FAS</td>
</tr>
</tbody>
</table>
5.2 Community

Table 10 – Net Community Impacts Benefits

<table>
<thead>
<tr>
<th>Area</th>
<th>Situation without the project</th>
<th>Program/Activity</th>
<th>Net Benefits</th>
<th>Indicators</th>
<th>Budget US$</th>
<th>Inst.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>Access to school (1st to 4th grades)</td>
<td>Creation of 3 schools according to the communities' needs, development of pedagogic materials, and support for teachers</td>
<td>Access to more advanced schooling (5th to 8th grade), computers and pedagogic materials</td>
<td>3 schools implemented and operational</td>
<td>398,176</td>
<td>FAS</td>
</tr>
<tr>
<td>Housing</td>
<td>Precarious houses</td>
<td>Social Forest Allowance / Family Forest Allowance The families will have more resources to invest in their houses</td>
<td>Good houses made with local and external materials and an indoor bathroom</td>
<td>Houses with better conditions</td>
<td>522,353</td>
<td>FAS</td>
</tr>
<tr>
<td>Health</td>
<td>No access to basic health treatment</td>
<td>The families will have more resources to invest in their houses</td>
<td>Access to hospitals and specialized health treatment</td>
<td>Better access to medical support, improvement of health quality</td>
<td>68,824</td>
<td>FAS</td>
</tr>
<tr>
<td>Energy</td>
<td>No access to energy</td>
<td>Investment in solar energy system technology in the new schools</td>
<td>Access to clean energy</td>
<td>Solar panels installed</td>
<td>23,471</td>
<td>FAS</td>
</tr>
<tr>
<td>Water</td>
<td>No water treatment</td>
<td>Pro-chuva program will improve rain water storage and treatment</td>
<td>Well with chlorine treatment</td>
<td>Wells installed and working</td>
<td>70,588</td>
<td>CEUC</td>
</tr>
<tr>
<td>Personal Documentation</td>
<td>People have a birth certificate</td>
<td>The Forest Allowance Program will provide the lacking personal documentation</td>
<td>People have complete documentation</td>
<td>All community members have personal documentation</td>
<td>11,765</td>
<td>FAS</td>
</tr>
<tr>
<td>Social Organization</td>
<td>Informal groups and community organizations</td>
<td>Forest Allowance for Association The Program stimulates social organization</td>
<td>Empowered and formal community organization</td>
<td>Formal social organizations articulated</td>
<td>44,471</td>
<td>FAS</td>
</tr>
<tr>
<td>Communication</td>
<td>Isolated</td>
<td>Creation of Communication Bases</td>
<td>Radio Communication System</td>
<td>Community bases built</td>
<td>88,235</td>
<td>FAS</td>
</tr>
<tr>
<td>Networking</td>
<td>Inter-communities networking</td>
<td>Forest Allowance for Association Strengthening of grassroots organizations and cooperatives</td>
<td>Networking within the municipality</td>
<td>Information flow through associations</td>
<td>47,059</td>
<td>FAS</td>
</tr>
<tr>
<td>Lake Management</td>
<td>Lack of lake management rules</td>
<td>Management Plan Investment in community development, as well as ProBUC biodiversity monitoring in lakes</td>
<td>Lake management rules formalized and monitored</td>
<td>Lake management rules formalized, followed and monitored</td>
<td>32,941</td>
<td>FAS/ ProBUC</td>
</tr>
<tr>
<td>Aquiculture</td>
<td>Inexistent aquiculture</td>
<td>Income Forest Allowance Fish Farming Kits</td>
<td>Aquiculture based on local products and linked with efficient production chains</td>
<td>Aquiculture activities implemented and linked with efficient production chain</td>
<td>35,294</td>
<td>FAS</td>
</tr>
<tr>
<td>Family-based Agriculture</td>
<td>Subsistence/Harvest surplus done with low level technologies</td>
<td>Increase of productivity by developing new techniques, through technical assistance</td>
<td>Production with high level technology</td>
<td>New technologies implemented and in use</td>
<td>16,518</td>
<td>FAS</td>
</tr>
</tbody>
</table>

*From 2008 to 2011*
6. BIBLIOGRAPHY


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ANNEX I – ADDITIONALITY TOOL FOR THE JUMA RED PROJECT

“Tool for Demonstration and Assessment of Additionality in Project Activities Reducing Emissions of Greenhouse Gases (GHG) from Deforestation and Forest Degradation (REDD)”

(Adapted Version 1.0)5

APPLICATION AT THE JUMA RESERVE RED PROJECT (25th August 2008)

I. PROCEDURE

Project participants shall apply the following five steps:

STEP 0. Preliminary screening based on the starting date of the REDD project activity;
STEP 1. Identification of alternative scenarios;
STEP 2. Investment analysis to determine that the project activity is not the most economically or financially attractive of the identified land use scenarios; or
STEP 3. Barrier analysis;

STEP 0. Preliminary screening based on the starting date of the REDD project activity

Until 2002, the business as usual scenario for land use in Amazonas was characterized by incentives to agriculture and cattle raising, instead of forest conservation. The deforestation rates at that time were escalating. As an example, the former Governor of Amazonas State at the time used to distribute chainsaws in political campaigns to promote deforestation.

In January 2003, the current Governor of Amazonas, Eduardo Braga, made an official commitment, which was published and notarized before the beginning of his first term (AMAZONAS 2002). The basis of his commitment – the Green Free Trade Zone Program (Programa Zona Franca Verde - ZFV) – was to reduce deforestation and promote sustainable development in the State by adding value to the environmental services in relation to the Amazonas’ forests (Braga & Viana 2003).

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5This tool was adapted by Idesam (2008) for application on REDD project activities, and was based on the original AM Tool 01: “Tool for the demonstration and assessment of additionality V05.1”, designed by the CDM Executive Board (available at: http://cdm.unfccc.int/Reference/tools/index.html).
The implementation of sustainable development policies that have positive impacts on the reduction of deforestation is costly and compete for very limited governmental resources. Given the huge demand for social program funding (human development rates vary between 0.4 and 0.6 in Amazonas) – mainly health and education – investing in activities directly aimed at reducing deforestation was a huge challenge with high political risks.

Governor Braga took the risks and put in place a program for creating new State Protected Areas as central focus at ZFV. This program generated a 133% increase in the area of state protected areas (increased from 7.4 million ha in 2003 to 17 million ha in 2007). Deforestation was reduced by 53% (decreased from 1,585 ha/year in 2003 to 751 ha/year in 2006) (INPE, 2008). Such results and an intense process of political articulation both in national and international levels were the foundation of the first proposal of a compensation mechanism for ecosystem services provided by the State of Amazonas.

This first proposal was presented by the Government of Amazonas at the 11th Conference of the Parties of the UN Framework Convention on Climate Change (UNFCCC), held in Montreal in 2005 (Viana et al. 2005). At the time, REDD was first discussed as an official agenda at the COP/MOP. In November 2006, the “Amazonas Initiative” was presented in Nairobi, at the UNFCCC’ COP 12 (Viana et al. 2006).

The creation of the new protected areas in Amazonas was only possible with the perspective of implementation of the financial mechanism under construction through the activity of the Amazonas Initiative. The creation of the Juma Reserve (in 2006) and the construction of this PDD (as the first RED pilot-project of Amazonas) are the ultimate steps of the long-term commitment started in 2003 by the Government of Amazonas.

Therefore, for the addition assessing purposes, the start date of the activities of RED project is 2003 – when the ZFV Program was launched. However, regarding the definition of the project crediting period, the project start date is the date of the creation of the Juma Reserve (2006), when the project’s boundaries were clearly delimited and the Juma RED Project started being implemented “on the ground”.

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16 All references can be found in the bibliography section in the end of this document.
17 This proposal was crafted during a workshop held in Manaus - organized by the Government of Amazonas and Institute for the Conservation and Sustainable Development of Amazonas (IDESAM) - with the presence of various Brazilian governmental institutions, scientists, and NGOs.
18 The Appendix presents a memory with the whole chain of events and that configured the construction of the Amazonas Initiative, and the implementation of the Juma RED Project.
There was no legal requirement for the Government of Amazonas to create the Juma Reserve, at the date it was created in 2006. The most likely scenario for the land (state land) would be the creation of rural settlements for cattle ranching or agriculture, or its occupation by land-grabbers. This situation can be confirmed as the business as usual scenario for land use observed in all the other states of the Brazilian Amazon in recent years.

The consideration of carbon finance in the decision of creating the Juma reserve (as well as the other protected areas newly created by the actual Government of Amazonas) was always considered in the process of creating the policies and programs of the ZFV program for forest conservation and payment for environmental services, envisioned by the Government of Amazonas in 2003 (Braga & Viana, 2003) This had to follow a chain of events which takes time and follow a slow and bureaucratic politic process as: the creation of new laws, convincement of parliaments, modification of the annual state budgets, articulation with national and international stakeholders, contacts with donors and investors, etc.

At the time this process started, in 2003, there was no mechanism for compensating reduction of emissions from deforestation (REDD), nor in the perspective of the UNFCCC negotiations, nor in the global voluntary markets, so the consideration of carbon finance in the process was not straightforward. The now so called “REDD carbon benefits” were considered in the light of “payment for environmental services” and is extensively documented in Braga & Viana (2003) and in Amazonas (2002). Afterwards, the Government of Amazonas was very active and had a key role on influencing the whole process of the REDD agenda in the UNFCCC negotiations, and the actual promising development of REDD activities in the voluntary markets (Viana & Cenamo, 2005, Viana et. al 2006, Amazonas 2007).

All these steps were fundamental and correct in time, to conduce to the creation of the Juma Reserve REDD Project (2006), the Climate Change and PA’s laws (2007), the Amazonas Sustainable Foundation – FAS (2008), and finally the contract with Marriott international – which concludes the long cycle of a “learn by doing” process that was necessary for the Government of Amazonas to establish the actual existent framework for marketing ecosystem services to promote forest conservation and reduction of deforestation within State lands.
STEP 1. Identification of alternative land use scenarios to the proposed REDD project activity

This step is to identify alternative land use scenarios for the activities proposed by the REDD project that could serve as baseline scenario, through the following sub-steps:

Sub-step 1a. Identify credible alternative land use scenarios to the proposed REDD project activity.

The identified land use scenarios for the land within the project boundaries in the absence of the project are:

Continuation of current forest cover; i.e., forest conservation resulting from the proposed project activities not being undertaken as part of a REDD project

Deforestation of the lands for cattle raising and agriculture

Sub-step 1b. Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations.

Current laws and/or regulations basically allow the two alternative scenarios identified. There is no mandatory law forcing forest conservation in public lands (unless a protected area is created), therefore the land where the project was implemented did not have to be protected on the project start date.

Basically, there were three possible scenarios for land tenure in the project area in 2003: (I) the creation of a protected area by law, (II) the creation of rural settlements for agriculture and cattle raising, and (III) the uncontrolled occupation of the land by landgrabbers and independent producers.

The creation of state protected areas was not a common practice in the “business as usual” (BAU) scenario in Amazonas State, and even today the illegal or uncontrolled occupation of public lands is widespread, representing a great part of the land where deforestation occurs.

According to a broad study recently carried out by IMAZON (2008), the Brazilian government does not have control over the land in a great part of the Amazon territory. The research indicated that only 12% of the land “supposedly” under private control or tenure is officially registered and has up to date land titles at the government’s central office.
Therefore, the most likely scenario for the project area was options (II) and (III), which would result in deforestation. In both alternatives, there are laws applicable that mandate forest conservation, however such laws are systematically not observed in the region. This incompliance with environmental laws and legal requirements for land use is quite common in the Amazon and can be found in many relevant writings and studies about the region.

According to GREENPEACE (2008), only 10% of the deforestation that took place in the Amazon in 2006/2007 was legally authorized (i.e., happened in properties legally entitled and respecting the limits of deforestation permits). The lack of law enforcement is also a key factor for the common practice of deforestation: in 2007 only 3.4% of the illegal deforestation detected by the National System of Deforestation Monitoring (DETER) was processed and fined by the legal authorities GREENPEACE (2008).

Not even the legally protected areas stay safe of deforestation. In the period between July 2007 and August 2008, it was registered that 5.4% (14.9 km²) of the total deforestation occurred in the Legal Amazon happened inside protected areas (IMAZON, 2008).

Sub-step 1c. Selection of the baseline scenario:

The historical trends regarding land use and land occupation in the Amazon indicate that deforestation would be the most likely scenario for the forest land within the project’s boundary. According to the National Space Agency (INPE, 2008), over the last 50 years, 17% of the Amazon’s original forest cover has been destroyed. In the last 7 years alone, between 2000 and 2007, about 150,000 km², or 3.7% of its forests cover area, was lost.

Although the State of Amazonas has had a historical low rate of deforestation, with ninety-eight percent (98%) of the State’s original forest cover still intact, the most advanced models for simulating deforestation indicate that the deforestation rate in the State of Amazonas will increase fast in the coming decades. Many experts consider the deforestation model of Soares-Filho et al (2006), SimAmazonia I, as one of the most refined models for the Amazon region.  

19 The Brazilian Forest Law (“Código Florestal, Lei Nº 4.771/1965”) sets that private lands in the Amazon Basin should keep 80% of the original forest cover protected as “legal reserve”

20 SimAmazonia I was designed by program “Amazon Scenarios”, lead by the Institute for Environmental Research in the Amazon (IPAM), The Federal University of Minas Gerais, and the Woods Hole Research Center.

21 A detailed description on the model functionality, its parameters, and assumptions is presented in Annex X. The model is also available for public use online on the website (in English): http://www.csr.ufmg.br/simamazonia/
The model indicates that there will be an intense deforestation trend in the near future, which could result in a loss of up to 30 percent of the Amazon’s forest cover by 2050. According to SimAmazonia I model, the region where the project is located (cities of Novo Aripuanã and Apuí) will be one of the most deforested on the upcoming decades.

Currently, this is already happening: according to IMAZON (2008), the City of Novo Aripuanã figured as the 4th city with the highest deforestation rates in the whole Amazon region in the first semester of 2008. See Figure 01 and Table 01.

Table 01. Ranking of the Top 10 Municipalities with higher deforestation in May 2008 (Source: Imazon/ SAD).

<table>
<thead>
<tr>
<th>City</th>
<th>Estate</th>
<th>Ranking</th>
<th>Area (Km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altamira</td>
<td>Pará</td>
<td>1</td>
<td>76.57</td>
</tr>
<tr>
<td>Novo Progresso</td>
<td>Pará</td>
<td>2</td>
<td>63.55</td>
</tr>
<tr>
<td>Itaituba</td>
<td>Pará</td>
<td>3</td>
<td>15.79</td>
</tr>
<tr>
<td>Novo Aripuanã</td>
<td>Amazonas</td>
<td>4</td>
<td>15.16</td>
</tr>
<tr>
<td>São Félix do Xingú</td>
<td>Pará</td>
<td>5</td>
<td>12.58</td>
</tr>
<tr>
<td>Pimenta Bueno</td>
<td>Rondônia</td>
<td>6</td>
<td>10.64</td>
</tr>
<tr>
<td>Porto Velho</td>
<td>Rondônia</td>
<td>7</td>
<td>8.39</td>
</tr>
<tr>
<td>Apuí</td>
<td>Amazonas</td>
<td>8</td>
<td>6.42</td>
</tr>
<tr>
<td>Nova Ubiratã</td>
<td>Mato Grosso</td>
<td>9</td>
<td>4.81</td>
</tr>
<tr>
<td>Santa Carmen</td>
<td>Mato Grosso</td>
<td>10</td>
<td>4.77</td>
</tr>
</tbody>
</table>
Cattle ranching and soy farming accounts for some 82 % of the deforestation in the Amazon (GREENPEACE, 2008). Regionally, according to the Institute for the Agriculture and Livestock Development of Amazonas (IDAM), in the municipality of Apuí – the closest and most developed municipality in the south of Novo Aripuanã – 88% of the “productive lands” are occupied by cattle raising.

The most likely baseline scenario by Juma Project is deforestation of the land (scenario A1). The amount of deforestation expected in the project area is given by the “business as usual scenario (BAU)” as described by Soares Filho et al and published in Nature (2006). A more detailed description of the baselines scenario expected on the project area is presented on the PDD on the item G2 – Baseline Projections.
STEP 2. Investment analysis

The investment analysis does not apply to Juma Project, as the creation of the reserve is not considered as an economic investment activity.

STEP 3. Barrier analysis

Sub-step 3a. Identify barriers that would prevent the implementation of a type of the proposed project activity:

Investment barriers:

The basics of deforestation is quite simple and motivated by an economic rationality. Development policies and the world economy have always favored deforestation: agricultural products are worth more than standing forests. International demand for food and biofuels is making large scale plantations more profitable than any other land use activity. Forest destruction for agriculture and cattle raising has been a rational choice to small, medium, and large-sized farmers alike.

The creation and implementation of protected areas (PAs) in developing countries is costly and competes for very limited governmental resources. In Amazonas, its high costs are associated with long distances and lack of access by land, poor transportation and communication infrastructure, and isolation of indigenous and traditional populations. Given the huge funding demand for social programs (human development rates vary between 0.4 and 0.6) - mainly health and education - activities directly aimed at reducing deforestation are always and significantly underfunded.

According to JAMES et al. (2006) the annual costs for maintaining protected areas (PAs) in developing and developed countries can range from US$ 1.57 to US$ 20.58 per ha/year. Specifically for the State of Amazonas, Amend et al. (2006) has conducted a study in 10 PAs close to Manaus, and estimated that these costs can vary from US$ 0.18 to US$ 141.11. The main reason for cost variation in the Amazonas PAs is related to the distance from urban centers and availability of transport infrastructure.

A preliminary estimate made by Amend et al. (2007) calculated that the annual costs for implementation and maintenance of all Amazonas State PAs would be around US$ 69 million per year – without considering costs for re-location of populations and amends for private areas, which alone are preliminary estimated in some US$ 642 million for the hole system.
Even though the Government of Amazonas has made strong efforts to enhance the environmental protection through the increase of its share in the annual budget, the “demand is still much higher than the bid”. Table 02 presents the annual budget available for all environmental protection and management programs within the Amazonas State, and specifically the amount that effectively is destined and needed to be invested in the State PAs.

Table 02 - Amazonas State’ annual budget for environmental management and implementation of protected areas (PAs), in comparison with its real annual costs (Amend, 2008) and other public sectors.

<table>
<thead>
<tr>
<th>Public Sector</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - Public Security</td>
<td>177,231,203</td>
<td>196,336,928</td>
<td>236,063,430</td>
<td>261,053,686</td>
<td>281,889,436</td>
</tr>
<tr>
<td>B - Health</td>
<td>447,275,609</td>
<td>534,947,409</td>
<td>618,031,739</td>
<td>665,539,094</td>
<td>743,244,833</td>
</tr>
<tr>
<td>C - Education</td>
<td>3,663,956,668</td>
<td>427,775,199</td>
<td>482,852,153</td>
<td>539,716,083</td>
<td>600,041,739</td>
</tr>
<tr>
<td>D - Environmental Protection and Management</td>
<td>5,065,075</td>
<td>13,082,269</td>
<td>18,371,352</td>
<td>18,420,847</td>
<td>23,834,266</td>
</tr>
<tr>
<td>D1 - TOTAL BUDGET FOR PAs*</td>
<td>101,301</td>
<td>261,645</td>
<td>367,427</td>
<td>368,417</td>
<td>467,685</td>
</tr>
<tr>
<td>E - Total State Budget</td>
<td>2,245,856,826</td>
<td>2,267,117,027</td>
<td>2,727,606,435</td>
<td>3,483,764,669</td>
<td>3,821,193,316</td>
</tr>
<tr>
<td>% of the total Budget/ PAs (D1/E)</td>
<td>0,005%</td>
<td>0,012%</td>
<td>0,013%</td>
<td>0,011%</td>
<td>0,012%</td>
</tr>
<tr>
<td>F - TOTAL BUDGET NEEDED FOR PAs</td>
<td>26,261,305</td>
<td>31,214,286</td>
<td>94,542,857</td>
<td>105,047,619</td>
<td>110,300,000</td>
</tr>
<tr>
<td>% State Budget Available / Needed for PAs (D1/F)</td>
<td>0,4%</td>
<td>0,8%</td>
<td>0,4%</td>
<td>0,4%</td>
<td>0,4%</td>
</tr>
</tbody>
</table>

* The annual budgets are originally provided in BRL R$. Solely for the purposes of this analysis it was used an exchange rate of 1,65 (1USS = 1,65 BRL)

** Estimated as around 2% of the total budget for environmental protection and management.
As presented in Table 02, only 0.4% of the annual budget necessary to implement the Amazonas State PAs (created by the ZFV Program) is available on the State’s Budget. These PAs have been undermanaged with lack of resources, and their program and activities have been funded, basically, by grants provided by international foundations. These grants provided to implement the State System for Protected Areas are presented at Table 03.

In the specific case of the Juma Reserve, since its creation it was invested US$ 560,380 (US$ 183,456 per year) during 2006-2008. Comparing it with the annual costs needed for its management and implementation (Amend et al., 2008), it was verified a deficit of 95% of the investments needed, i.e the government could invest only 5% of the necessary for its implementation. For the first 4 years after the contract with Marriott (2008-20011), it will be invested approximately US$ 2.5 million upfront by FAS and Marriott, plus at least 4.2 million from the carbon revenues (see CL 1.1 Table 17 of the project design document). This amount (US$ 6.72 million) will balance the deficit of investments for the Reserve, covering at least 57% of its annual implementation costs. It’s important to mention that Amend et al. (2008) estimates are preliminary and the Juma implementation costs are even re-assessed by FAS and CEUC teams.

Table 03 - Total budget available combining all international grants and donations for SDS plus the State’s budget for maintaining the Amazonas State System for Protected Areas, in comparison with the total budget needed according to Amend et al, 2008.

<table>
<thead>
<tr>
<th>DONOR/SOURCE</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gordon and Betty Moore Foundation (GBMF)</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 727,273</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>Amazon Region Protected Areas (ARPA)</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 3,127,273</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>World Wildlife Foundation (WWF)</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 339,384</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>A - Total Grants</td>
<td>$ -</td>
<td>$ -</td>
<td>$ 4,193,938.38</td>
<td>$ 4,727,272.73</td>
<td>$ 6,048,484.85</td>
<td>$ 2,515,151.52</td>
</tr>
<tr>
<td>B - Total State Budget for PAs</td>
<td>$ 101,301</td>
<td>$ 261,645</td>
<td>$ 367,427</td>
<td>$ 368,417</td>
<td>$ 476,685</td>
<td>N/A</td>
</tr>
<tr>
<td>C - Total Budget Available (A+B)</td>
<td>$ 101,301</td>
<td>$ 261,645</td>
<td>$ 4,561,366</td>
<td>$ 5,095,690</td>
<td>$ 6,525,170</td>
<td>$ 2,515,152</td>
</tr>
<tr>
<td>D - Budget Needed for PAs (AMEND, 2008)</td>
<td>26,261,905</td>
<td>31,514,286</td>
<td>94,542,857</td>
<td>105,047,619</td>
<td>110,300,000</td>
<td>110,300,000</td>
</tr>
<tr>
<td>% Grants + State Available / Budget needed for PAs</td>
<td>0 %</td>
<td>0 %</td>
<td>4 %</td>
<td>5 %</td>
<td>5 %</td>
<td>2 %</td>
</tr>
</tbody>
</table>

Source: SDS (2008), SEPLAN (2008), Amend et al. (2008)
• Institutional barriers, *inter alia:*

Until 2002, the former governor of Amazonas used to distribute chainsaws to the population in public campaigns. The creation of protected areas by the ZFV Program has faced a lot of resistance in its first years. Juma Reserve RED Project will be the first project of its kind to be implemented since the creation and approval of the Climate Change State Policy Law (Lei da Política Estadual de Mudanças Climáticas, PEMC-AM) and the State System for Protected Areas (Sistema Estadual de Unidades de Conservação, SEUC-AM). This legislation provides the entire legal framework necessary to implement these types of projects in Amazonas.

Unlike any other State, the creation of the PEMC-AM and SEUC-AM legislations was the first of its kind in Brazil, and granting an independent public-private foundation (FAS) with the legal rights over the management of the State PAs environmental services and products (including the carbon credits generated by RED project activities) seeks to guarantee a long-term commitment not subject to changes in governments policies.

• Barriers due to social conditions, *inter alia:*

Illegal deforestation for grazing, cattle raising, and agriculture is widespread in the whole Amazon region and also in the project area. According to GREENPEACE (2008), only 10% of the deforestation that took place in the Amazon in the year 2006/2007 was legally authorized (i.e., took place in legally titled properties and respecting the limits of deforestation permits) and only 3.4% of the illegal deforestation detected by the National Deforestation Monitoring System (DETER/INPE) was processed and fined by the legal authorities GREENPEACE (2008).

This situation is typical in the region where the project was created, which actually is one under the highest pressure pro-deforestation in the whole Amazon basin. Even after the creation of Juma Reserve RED Project, deforestation threats inside its boundaries have been detected, coming from outside land-grabbers and illegal timber loggers. Without the successful implementation of the project as a RED project activity, in ways as to provide the substantial financial resources needed to halt the deforestation threats, it would not be possible to enforce the law at the level needed to stop deforestation inside the project.

11 The Brazilian Forest Law (“Código Florestal, Lei Nº 4.771/1965”) sets that private lands in the Amazon Basin should keep 80% of the original forest cover protected as “legal reserve”.
Sub-step 3 b. Show that the identified barriers would not prevent the implementation of at least one of the alternative land use scenarios (except the proposed project activity):

The identified barriers do not affect the alternative land use scenario (deforestation for cattle raising and agriculture) negatively and in fact can be considered as incentives for it.

STEP 4. Common practice analysis

The proposed REDD Project is the first of its kind in Brazil. Despite the existence of a significant amount of legally protected areas in the Amazon, the illegal deforestation in such areas is widespread and the creation of State PAs is not a common practice. Historically, the land use related State policies have always preferred to promote agriculture and cattle raising (thus, deforestation), instead of protecting or managing forests.

Table 04 shows the total deforested areas in all the Amazon States. Deforestation has been the “business as usual” scenario for the land use. Amazonas does not want to follow such examples.

Table 04 - Deforestation by States of the Brazilian Amazon accumulated up top 2007 (Source: PRODES, 2008).

<table>
<thead>
<tr>
<th>State</th>
<th>(A) Total forest territory (km²)</th>
<th>(B) Original forest cover (km²)</th>
<th>(C) Accumulated deforestation in 2007 (km²)</th>
<th>% of the territory deforested in 2007 (C) / (A)</th>
<th>% of the original forest cover deforested</th>
<th>Rank in deforested areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pará</td>
<td>1.248.576</td>
<td>563.388</td>
<td>218.369</td>
<td>17,5</td>
<td>38,8</td>
<td>1</td>
</tr>
<tr>
<td>Mato Grosso</td>
<td>904.895</td>
<td>419.827</td>
<td>201.013</td>
<td>22,2</td>
<td>47,9</td>
<td>2</td>
</tr>
<tr>
<td>Maranhão</td>
<td>335.902</td>
<td>249.574</td>
<td>95.587</td>
<td>28,5</td>
<td>38,3</td>
<td>3</td>
</tr>
<tr>
<td>Rondônia</td>
<td>240.404</td>
<td>420.127</td>
<td>82.849</td>
<td>34,5</td>
<td>19,7</td>
<td>4</td>
</tr>
<tr>
<td>Amazonas</td>
<td>1.601.920</td>
<td>271.430</td>
<td>33.223</td>
<td>2,1</td>
<td>12,2</td>
<td>5</td>
</tr>
<tr>
<td>Tocantins</td>
<td>278.998</td>
<td>40.262</td>
<td>30.003</td>
<td>10,8</td>
<td>74,5</td>
<td>6</td>
</tr>
<tr>
<td>Acre</td>
<td>158.881</td>
<td>376.809</td>
<td>19.368</td>
<td>12,2</td>
<td>5,1</td>
<td>7</td>
</tr>
<tr>
<td>Roraima</td>
<td>226.232</td>
<td>377.828</td>
<td>8.350</td>
<td>3,7</td>
<td>2,2</td>
<td>8</td>
</tr>
<tr>
<td>Amapá</td>
<td>142.930</td>
<td>111.593</td>
<td>2.522</td>
<td>1,8</td>
<td>2,3</td>
<td>9</td>
</tr>
</tbody>
</table>
The approval and implementation of the proposed REDD project will overcome institutional, economic, and financial hurdles, as well as other identified barriers, and thus enable the proposed REDD project activities to be undertaken and generate the following benefits:

• Prevention of carbon emissions to the atmosphere, that would occur as a result of the land use activities prevalent in the alternative scenarios. Even in the project scenario, an intense deforestation pressure in favor of cattle raising and agriculture in the project area is expected.

• Influence and attraction of other regional, national, and international stakeholders (both government and private land dwellers) who can see this as a testing ground for future carbon finance activities related to REDD, and are expected to be motivated to participate in a “learning by doing” exercise regarding carbon monitoring, verification, certification, trading, and carbon project development in general.

• Increase of interest in forest conservation related activities, since nowadays, the “possible” generation of REDD carbon credits is only (high risky) possible income, and thus is not an economically and socially attractive investment for land dwellers.

• The proposed REDD project will entail close interaction between individuals, communities, government, forest entrepreneurs, and carbon markets to intensify the institutional capacity to link networks for environmental products and services.

• Creation of a new land management model with high social and biodiversity benefits, such as sustainable production activities, improvement of livelihoods through education, health and welfare for local communities, as well as scientific biodiversity management, monitoring, and reporting.
## Appendix I – Chain of Events of the Amazonas Initiative

<table>
<thead>
<tr>
<th>DATE</th>
<th>EVENT</th>
<th>PLACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 2002</td>
<td>Launch of the Green Free Trade Zone (GFTZ) as a part of Governor Eduardo Braga Governance Plan</td>
<td>Manaus, Brazil</td>
</tr>
<tr>
<td>January 2003</td>
<td>Beginning the implementation of GFTZ</td>
<td>Amazonas, Brazil</td>
</tr>
<tr>
<td>September 2003</td>
<td>Swiss Re – Katoomba Meeting</td>
<td>Switzerland</td>
</tr>
<tr>
<td>November 2005</td>
<td>I Workshop on Global Climate Change</td>
<td>Rio Negro, Manaus, Brazil</td>
</tr>
<tr>
<td>December 2005</td>
<td>Presentation at UNFCCC' COP 11 and launch of the Paper: &quot;Reducing emissions from deforestation in Amazonas, Brazil: a State Government’s proposal for action&quot;</td>
<td>UNFCCC' COP 11/MOP 1, Montreal, Canada</td>
</tr>
<tr>
<td>July 2006</td>
<td>Presentation at the “Religion Science and the Environment – Symposium VI” sponsored by Patriarch Bartholomew I</td>
<td>Manaus, Brazil</td>
</tr>
<tr>
<td>July 2006</td>
<td>Creation of the “Sustainable Development Reserve of Juma”, through the Law Decree n.26.010</td>
<td>Manaus, Brazil</td>
</tr>
<tr>
<td>September 2006</td>
<td>Technical meetings with business and governmental officials in London</td>
<td>London, Brazil</td>
</tr>
<tr>
<td>October 2006</td>
<td>Presentation at the Katoomba Meeting: Valuing Environmental Services: Securing the Natural Capital of Present and Future Generations</td>
<td>São Paulo, Brazil</td>
</tr>
<tr>
<td>November 2006</td>
<td>Presentation at UNFCCC' COP 12 and launch of the Paper: “Amazonas Initiative for Forest Conservation and Ecosystem Services”</td>
<td>UNFCCC' COP 12 / MOP 2, Nairobi, Kenya</td>
</tr>
<tr>
<td>January 2007</td>
<td>Beginning of the second term of Governor Eduardo Braga</td>
<td>Amazonas, Brazil</td>
</tr>
<tr>
<td>January 2007</td>
<td>II Workshop on Global Climate Change: “Strategies to Market Ecosystem Services Derived from Forest Conservation”</td>
<td>Rio Negro, Brazil</td>
</tr>
<tr>
<td>April 2007</td>
<td>Law Decree of the Amazonas State Policy for Climate Change</td>
<td>Manaus, Brazil</td>
</tr>
<tr>
<td>April 2007</td>
<td>Workshop - Alliance of the Forest People: “The importance of the Forest People for Global Climate Change”</td>
<td>Manaus, Brazil</td>
</tr>
<tr>
<td>April 2007</td>
<td>Forum on Sustainability: Council of the Americas, Association of UN Organizations</td>
<td>New York, USA</td>
</tr>
<tr>
<td>June 2007</td>
<td>Creation of the first Brazilian Law on Climate Change, Environmental Conservation and Sustainable Development</td>
<td>Manaus, Brazil</td>
</tr>
<tr>
<td>September 2007</td>
<td>Launching of the “Bolsa Floresta Program,” first Brazilian program for payment of environmental services to the forest guardians</td>
<td>Manaus, Brazil</td>
</tr>
<tr>
<td>December 2007</td>
<td>Creation of the “Amazonas Sustainable Foundation” - FAS</td>
<td>Manaus, Brazil</td>
</tr>
<tr>
<td>December 2007</td>
<td>Establishment of the partnership between FAS and Marriott International, and the beginning of the PDD’s elaboration</td>
<td>Manaus, Brazil</td>
</tr>
<tr>
<td>April 2008</td>
<td>Creation of the State Center for Climate Change (CECLIMA)</td>
<td>Manaus, Brazil</td>
</tr>
<tr>
<td>July 2008</td>
<td>Submission of the PDD for the CCB validation of the “Juma Reserve RED Project”</td>
<td>Manaus, Brazil</td>
</tr>
</tbody>
</table>
ANNEX II – VALIDATED BY TÜV - SÜD

Validation of the CCBA Project:

VALIDATION OPINION
TÜV SÜD has performed a validation of the following proposed CCBA project activity:

The review of the project design documentation and the subsequent follow-up interviews have provided TÜV SÜD with sufficient evidence to determine the fulfilment of stated criteria.
In our opinion, the project meets all relevant CCBA requirements. According to the scorecard approach introduced by CCBA, TÜV SÜD considers the project to comply with GOLD status.
An analysis as provided by the applied methodology demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

Given that the project is implemented as designed, the project is likely to achieve the estimated amount of 3,611,723 t CO₂e tCO₂e in avoided GHG emissions over the first 10 years of the defined crediting period, which equals an average GHG removal of 361,172 tCO₂e per year.

The validation is based on the information made available to us and the engagement conditions detailed in this report. The validation has been performed using a risk based approach as described above. The only purpose of this report is its use during the registration process as part of the CCBA project cycle. Hence, TÜV SÜD can not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

Munich, 2008-09-30

[Signature]

Certification Body “climate and energy”
TÜV SÜD Industrie Service GmbH

Munich, 2008-09-30

[Signature]

Assessment Team Leader