

# **The Brazilian steel & iron sector and the CDM: examples of EcoSecurities' activities in this field**

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EcoSecurities Ltd. is an established environmental finance company which specialises in advising on strategy regarding global warming issues. With offices in 5 countries, to date the firm has worked in more than 60 countries, apart from providing advice to various United Nations agencies, national governments, project developers and major corporations on scientific, policy and commercial issues related to Climate Change. This article describes some projects which EcoSecurities is involved with in the steel and iron sector in Brazil, which have interesting GHG mitigation potential.

As part of the steel production process, large quantities of carbon feedstocks (thermo-reduction agents) are used. Internationally, the main source of carbon feedstock is coke, obtained from the dry distillation of coal, one of the most carbon intensive fossil fuels. The Brazilian steel sector, however, it is the only one globally that uses charcoal as a reducing agent. Given that charcoal is a renewable fuel source, the charcoal-based steel can therefore be considered 'carbon neutral'.

During the last 10 years, however, economic trends related to both the industrial operations and the forestry sector in Brazil are leading to increased utilisation of imported coal, as opposed to locally produced charcoal. This, in turn, results in increases in greenhouse gas (GHG) emissions. Recently, a few companies have been trying to reverse this trend by selling carbon credits through the Clean Development Mechanism (CDM).

## **Economic trends affecting the steel & iron sector**

The charcoal-based steel & iron industry in Brazil has developed in parallel with the plantation forestry sector, its main source of raw fuel material. In order to support the development of these sectors, in 1967 the Brazilian Government introduced the Fiset fiscal incentive program, to encourage investment in afforestation for use in the pulp, paper and charcoal-based pig-iron and steel industries. By 1990, over 6 million hectares of forest plantations had been established in Brazil under this program. Associated investments in breeding and cloning helped to establish the Brazilian plantation forestry sector as one of the most advanced and productive worldwide. At the same time, the country grew to become the world's 8<sup>th</sup> largest producer of steel.

In 1989, however, the Fiset program was discontinued. Following the end of the fiscal incentives, plantation establishment decreased while harvesting of existing plantations continued at the existing rate, leading to a reduction in the Brazilian plantation forest base from a total of 6.5 million hectares in 1990 to 4.8 million in 1998. Replanting is a costly activity and investment is not taking place for a series of reasons, namely, lack of access to long term finance for investment in forestry, inherent low profitability of the forestry activity in Brazil, and the risks related to investments of long gestation in the Brazilian macro-economic context.

Adding to this scenario, in 1994 the Brazilian Government introduced the Plano Real economic plan, which resulted in the pegging of a new Brazilian currency (Real) to the dollar, on an equal level (1:1). This artificially high exchange rate has made the cost of imports relatively lower in relation to goods produced locally. In the steel and iron industries, it made the utilization of imported coal more cost effective than the use of locally produced charcoal.

The combination of these factors has led a series of steel manufacturers to move away from charcoal back to coal, leading to a substantial increase in GHG emissions. Examples of this economic trend abound. A recent study by the Brazilian Steel Institute shows that the consumption of charcoal has been reduced from 8 million tonnes in 1993 to 4.2 million tonnes in 1999. Since 1999, the number of small independent pig iron producers (who sell this raw material to the larger steel producers) has halved, and it is expected that more firms in this market segment may be forced out of business. Others are moving to the Amazon states, where charcoal production is based on the unsustainable exploitation of natural forests, with negative environmental implications. In parallel, large steel manufacturers are selling their plantation forest assets. Since 1996, Acesita (the only Brazilian producer of stainless steel) has reduced its forest assets from 250,000 ha to 101,500 ha, and invested US\$ 650 million to adapt one of its furnaces to operate on coke alone. Companhia Belgo-Mineira, the second largest producer of steel in Brazil, has recently completed its total conversion to coal, with an investment of US\$ 150 million in a coke-fuelled blast furnace, and has already started slowing down its forestry operations.

A general feeling among experts in this industry is that unless incentives are put in place to support either the forestry sector or the use of charcoal, the current trend of substitution to coal will persist. This will lead to a significant increase in GHG emissions in Brazil associated with the use of coke used for iron/steel production, as well as during the coking process (i.e., the transformation of coal in coke, through a dry distillation process).

### **New initiatives involving carbon trading**

Within this context, the international GHG advisory firm EcoSecurities is involved in three projects making use of carbon finance through the Clean Development Mechanism (CDM) to tilt the balance towards the utilisation of charcoal. The extra income derived from the sale of carbon credits will increase the profitability of charcoal-based pig iron and steel production avoiding the decline of this industry.

The Plantar project consists of the maintenance of charcoal-based production of pig iron in its mills in Minas Gerais, Brazil, funded through the sale of carbon credits. This is the first investment of the World Bank PCF in Brazil, who retained EcoSecurities to determine the potential GHG emission reductions to be generated by the project. The project involves the planting of over 23,000 ha with sustainably managed (certified to the Forest Stewardship Council standards) forests of high yielding clonal *Eucalyptus* trees. Additionally, Plantar will initiate a pilot project of landscape-scale management of biodiversity based on the regeneration of native vegetation in an area previously covered with plantation forests. It was estimated that the project has the capacity to generate 12 million tonnes of CO<sub>2</sub> emission reduction equivalents over a 28-year timeframe. The PCF is particularly interested in the replicability of this investment, and its effect on the iron & steel sector as a whole. The project is currently being independently verified by DNV, prior to completion of the deal.

EcoSecurities is also assisting two other companies on similar initiatives. One of the them is being developed by V&M Tubes do Brazil (a joint venture between the French group Vallourec and the German company Mannesmannrohren-Werke). V&M Tubes is the only steel pipe manufacturer in the world to use 100% renewable energy for the production of pig iron and steel. Its forestry division, V&M Florestal, is responsible for the production of all charcoal required by its mills, from its 120,000 hectares of plantation forests (certified as sustainably-managed according to the standards of the Forest Stewardship Council). The project consists of investments to ensure the use of sustainably-produced charcoal for steel manufacture in Brazil, avoiding the use of coal. It is estimated that this will result in the reduction of 45 million tonnes of CO<sub>2</sub> emissions during the next 27 years.

A third project has been developed by Cosipar, a Brazilian private company producing 330,000 million tonnes of pig iron in the state of Pará, in Northern Brazil. Cosipar's objective is to establish plantation forests to produce its charcoal needs, as opposed to other companies in the Amazon region that are either using charcoal from unsustainable degradation of natural rainforests, or are moving to coke. Being a leader in the region, and an important member of the association of pig iron producers, Cosipar hopes to catalyse a change by providing an example of a new source of financing for the sector. It was estimated that the project has the capacity to generate over 1,8 million tCO<sub>2</sub> credits during its lifetime.

A secondary benefit from all these projects relates to the production process of charcoal. Traditionally, the charcoal kilns in Brazil generate a substantial amount of methane in the carbonisation process. At least 90% of charcoal produced in Brazil is obtained from beehive type masonry kilns with low caloric efficiency and whose methane emissions are significant. Both the Plantar and the V&M tubes projects plan to adapt their existing carbonisation kilns to incorporate best available technology to avoid the emissions of methane and particulates.

These projects illustrate how CDM funding can promote potential changes in industrial sectors in developing countries.

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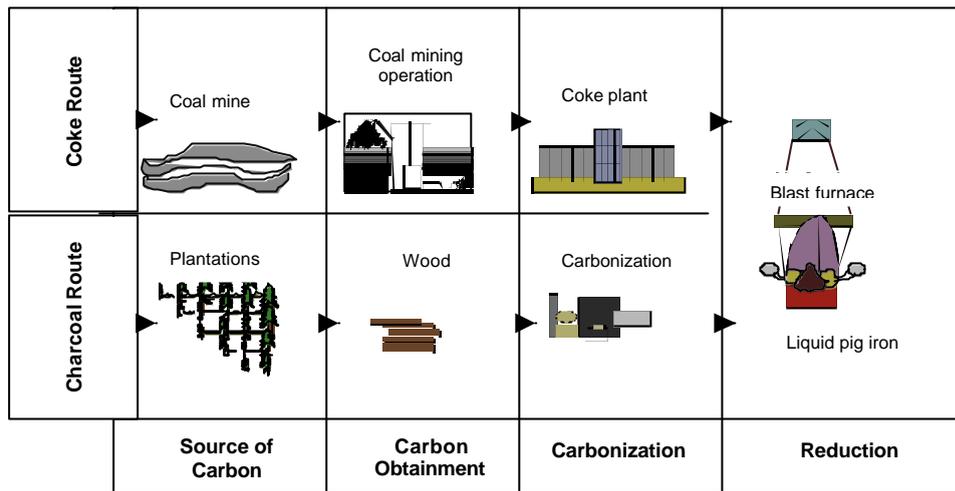


Plate 1. Comparison of coke and charcoal-based pig iron manufacture. Source: Biodiversitas (2001)



Figure 1: Pig iron mill in Minas Gerais, Brasil.



Figure 2: Eucalyptus plantations for charcoal production