



Strategic Analysis of the Global Status of Carbon Capture and Storage

Report 3: Country Studies
Brazil

Final Report



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1. Executive summary

Brazil does not currently have any integrated policies or legislation dedicated to encouraging the development of CCS technologies or regulating the conduct of CCS projects in Brazil. There are no proposals for CCS draft policies or legislation at a National or State level. The National Plan on Climate Change has, however, identified climate change as a strategic issue for both the present and the future of national development.

Existing environmental, health and safety legislation may be applicable to particular CCS activities. The legislation may also provide an insight into how Brazil might incorporate the regulation of CCS activities within existing regulatory regimes or create new CCS specific legislation in the future.

2. Glossary

ABNT	Brazilian association of Technical Norms (Associação Brasileira de Normas Técnicas)
ANEEL	Brazilian Electricity Regulatory Agency (Agência Nacional de Energia Elétrica)
ANP	National Petroleum Agency
ANVISA	National Sanitation Surveillance Agency
BFC	Brazilian Forest Code, Federal Law No 4,771/65
BM&F	Brazilian Mercantile and Futures Exchange (Bolsa de Mercadorias e Futuros)
CDM	Clean Development Mechanism (Mecanismo de Desenvolvimento Limpo)
CETESB	Secretary of State for the Environment
CONAMA	Conselho Nacional do Meio Ambiente
CPD	Civil Police Department
CVM	Securities and Exchange Commission of Brazil (Comissão de Valores Mobiliários)
EIA	Environmental Impact Study (Estudo de Impacto Ambiental)
FPD	Federal Police Department
GHG	Greenhouse Gas
IBAMA	Brazilian Environmental and Renewable Natural Resources Institute (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis)
Kyoto Protocol	<i>Kyoto Protocol to the United Nations Framework Convention on Climate Change</i> , opened for signature 11 September 1997 2303 UNTS 148 (entered into force 16 February 2005)
MA	Ministry of Army
MARPOL	<i>International Convention for the Prevention of Pollution from Ships</i> , 1973, as modified by the Protocol of 1978, opened for signature 17 February 1978, 1340 UNTS 62 (entered into force 2 October 1983)
Mining Code	Federal Decree-Law No 227/67
RIMA	Environmental Impact Report (Relatório de Impacto Ambiental)
Rule	Rule which was approved by Federal Decree No 96,044/88
UNFCCC	<i>United Nations Framework Convention on Climate Change</i>

3. CO₂ pricing

3.1 Introduction

There is no Federal-level mechanism currently in place in Brazil to impose a cost on GHG emissions. Brazil has not yet implemented a national emissions trading scheme, but some initiatives have been taken to facilitate the development of trading in carbon products.

The Brazilian Carbon Facility is a non-governmental initiative. It is not underpinned by Federal Government legislation. It was launched in 2005 by the Brazilian Mercantile and Futures Exchange (Bolsa de Mercadorias e Futuros; BM&F) and the Brazilian Ministry of Development, Industry and Foreign Trade (Ministério do Desenvolvimento, Indústria e Comércio Exterior). The Carbon Facility connects carbon project developers and investors through a registry of:

- Clean Development Mechanism (CDM) projects (as validated by Designated Operational Entities);
- CDM Project Idea Notes; and
- Foreign investors interests (e.g. project-based activities they seek).

The trading of carbon credits generated by CDM projects is done electronically through the BM&F Carbon Credit Auction System. In addition, one Brazilian state, Amazonas, has implemented legislation which aims to facilitate the generation and sale of carbon products from emission reduction projects.

3.2 Mandatory cap and trade schemes

Brazil has not as yet developed a mandatory cap and trade scheme. Brazil became a party to the United Nations Framework Convention on Climate Change (UNFCCC) by means of Federal Legislative Decree No 1 on 3 February 1994. Brazil ratified the Convention on 28 February 1994 and implemented it by means of Federal Decree No 2652 on 1 July 1998. Brazil became a party to the Kyoto Protocol by means of Decree No 144 on 20 June 2002 and ratified the protocol on 23 August 2002. The Kyoto Protocol came into force in Brazil on 16 February 2005 and it was enacted by means of Federal Decree No 5445 on 12 May 2005.

Brazil has an internalisation process related to international treaties. This process includes the approval and ratification of the international treaty in order to bring it into force domestically. However, the effectiveness and enforcement of the international treaty in Brazil begins only with its enactment.

Since Brazil is a Non-Annex I Party of the Kyoto Protocol, the CDM is the only Kyoto Protocol trading mechanism that directly concerns Brazil. Brazil does not have regulations on Joint Implementation.

3.3 Mandatory emission reduction schemes

The Brazilian Carbon Facility is a non-governmental initiative. It is not underpinned by Federal Government legislation and is not mandatory.

The first legislative initiative in Brazil to foster the carbon market was passed by the state of Amazonas on 5 June 2007 (Amazon State Law No 3135). Article 24 of the legislation authorises the State of

Amazonas to alienate reductions of emissions and carbon credits of which it is the beneficiary or the title holder, provided that these are acknowledged or certified, and are derived from:

- avoided CO₂ emissions in natural forests, reforestation of degraded areas or conversion of the soil (for an alternative use);
- projects or activities which reduce GHG emissions as under the *United Nations Framework Convention on Climate Change* and the Kyoto Protocol; and
- other market mechanisms and regimes for reducing GHG emissions.

The legislation anticipates the alienation of GHG reductions for sale in the Brazilian Market for Reduction of Emissions, or in other national or international markets.

3.3.1 Acceptance into mandatory cap and trade schemes

There is no indication at this point that the Brazilian Carbon Facility would be recognized under a mandatory Federal program

3.4 CO₂ taxation schemes

Brazil currently has no specific tax rules related to domestic or cross-border trade in emissions credits. The revenue resulting from the sale of the emissions credits would be considered taxable revenue in Brazil.

Nevertheless, to date several bills that include a tax on CO₂ have been introduced in the Brazilian Congress.

Bill of Law No 1,657/2007 creates tax incentives for individuals or companies for investing on Clean Development Mechanism projects to generate Certified Emission Reductions. It excludes from the Corporate Income Tax and the Social Contribution on Net Profits the profits of CERs transaction. It exempts from the Social Contribution on Gross Revenue the revenue obtained by the transaction of CERs. It authorises the creation of Investment Funds in Clean Development Mechanism projects, that shall be regulated by the Securities and Exchange Commission of Brazil.

Bill of Law No 494/2007 creates tax incentives for individuals or companies for investing on Clean Development Mechanism projects to generate Certified Emission Reductions. It excludes from the Corporate Income Tax and the Social Contribution on Net Profits the profits of CERs transaction. It exempts from the Social Contribution on Gross Revenue the revenue obtained by the transaction of CERs. It authorises the creation of Investment Funds in Clean Development Mechanism projects, that shall be regulated by the Securities and Exchange Commission of Brazil.

3.5 Greenhouse gas emission and energy use reporting schemes

Brazil does not have regulations for the mandatory economy-wide reporting of domestic GHG emissions. While there are no climate change-specific energy reporting regimes in Brazil, there is a National Energy Policy (Law No 9,478/97), which has the following purposes:

- environmental protection; and
- promotion of energy conservation and use of alternative energy sources through the efficient use of existing resources and available technologies.

Although there is no mandatory scheme in Brazil for the reporting of economy-wide GHG emissions, since the mid-1990s concessionaires which supply electricity to the public have been required to collect and report energy data (under Federal Decree No 2, 335 of 6 October 1997; ANEEL Resolution No 456 of 29 November 2000; and Federal Decree No 5, 177 of 12 August 2004, which regulates Federal Law No 10,848 of 16 March 2006).

Since the establishment of Brazilian Electricity Regulatory Agency (Agência Nacional de Energia Elétrica; ANEEL) in 1997, energy reporting obligations have continued to develop, with 2000 seeing the introduction of significant data maintenance obligations and 2004 heralding the introduction of penalties for failure to report. ANEEL's reporting obligations are not triggered by electricity production or consumption above particular thresholds. However, the register must contain data disclosing electricity demand and consumption expressed in agreements executed between the concessionaire responsible for electrical generation and ANEEL.

Finally, there are two voluntary reporting programs in Brazil, neither of which is underpinned by Federal government regulation. These are:

- at the national level, the Brazilian Cooperative GHG Emission Program, which commenced on 12 May 2008 and makes international methodologies to develop GHG inventories available to Brazilian companies so they can control their emissions, and
- at the state level, the voluntary scheme of the São Paulo State Environmental Protection Agency, which invites the one hundred most polluting companies in São Paulo State to report on their actual and potential emissions of CO₂, the data from which will be used in the development of a state GHG inventory.¹

¹ 7,329 industries participated in the voluntary scheme. It concluded that the 100 most pollutant industries with potential to generate CO₂ are responsible for 98.1 percent of the potential emissions in São Paulo State, and 54 percent of the 329 industries intend to expand its emissions in the next 5 years. Further information is available at http://www.cetesb.sp.gov.br/arquivos_default/100co2.pdf.

4. Capture of CO₂

4.1 Introduction

There are no proposals for CCS draft policies or legislation at national or state level in Brazil. The following comments are based on current Brazilian policies and legislation on environmental, health and safety protection.

4.2 General policy and legislation with applicability to CO₂ capture

4.2.1 Relevant pollution laws and policies

The Federal Law No 6,938 of 31 August 1981 established strict civil liability for polluters and the role of State and Federal District Attorneys in suing polluters for damage to environment. According to this law, a polluter is obliged to indemnify or repair the damage it has caused to the environment and to the public regardless of its fault. A polluter is a physical or legal entity, private or public, directly or indirectly responsible for an activity that causes environmental damage (Article 3, IV). It is important to note that there is no statute of limitations for claims on environmental damage in Brazil.

At the judicial level, polluters in Brazil are subject to strict civil liability that is both joint and several. Where there is joint and several liability, any of the liable parties may be sued for the entire amount of damages. Therefore, one whose act contributes to pollution is not relieved from liability because such an act is not the sole cause of the damages.

Until 1998, criminal liability in Brazil had not affected companies, but solely individuals who owned and/or held management positions. However, the Federal Environmental Crimes Law (Federal Law No 9,605/98) provides criminal penalties against legal entities and individuals who violate its provisions regarding protection of natural resources and polluting activities.

The Federal Environmental Crimes Law regulates criminal liability for harming the environment. The law imposes criminal punishment on individuals (including officers, controllers, board members, managers and employees of legal entities) who participate in activities causing environmental damage. Environmental agencies may be held jointly liable should they fail to properly disclose an environmental violation after becoming aware of it. The law also provides for disregarding the corporate legal entity in any situation where such entity is a barrier to the recovery of damage to the environment.

According to the Federal Decree No 6,514 of 22 July 2008, administrative violations are punished with the following sanctions: (i) warning; (ii) simple fine; (iii) daily fine; (iv) confiscation of animals, fauna and flora products and by products, instruments, tools, equipment or vehicles of any nature used in the violation; (v) destruction of the product or rendering it useless; (vi) suspension of sale and manufacture of the product; (vii) embargo of construction or activity; (viii) demolition of construction; (ix) partial or total suspension of activities; and (x) restriction of rights. Pursuant to Federal Decree No 6,514/08, fines may range from R\$50 (fifty Reais) to R\$50,000,000 (fifty million Reais) (US\$26-26,000,000).

Federal and State District Attorneys as well as Brazilian non-governmental organizations (NGOs) registered with Brazilian public record offices have to sue polluters for damages in public civil action (similar to US class actions) regulated by Federal Laws No 7,347/85 and No 8,078/90. Although

individuals can not sue under Federal Law No 7,347/85, they may sue to recover personal damages under Brazilian nuisance and tort laws.

Further, it is relevant to mention that the transportation, handling, storage and final disposal of hazardous and/or dangerous substances may also be subject to the inspection, control and registration before the Ministry of Army (MA), Federal Police Department (FDP) or the Civil Police Department (CPD).²

4.3 Integrated policy and legislation

4.3.1 Licencing of transportation activities

PIPELINES

NEW PIPELINES:

The installation of pipelines for gases transportation may be subject to national or State level legislation, depending on the environmental impact and extension of the enterprise since the Federal jurisdiction is competent for the licencing of activities executed across the States. At the Federal level, the licencing for gases transportation is ruled by Brazilian National Council for Environment Resolutions (Conselho Nacional do Meio Ambiente, CONAMA)³ and shall be subject to the Brazilian Environmental and Renewable Natural Resources Institute (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis; IBAMA) inspection. The documents and licences requested for pipelines installation are determined in view of the environmental impact of the project, analysed under the Environmental Assessment Study and its report.

EXISTING PIPELINES:

Existing pipelines must remain in compliance with any permit or licence conditions established by Federal or state level, as well as pipeline safety regulations established by the Brazilian competent environmental and regulatory agencies which rule this activity.

ROAD AND RAIL TRANSPORT

The road transportation of hazardous products in Brazil is regulated in the rule which was approved by Federal Decree No 96,044/88 (the Rule). The transportation through public roads of products that might be hazardous or that represent any risk to human health, to the public safety, or to the environment is subject to this Rule.

Vehicles are required to carry the equipment set for emergency situations, as foreseen by Brazilian association of Technical Norms (ABNT) standards NBR 7503, 7504, and 8285 that deal with this

² The legislation which rules the Civil Police Department activities is issued by the municipalities and, in view of the existence of over 2,000 municipalities in Brazil such legislation will not be inserted in the report. For instance, the Municipality of São Paulo issued the Municipal Decree No 50,446 on 20 February 2009 to rule this subject. In relation to the Ministry of the Army, see for example Federal Decree No 3,365/00; and in relation to the Federal Police department, see for example Federal Law No 10,357/01 and Federal Decree No 4,262/02.

³ CONAMA Resolution No 01/86 provides in Article 2 that the environmental licencing of activities that may impact the environment including (v) oil pipelines, gases pipelines; minerals pipelines shall be subject to Environmental Impact Study (Estudo de Impacto Ambiental) and its respective Environmental Impact Report.

matter. Moreover, vehicles should follow the specific standards concerning signaling with labels and specific safety panels.

Article 10 of the Rule states that the shipper has the duty to inform the National Highway Department of the itinerary of a certain mode of transportation which is used with certain regularity. Article 9 states that vehicles transporting hazardous products must avoid the use of roads located in densely populated areas or near protected water sources, water reservoirs or forest reserves, or nearby areas. The driver of a vehicle transporting hazardous material should receive specific training in a program to be approved by the Federal Government. Moreover, Article 22 of the Rule states that compulsory documents should be carried on the vehicles used in the transportation of hazardous products. These are (i) the certificate of capability for the bulk transportation of hazardous products, (ii) the tax documents of the product transported, (iii) and the Emergency Sheet and Envelope for the transportation, as foreseen in ABNT standards NBR 7503, 7504, and 8285.

According to Article 30 of the Rule, it is the duty of the manufacturer of dangerous products to provide the information for caution to the transportation and handling, as well as those required for completion of the Emergency Sheet, and shall provide the specifications for packaging of the product.

TRANSPORTATION BY SHIP

Brazil is a party to the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL). The Convention was promulgated under Federal Decree No 2,508/98. This Convention deals not only with oil, but also with all forms of marine pollution caused by ships and there are some normative instruments enacted by National Congress to implement such issues, for example, Federal Law No 9,966/00 and Federal Decree No 4,136/02.

Federal Law No 9,966/00 establishes basic safety rules for the transport of oil and other hazardous substances. The Law defines a hazardous substance as any substance that may cause risks or damage to human health, marine ecosystems or impair water use. Therefore, it is understood that this law may apply to CO₂ transportation by ship. According to Law No 9,966/00, harbours and other similar installations must have emergency plans for pollution control, which must be approved by Environmental Agencies.

4.3.2 Planning

ZONING FOR TRANSPORT FACILITIES

Zoning for transport facilities must be carefully analysed and approved by Environmental Agencies. Such analysis will be performed in light of local zoning laws. According to Article 10 of Law No 6,938/81, the State Environmental Agency is the primary environmental licencing authority for any activity other than those licenced by the Union (for example, activities that affect two or more States). Nevertheless, CONAMA Resolution No 237/97 establishes that environmental licences will be granted by the Municipalities when an activity affects only one city. In this case, competent agencies of the State and Federal Union may also be consulted. However, few Municipalities have created the necessary infrastructure in order to be able to take on the licencing activities.

CONSTRUCTION AND BUILDING CODES

As mentioned above, the implementation of facilities is closely related to local zoning laws which must be observed. These laws include restricting the establishment of specific plants and activities and the

expansion of existing ones in certain areas. Any CCS policy must carefully consider existing land restrictions.

PIPELINE LICENCING REGIMES

According to information provided by Federal Environmental Agency, the licencing of pipelines is subject to a case-by-case analysis, depending on the circumstances of the project, without distinction between new and existing pipelines.

ENVIRONMENTAL IMPACT ASSESSMENT

Brazilian legislation requires that activities which may cause significant degradation to the environment (private or public) present environmental impact studies and reports (EIA/RIMAs) for licencing purposes, in accordance with Article 225, IV, of the Federal Constitution, CONAMA Resolution No 01/86, and IBAMA Resolution No 01/90. The EIA/RIMA must assess the potential environmental impact of the proposed activity and must propose measures to prevent, control, or reduce such impact.

The presentation of the EIA/RIMA is compulsory for certain activities, including oil and gas pipelines (CONAMA Resolution No 01/86 lists such activities and also provides for a set of conditions and requirements for the execution of the EIA/RIMA). However, the EIA/RIMA may also be required by the licencing authorities for other activities if they have a potentially significant environmental impact. The EIA/RIMA process may require a public hearing for comments and criticism from the affected community, non-governmental organizations, and other entities.

The EIA/RIMA process can require significant resources and be highly time-consuming. In addition, it is not uncommon to have projects (including public bids) suspended by court order due to the lack of an EIA/RIMA.

4.3.3 Access / tenure

NATURE OF PROPERTY INTERESTS CONFERRED

The nature of property interests is not provided by the law.

ESTABLISHING PRIORITY BETWEEN TRANSPORT AND EXISTING USES AND RIGHTS

The laws related to transportation do not establish priorities. This issue will be subject to a case-by-case analysis during the environmental licencing process. It is important to consider, however, that Federal Laws establish certain protected areas, where business activities are only authorised within special regimes. For example, Federal Law No 4,771/65 (the Brazilian Forest Code; BFC) establishes several rules regarding the preservation of natural vegetation, including provisions for areas which cannot be exploited at all, such as areas of permanent preservation, legal reserve areas and areas of environmental protection.

PETROLEUM AND RESOURCE EXTRACTION

The majority of the oil and gas prospecting, exploration, processing and transportation activities are subject to licencing and other environmental requirements. CONAMA Resolution No 01/86 lists the

following activities as being subject to the Environmental Impact Study for licencing purposes: (i) petroleum activities; (ii) oil pipeline and gas pipeline; (iii) fossil fuel extraction; and (iv) setting up of petrochemical complexes.

The monopoly of the oil and gas industry by the state-owned company Petrobrás was amended with the enactment of Constitutional Amendment No 09/95. However, the Petroleum Law (Federal Law No 9,478/97) maintained the government monopoly over crude oil, natural gas and other fluid hydrocarbon materials existing in Brazil. The Law also states that the activities listed in Article 177 of the Federal Constitution may be exercised by companies incorporated under Brazilian law, with head office and administration in Brazil, through concessions or authorisations. Article 44 of the Law requires concessionaires to adopt the necessary measures to preserve the reservoir and other natural resources and to implement other necessary actions to preserve the environment. During a bidding process, an Environmental Impact Study may also be required (Article 2, III, CONAMA Resolution No01/86).

The Petroleum Law includes, among its purposes, the protection of the environment and the promotion of energy conservation (Article 1, item IV). It also requires the National Petroleum Agency (ANP) to enforce environmental preservation actions (Petroleum Law, Article 8).

Any offshore seismic activity requires prior approval from the IBAMA, based on the general rules of environmental licencing set by the Brazilian legislation. An applicant for a seismic permit must demonstrate to IBAMA that the seismic activity may not cause any damage to the environment, or harm any local economic activity.

The construction, installation, modification, enlargement and operation of establishments related to oil and gas distribution, gas stations, retail systems, installation, and floating gas stations are regulated by CONAMA Resolutions No 273/00 and No 319/02, which established the need of prior licencing before the environmental protection agency.

Furthermore, CONAMA Resolution No 362/2005 establishes shared responsibilities between generators, producers, importers, collectors and re-refiners of used or contaminated lubricating oil for its proper and final disposal. According to the Resolution, importers and producers are jointly liable for actions or omissions performed by hired collectors and are subject to criminal, civil and administrative liabilities established by Federal Statute 9,605/98 and Federal Decree No 3,179/99.

FISHING

Brazilian laws and regulations comprise of a series of rules related to the protection of fauna including marine fauna. However, such laws may vary depending on the area to be exploited. IBAMA has enacted several regulations related to the specific species to be protected.

FAUNA AND FLORA, INCLUDING ENDANGERED SPECIES

Brazilian laws and regulations comprise of a series of rules related to the protection of fauna and flora. However, such laws may vary depending on the area to be exploited. IBAMA has enacted several regulations related to the specific species to be protected.

NAVIGATION

As mentioned above, Brazil is a party to the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL). Brazil has enacted some normative instruments to implement such issues, such as Federal Law No 9,966/00 and Federal Decree No 4,136/02.

MINING

Mining activities are mainly regulated by Federal Decree-Law No 227/67 (Mining Code). The mining activity is divided into three categories: (i) mineral research; (ii) plow; and (iii) prospecting for minerals, spark and search. All of these activities are subject to authorisation, licence, or concession regime, depending on the type of exploration. Specific licencing requirements for certain types of minerals are established by CONAMA Resolutions No 09/90 and No 10/90.

Licencing of certain mining activities may require an Environmental Impact Study and respective Environmental Impact Report subject to the approval of the State Environmental Protection Agency. Along with these assessments, the company is usually required to submit a plan to recover the degraded area (CONAMA Resolution No 01/86 and Article 225 of the Federal Constitution).

SUBSEQUENT USES

There are no specific requirements for subsequent uses, however, in some States, after the termination of the use of a site, the Company must present the decommissioning plan to the relevant Environmental Agency.

RIGHTS OF INDIGENOUS PEOPLES AND OTHER CUSTOMARY RIGHTS

Indigenous peoples in Brazil enjoy robust rights in respect of lands and waters. These are established in the Brazilian Federal Constitution, issued in 1988, and the Indian Statute, a Federal law issued in 1973 that remains in force to the extent that it does not conflict with the 1988 Constitution. Further requirements are established by Federal laws in connection with the environmental protection of natural resources and, in particular, forest management.

Brazilian Indian land is considered as the property of the Federal Union, while the Indians enjoy permanent possession rights. The treatment of Indians lands as “public assets” must be interpreted as a strategic instrument for the Government in order to assure the country’s sovereignty over the national territory along with recognizing to Brazilian Indians the right to survive and to preserve their culture, as well as to protect Brazilian biodiversity and indigenous traditional knowledge.

Consequently, the enjoyment by Brazilian Indians of property rights is subject to limitations established in Article 231 of the Brazilian Federal Constitution. This is because the Union does not have the rights of fruition related to the property. Those rights, concerning the usufruct over soil, rivers and lakes, belong to the Indians, who may, for example, undertake rural activities in these areas. While fruition rights are exclusively granted to the Brazilian Indians, the Union may only exploit water resources, including their use for energy purposes, and mineral assets, if previously approved by Federal Congress (art. 231, par. 3, Federal Constitution).

In view of this, the Brazilian Federal Constitution declares that the Brazilian Indians’ land and its fruition belong to the Brazilian Indians, who have the exclusive use of the soil and rivers within these lands. In this context, the irregular use of the Brazilian Indians’ land without authorisation is considered invalid.

In addition, according to Article 24 of the Brazilian Indians Statute, Brazilian Indians also enjoy exclusive rights to exploit natural resources which fall within their lands, which is consistent with Article 231, first paragraph of the Constitution, as mentioned above.

Furthermore, according to the Brazilian Federal Constitution, the land of Brazilian Indians is inalienable and is not disposable, meaning that Brazilian Indians cannot sell, lease or otherwise dispose of their lands and the rights of Brazilian Indians are not prescriptive. This means that, even though the Federal Union has proprietary rights, the lands of Brazilian Indians can not be sold or used for other purposes than that established by law.

In 2008, the Brazilian mining company VALE was ordered by a Federal Court to compensate Indians for the use of their areas, located in the State of Pará. The decision was based on the fact that the exploitation of mining activities impaired the use of the area by Indians for other purposes, such as rural activities. The company was ordered to pay R\$650,000 (approximately US\$334,000) per month to the Indian Community as compensation.

COMPULSORY ACQUISITION AND COMPENSATION REGIMES

Federal Law No 9,985/00 (SNUC) establishes that undertakings with a high level of environmental impact must support the implementation and maintenance of conservation units of the protection group based on its Environmental Impact Study. The environmental licencing authorities will establish the level of the environmental impact of an undertaking considering the Environmental Impact Study and respective Report, elaborated before the licencing procedure, considering the negative and non-mitigating impact on natural resources. The compensation to be paid by the undertaking is up to 0.5 percent of the total costs to implement the undertaking. The percentage will be defined by the competent environmental authorities responsible for the licencing of the undertaking and based on the expected environmental impact. The competent environmental authorities will also define which conservation units will benefit from the compensation based on the proposals presented in the Environmental Impact Study.

4.3.4 Environmental and other risks

LEAKAGE OF TRANSPORTED CO₂

The ordinance of the Ministry of Transport No 349/02 foresees procedures to be adopted in case of emergency, such as leakage of hazardous substances. It states that when an irregularity that may cause risk to people, goods or the environment occurs, the Public Inspection Agent must take adequate measures to fix such an irregularity and to determine, if necessary:

- the removal of the vehicle to a safe place, being able to authorise its movement to where the irregularity can be corrected;
- the unloading and transfer of goods to another vehicle or to a safe place; and
- the elimination of the hazard of the cargo or its destruction, under the guidance of the manufacturer or importer of the product and, when possible, with the presence of the representative of the insurance company.

While detained, the vehicle will remain under the custody of the authority responsible for the retention without prejudice to the responsibility of the carrier by the facts that gave rise to the retention.

In case of accident, damage or any other fact requiring the immobilization of the vehicle carrying hazardous products, the carrier shall:

- inform the authorities of the immobilization of the vehicle by accident or damage;
- take the measures indicated in the emergency form, informing the traffic authority or other near public authority, through the fastest way;
- to support and provide information requested by public authorities.

It also foresees that, except if specialized personal are available, the transport inspection team must not try to control the occurrence alone.

POLLUTION – NOISE, AIR AND WATER

NOISE

CONAMA Resolution No 01/90 and CONAMA Resolution No 02/90 establish Brazilian Federal Noise Level requirements. These regulations incorporate Brazilian Technical Standards NBR 10151 (Noise Assessment in Inhabited Areas, Aiming at the Community's well-being) and NBR 10152 (Noise Levels for Acoustic Comfort - Procedures), issued by ABNT - Brazilian Association of Technical Standards.

Both standards provide for noise limits and assessment procedures for different activities and different locations. In addition, Federal regulations authorise the state and municipal authorities to impose noise limits that are more stringent than those indicated in NBR 10,151 and 10,152, when necessary.

AIR

Federal laws and some State laws establish air quality and emission standards, taking into account the concentration of atmospheric pollutants that may affect public health, safety and the physical environment in general. CONAMA Resolution No 005/89 sets the National Air Quality Monitoring Program (PRONAR). Such Program provides for primary and secondary air quality standards and classifies different regions of the country in order to prevent significant deterioration. Class I areas are those with pristine air quality and which should have no air quality impact; Class II areas must be limited by secondary air quality standards; and Class III regions must comply with primary air quality standards.

CONAMA Resolution No 03/90 complements PRONAR by establishing primary and secondary standards for total suspended particulate, smoke, free particulate, sulfur dioxide, carbon monoxide, ozone, and nitrogen dioxide. It also establishes sampling and analysis methods for the pollutants mentioned herein. The States are responsible for monitoring these programs.

CONAMA Resolution No 08/90 establishes emission standards for external combustion processes at new stationary sources with nominal power of 70 megawatts and higher. New stationary sources are defined as those that burn combustible substances in electric power plants, steam generators, boilers, stoves, ovens, furnaces and heat generation dryers as well as incinerators, among other things.

The substances that are regulated by this resolution are: total particulate matter, sulfur dioxide, calorimetric density, and consumption of fuel oil. Emission standards may vary depending on whether the nominal power generated is more or less 70 megawatts. States may establish their own air emission standards, but they must be equal to or more stringent than those established by Federal regulation. Compliance with such standards may be verified by environmental protection agencies by

the time of the issuance of the Operating Licence. In addition, licencing authorities have the authority to establish new or more stringent standards to a given company case by case.

WATER

Businesses operating in Brazil that discharge liquid effluents are subject to Federal and State government environmental control. CONAMA Resolution No 357/2005 sets the standards for effluent, maximum levels of pollutants and the flow regime. Governmental water quality standards differ according to water suitability. Brazil's water quality standards cover a broad range of pollutants and substances, including oil, fecal coliforms, dissolved oxygen and various toxins. The use of specific segments of streams and water bodies are designated by governmental agencies having jurisdiction over certain water bodies.

Some Brazilian States, including the State of São Paulo, have established supplemental standards that exceed Federal minimum standards. In case of conflict, the more restrictive standards shall apply. The State Environmental Protection Agency may impose even stricter standards to a given company if the body of water receiving the effluent is already contaminated, or as a result of peculiar characteristics of the company's process and wastes.

In addition to the criminal law provisions regarding potable water contamination, Article 24 of CONAMA Resolution No 20/86 forbids the discharge of liquid effluents that are not in compliance with the standards of regulations in force.

Furthermore, Article 51 of State of São Paulo Decree No 8,468/76 forbids the deposit, disposal, discharge, burial, infiltration of pollutants into the soil in any manner. Also, Article 5 of the São Paulo State Law No 6,134/88 prohibits any form of groundwater pollution.

WASTE

The generator is responsible for the proper, final disposal of hazardous and non-hazardous waste. Federal and State regulations require that waste transportation, treatment and disposal (whether solid, hazardous, non-hazardous or medical) must be subject to the prior approval of a state environment protection agency (Federal Regulation No 053/79). In some cases, companies may temporarily store waste at their facilities under state approval and supervision. In the State of São Paulo, the approval for waste disposal is made by CETESB through a Certificate of Approval - Disposal of Industry Waste - "*Certificado de Aprovação - Destinação de Resíduos Industriais - CADR*", which contains the qualifications of the waste generator, transporter, and site disposal.

Some bills of law on waste management policies are under discussion at the State level. In the State of São Paulo, for example, the House of Representatives is analysing three different bills of Law regarding the disposal of solid residues. In the State of Rio de Janeiro, by its turn, the State Law No 4,191/03 established the State Policy for Solid Residues.

OCCUPATIONAL HEALTH AND SAFETY

Under Brazilian labor law (Decree-law No 5,452/43; CLT) and health and safety regulations approved by Regulation No 3,214/78, there are several provisions requiring workers to be informed of the characteristics, potential risks, first aid measures and other information related to hazardous chemicals or materials used in a facility. Several regulations establish requirements for hazardous and unsafe occupations.

The Ministry of Labor has issued several Regulations related to the health and safety of workers. Four of the most important are: Regulation NR 6 related to Individual Protection Equipment; Regulation NR 7 related to Programs of Medical Control of Occupational Health; Regulation NR 9 Programs to Prevent Environmental Risks and Regulation NR 15, which defines as hazardous activities those that: (i) are carried out above the limits of tolerance established for exposure to noise, heat, cold, humidity, chemical agents, ionizing and non-ionizing radiation, vibration and mining dust; (ii) are developed under hyperbaric conditions; (iii) involve exposure to chemical agents other than those with tolerance limits established by the same regulation, but that are considered hazardous based on an assessment of the working conditions; and (iv) involve exposure to certain biological agents.

Also, employers must carry out periodical medical exams on their employees. All industrial facilities must have their installations approved and registered within the Ministry of Labor and may be periodically subject to regulatory inspections. Non-compliance with these rules may subject a company to fines and, occasionally, to a temporary suspension of activities.

THREATENED/ENDANGERED SPECIES

Brazilian laws and regulations comprise of a series of rules related to the protection of fauna and flora. However, such laws may vary depending on the area to be exploited. IBAMA issues periodic lists of threatened/endangered species. The impact to such species is usually appreciated during the licencing proceeding. In such cases, compensation measures may be required by the Environmental Protection Agency.

MIGRATORY SPECIES

Brazilian laws and regulations comprise of a series of rules related to the protection of fauna. However, such laws may vary depending on the area to be exploited.

5. Transport of CO₂

5.1 General policy and legislation specific to transport of CO₂

According to the Ordinance No 207/97 of the Ministry of Transport, CO₂ is included in the list of hazardous products for transportation and classified as Risk Class No 2.2 - Non-flammable, Non-toxic gas. During operations, packages must be handled with extreme care and, if possible, without being turned. Chemically unstable gases can only be transported if necessary measures to prevent destabilization during transport are taken.

It is also required to include the appropriate name of the substance or product to be transported in the transport document and the packages containing the products to ensure that the substance can be quickly identified during transport. According to the Ordinance No 207/97, the appropriate name to be used for CO₂ is its Portuguese name: *dioxido de carbono*.

Furthermore, the ordinance stipulates that, for quantities equal to or below 333Kg of CO₂, regardless of the size of packaging, the following requirements are excused:

- labels of risk and security panels affixed to the vehicle;
- presence of personal protection equipment and equipment to attend to emergencies, except fire extinguishers;
- limitations on the route, parking and places for loading and unloading;
- specific training for the driver of the vehicle;
- carrying a sheet of emergency; and
- prohibition of driving passengers in the vehicle.

It is necessary to mention that certain regulatory requirements remain valid, especially those concerning:

- precautions for handling (loading, unloading, stowing);
- provisions relating to the packaging of products and their marking and labeling; and
- the inclusion, in the documentation of carriage, of the appropriate name and number for loading, class or subclass of the product, indicating that it is exempt amount and declaration of conformity with the regulations, signed by the consignor.

STAKEHOLDER ENGAGEMENT

PUBLIC CONSULTATION

As mentioned above, Brazilian Federal legislation sets forth that activities which have relevant environmental impact shall be identified in a relevant EIA/RIMA. These reports are requested by the competent authority for the environmental licencing, which shall provide copies of these documents to other organs of public administration for comments and also to determine a deadline for receiving comments from third parties (civil society, NGOs, sectoral associations, among others). Public

hearings for discussion of EIA/RIMA may be held at the request of either a relevant District Attorney's Office, citizens (over 50 people) or civil entities, or at the discretion of the environmental agency.

LEGAL CHALLENGE

Administrative procedure codes for most Brazilian States and certainly for the Federal government contain mechanisms by which stakeholders can mount a legal challenge to State action with respect to the licencing or permitting of major projects. Under the Federal Law No 9,478 of 29 of January 1999, Article 53, the decisions issued by the public administration may be questioned through an administrative proceeding and "the Public Administration shall annul their acts, whenever any illegality is detected and may revoke these by reasons of convenience or opportunity, respecting the vested rights".

6. Exploration of potential CO₂ storage sites

As already mentioned, in Brazil, there is no CCS-specific policy and legislation. Therefore, exploration of potential CO₂ sequestration, as well as injection of CO₂ and closure activities, would be governed by the laws related to prevention and control of environmental impacts and possibly by mining laws. Moreover, these activities would be subject to the environmental licencing process and, as a result, the Environmental Agency in charge would foresee specific requirements for the development of the activity. As this type of activity may be understood as a practice which may cause significant degradation to the environment, the Environmental Agency would probably require the presentation of an EIA and the compensation of the impacts through the creation or maintenance of a conservation unit, as detailed above.

Additionally, mining regulations may also apply to a project, mainly the provisions of the Mining Code (Decree-Law No 227/67). All activities regulated by the Mining Code are subject to authorisation, licence, or a concession regime, depending on the type of exploration. In addition to the Mining Code, Federal Law No. 6,567/78 also provides for licencing requirements related to mining activities.

From a mining perspective, the licencing proceeding may bring about limitations to the activity based on the principles which guide mining activities in Brazil: (i) supremacy of the public interest (the activity must be aligned with public policies); (ii) global result (the project must be analyzed by considering environmental, economic and social conditions); (iii) full recovery of the environmental damage; and (iv) ethical content (mineral resources belong to the collectivity and, therefore, cannot be wasted). Such principles would guide the activity from its commencement through post-closure activities.

Finally, it is relevant to point out that mining licences or authorisations are additional to the environmental licence, meaning that the entrepreneur must face both proceedings, which are carried out before different authorities.

7. Injection and pre-closure of CO₂ storage formations

See Section 5 above for the application of environmental impact and mining laws. In Brazil, there are no laws relating to the underground injection of hazardous waste that could be extended to the injection of CO₂ in a CCS project.

8. Post-closure and long-term storage of CO₂

As mentioned, there are no specific laws and regulations related to CCS projects in Brazil, meaning that general environmental laws would likely be applicable to this type of activity. Moreover, after injection activities are performed, post-closure and storage would likely be governed by the conditions established by the environmental licence. The agency in charge may establish monitoring and control measures, such as periodic assessment of soil and underground water in order to verify their conditions. For the definitive termination of the environmental licencing proceeding, the agency may also require specific reports to demonstrate the compliance with compensation measures as well as the environmental conditions of the area. It is important to note that, even after the closure of the site, the entrepreneur will be liable for the damage caused by the activity.

9. Summary

As mentioned above, in Brazil, there is currently no CCS-specific policy and legislation and therefore CCS would be governed by existing policy and legislation on environmental, health and safety protection.

Given the main concern of forestry related issues in Brazilian society, a future CCS policy may have to take matters such as forests' preservation into consideration.

10. References

10.1 Legislation, regulations and international material

10.1.1 International material

United Nations Framework Convention on Climate Change, opened for signature 9 May 1992, 1771 UNTS 107 (entered into force 21 March 1994).

Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, opened for signature 29 December 1972, 1046 UNTS 138 (entered into force 30 August 1975).

International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978, opened for signature 17 February 1978, 1340 UNTS 62 (entered into force 2 October 1983).

Kyoto Protocol to the United Nations Framework Convention on Climate Change, opened for signature 11 September 1997 2303 UNTS 148 (entered into force 16 February 2005).

10.1.2 Legislation and regulation

Amazon State Law No 3135) on 5 June 2007.

ANEEL Resolution No 456 of 29 November 2000.

Bill of Law No 1,657/2007.

Bill of Law No 494/2007.

Brazilian Federal Constitution.

CONAMA Resolution No 362/05.

CONAMA Resolution No 357/05.

CONAMA Resolutions No 319/02.

CONAMA Resolutions No 273/00.

CONAMA Resolution No 237/97.

CONAMA Resolution No 10/90.

CONAMA Resolutions No 09/90.

CONAMA Resolution No 08/90.

CONAMA Resolution No 03/90.

CONAMA Resolution No 02/90.

CONAMA Resolution No 01/90.

CONAMA Resolution No 005/89.

CONAMA Resolution No 20/86.

CONAMA Resolution No 01/86.

Federal Decree No 6,514/08.
Federal Decree No 5445/05.
Federal Decree No 5, 177/04.
Federal Decree No 144/02.
Federal Decree No 4,136/02.
Federal Decree No 4,262/02.
Federal Decree No 3,365/00.
Federal Decree No 3,179/99.
Federal Decree No 2652/98.
Federal Decree No 2,508/98.
Federal Decree No 2, 335/97.
Federal Decree No 96,044/88.
Federal Decree No 227/67.
Federal Law No 10,848/06.
Federal Law No 10,357/01.
Federal Law No 9,985/00.
Federal Law No 9,966/00.
Federal Law No 9,478/99.
Federal Law No 9,605/98.
Federal Law No 9,478/97.
Federal Law No 8,078/90.
Federal Laws No 7,347/85.
Federal Law No 6,938/81.
Federal Law No 4,771/65.
Federal Regulation No 053/79.
Federal Regulation No 3,214/78.
Municipal Decree No 50,446/09.
Ordinance No 207/97 of the Ministry of Transport.
Ordinance No 349/02 of the Ministry of Transport.
São Paulo State Law No 6,134/88.
São Paulo Decree No 8,468/76.
State of Rio de Janeiro Law No 4,191/03.

10.2 Other sources

Relatorio do inventario estadual de fontes fixas emissoes de CO₂ – fontes industriais - combustiveis fosseis, available at: http://www.cetesb.sp.gov.br/arquivos_default/100co2.pdf.

Brazilian association of Technical Norms (ABNT) standards available at: <http://www.abnt.org.br/default.asp?resolucao=1280X1024>.