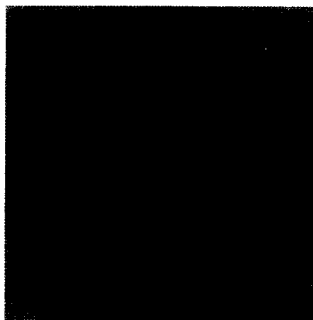


INTER-AMERICAN DEVELOPMENT BANK



BRAZIL

TECSIS
(Wind Power Technology)
(BR-L1173)

ENVIRONMENTAL AND SOCIAL MANAGEMENT REPORT
(ESMR)

July 2008

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Environmental and Social Management Report (ESMR)**

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I INTRODUCTION

- 1.1. TECSIS Tecnologia e Sistemas Avançados Ltda. (TECSIS or the Company) is a leading manufacturer of rotor blades for wind power turbines, expected to deliver to its clients in the current year blades representing electricity generation capacity of 4350 MW. Established in the city of Sorocaba, state of São Paulo, Brazil, TECSIS has expanded its fixed assets by more than six times since December 2004. This brisk growth was financed with medium-term debt obtained from commercial banks under financing structures where security arrangements have severely limited the Company's ability to obtain additional financing to meet continued production and sales growth.
- 1.2. The very rapid growth of the wind power industry, and the Company's success in expanding sales to existing and to new clients, implies an ability to continue growing at a rapid pace. Also, technological progress in the industry implies a need to create production capacity for longer rotor blades. Based on this, the Company is seeking to significantly extend the tenor of its existing debt and is implementing a capital expenditure program in 2009, primarily to install new production lines.
- 1.3. The proposed IDB A/B loan will allow the Company to achieve a debt structure more consistent with its sales and asset growth. The US\$120 million financing will refinance debt that will come due in 2008 and 2009, as well as finance a portion of the Company's 2009 working capital needs, making it less dependent on short-term financing. Cash flows that are currently utilized for debt service will be stretched over the tenor of the new IDB A/B loan, enhancing the Company's financial status and partially funding the Company's capital investments. The capital investments for 2008-9 include establishment of new rotor blade production lines for current and new customers in order to supply the growing market for custom-made rotor blades, and investments to maintain the Company's position as one of the most efficient and competitive producers in the wind power rotor blade industry.
- 1.4. The Project under consideration is essentially a debt-restructuring operation that does not involve construction or implementation of any infrastructure or civil works and is expected to have minimal environmental and social impacts.
- 1.5. The Environmental and Social Impact Review (ESR) cleared the Environmental and Social Strategy (ESS) for the Project on March 10, with the Project being classified as a Category C operation per the IDB Environment and Safeguards Compliance Policy. No further assessments or actions were required by ESR.
- 1.6. In fact, the Company's activities are integrated in a sector that presents significant environmental benefits. Wind power is a renewable source of energy, and exploiting renewable sources of energy avoids environmental impacts, risks and hazards associated with other sources, such as fossil fuels. Strategically, the use of wind power as an alternative or complementing source of energy contributes to diversification of fuel sources and lessens the dependency on oil.
- 1.7. Taking these environmental benefits into account, IDB's analysis has been partially supported by the Sustainable Energy and Climate Change Initiative (SECCI). The Technical Cooperation (TC) helped finance a market study on the global wind power sector, the trends of the industry, the competitiveness of the Company relative to other players in the wind

power sector and an evaluation of environmental and social impacts and risks associated with Company's existing operations and facilities.

- 1.8. Nevertheless, there may exist some limited environmental risks associated with Company's existing facilities and operations, which go beyond the Project that is being considered for financing by IDB. Therefore, the main potential environmental, social, health and safety and labor risks associated with the transaction will be those related to Company's existing operations and facilities, as well as to some of the new projects being planned or developed by TECSIS. These risks were also evaluated during the Environmental and Social Due Diligence (ESDD) developed by IDB.
- 1.9. IDB performed the ESDD to assess the potential environmental and social viability of the Project in terms of Bank policies and requirements. Since there are minimal impacts related to the Project, the ESDD focused significantly on potential risks related to possible impacts associated with the Company's activities and existing facilities, which are not part of the IDB financing. The ESDD included: (i) review of Company's main activities and relevant existing facilities to identify possible liabilities associated with environmental and social, health and safety, and labor impacts and risks; (ii) assessment of Company's commitment, capacity, and systems to adequately address these matters, applicable licenses, and environmental, social and health and safety management procedures, to manage both present and future impacts and risks; and (iii) development of an environmental, health and safety action plan to implement any recommended actions identified as part of the ESDD.

II EXISTING FACILITIES AND OPERATIONS

A. Main Facilities and Production

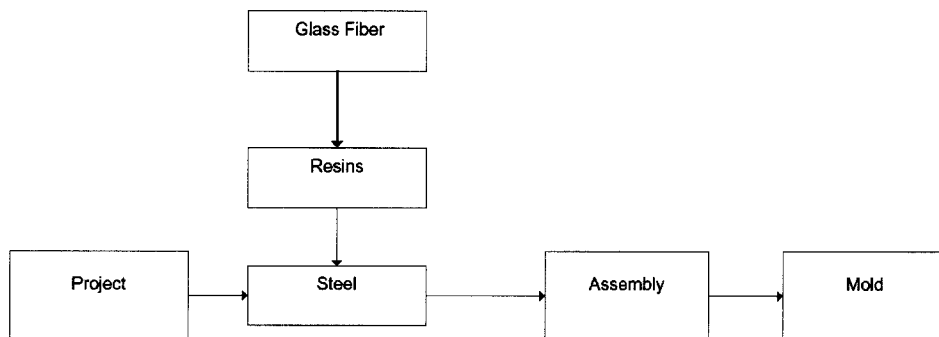
- 2.1 Since its inception in 1995, TECSIS has been a supplier of blades and nacelles⁽¹⁾ to the wind energy sector, and also supplier of ventilation equipment for the mining, industrial and construction sectors. As a leading manufacturer of wind turbine blades, in 2008 TECSIS is providing its clients with blades for installed production capacity of 4350 MW, and also manufactures equipments and turnkey solutions for cooling and ventilation applications with an installed base of over 3000 fans operating worldwide.
- 2.2 Currently, TECSIS is one of the largest manufacturers of blades and nacelles for wind turbines in the country and exports its entire production to countries in North America, Europe and Asia. To maintain its position, TECSIS has eight facilities – a new one has been constructed - and a Distribution Center, with a combined area of 526,672.08 m², located in the municipality of Sorocaba (SP) (see Annex 1 and Table 1). TECSIS also has two areas of land in Guarujá (SP) and Sorocaba, with 169,477.97 e 84,687.84 m², respectively, for the storage of blades storage and future expansion.
- 2.3 The blades are the most critical components of the wind power generator, being that the efficiency of the generator depends mainly on the project and production of these parts. The choice of the appropriate material is also an important factor. Parts manufactured by TECSIS

(1) A wind turbine consists of three basic parts: the tower, the nacelle, and the rotor blades. The nacelle is a shell that contains the inner workings of the wind turbine. Made of fiberglass, the nacelle contains the main drive shaft and the gearbox.

(blades, nacelles and molds) are made of glass fiber and resin. The selection of these materials is due to their high strength and sturdiness for its density, being lightweight and offering good resistance to corrosion, weathering and abrasion.

- 2.4 All parts are manufactured according to a specific project from each client and the molds are developed in Unit 8. The technology behind designing and building these molds is therefore crucial for the quality of the finished blades. Building a new blade mold begins by design and construction a full-scale model with the exact shape of the final blade (**Figure 1**).
- 2.5 The blades for the wind generators are manufactured through the use of a combination of systems for vacuum infusion of resin, in which more than 6 tons of composite material is processed, with parts which vary between 34 and 49m in length and can produce up to 2.5 MW of clean energy (**Figure 2**). The vacuum resin infusion process is performed in Units 1, 3, 7, 9 and 10. On Unit No. 8, the process begins with the lamination of parts with fiberglass and epoxy resin, edge trimming and finishing, subsequently been cured in a stove with a 15 kW power (**Figure 3**).
- 2.6 The manufacturing process for the nacelles is performed on Unit 2, and consists basically of lamination of epoxy resin, as per workflow shown on **Figure 4**.
- 2.7 The equipment for Industrial fans are produced in Unit 4, with an estimated annual production of 2,400 blades of composite material, the assembly of 360 sets of cubes (metallic base for the fans), and assembly of 60 sets of industrial fans per year. TECSIS manufactures fans from up to 1350 HP, with airflow of up to 160 m³/s and static pressure of up to 500 mmWG⁽²⁾.

Figure 1: Process Workflow - Mold and Development (Unit 8)



(2) wind pressure in mm of water gauge.

Figure 2. - Process Workflow - Blade Production Unit (Units 1, 3, 7, 9 and 10)

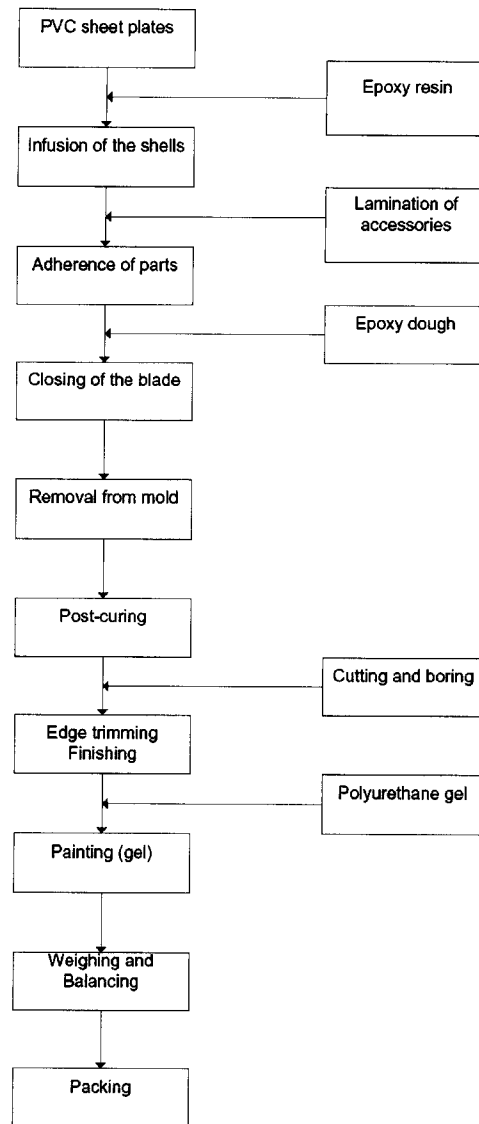


Figure 3. - Process Workflow - Blade Production Unit (Unit 8)

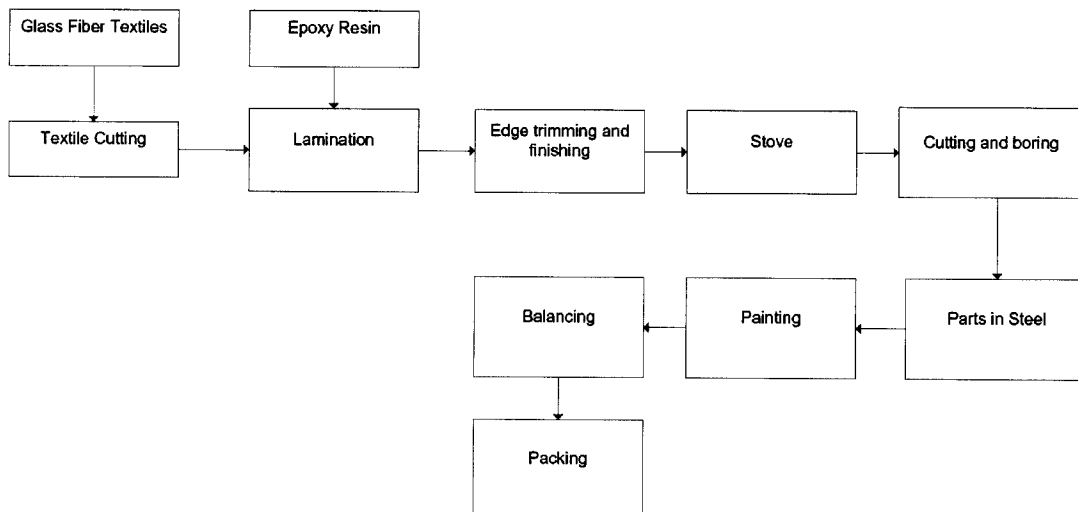
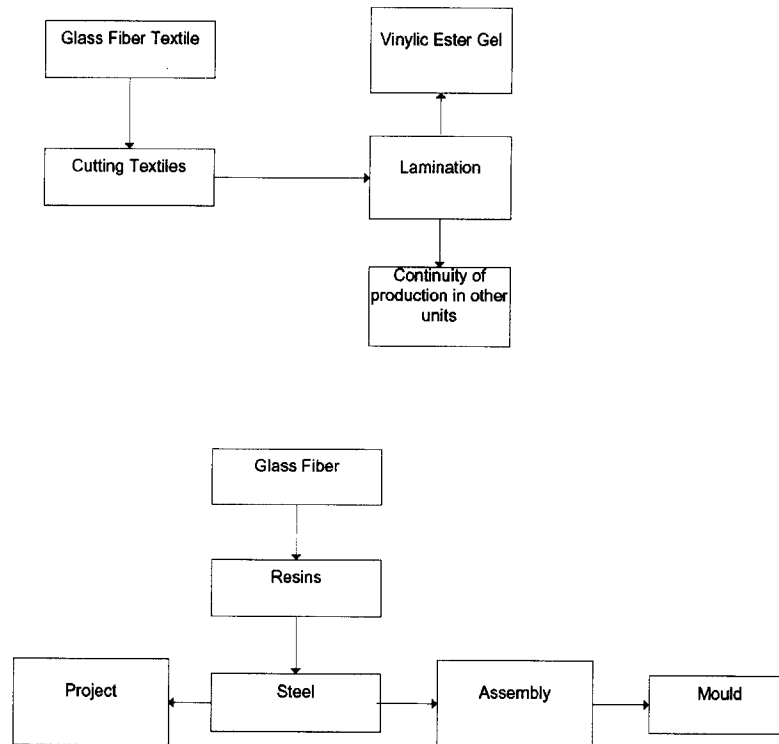
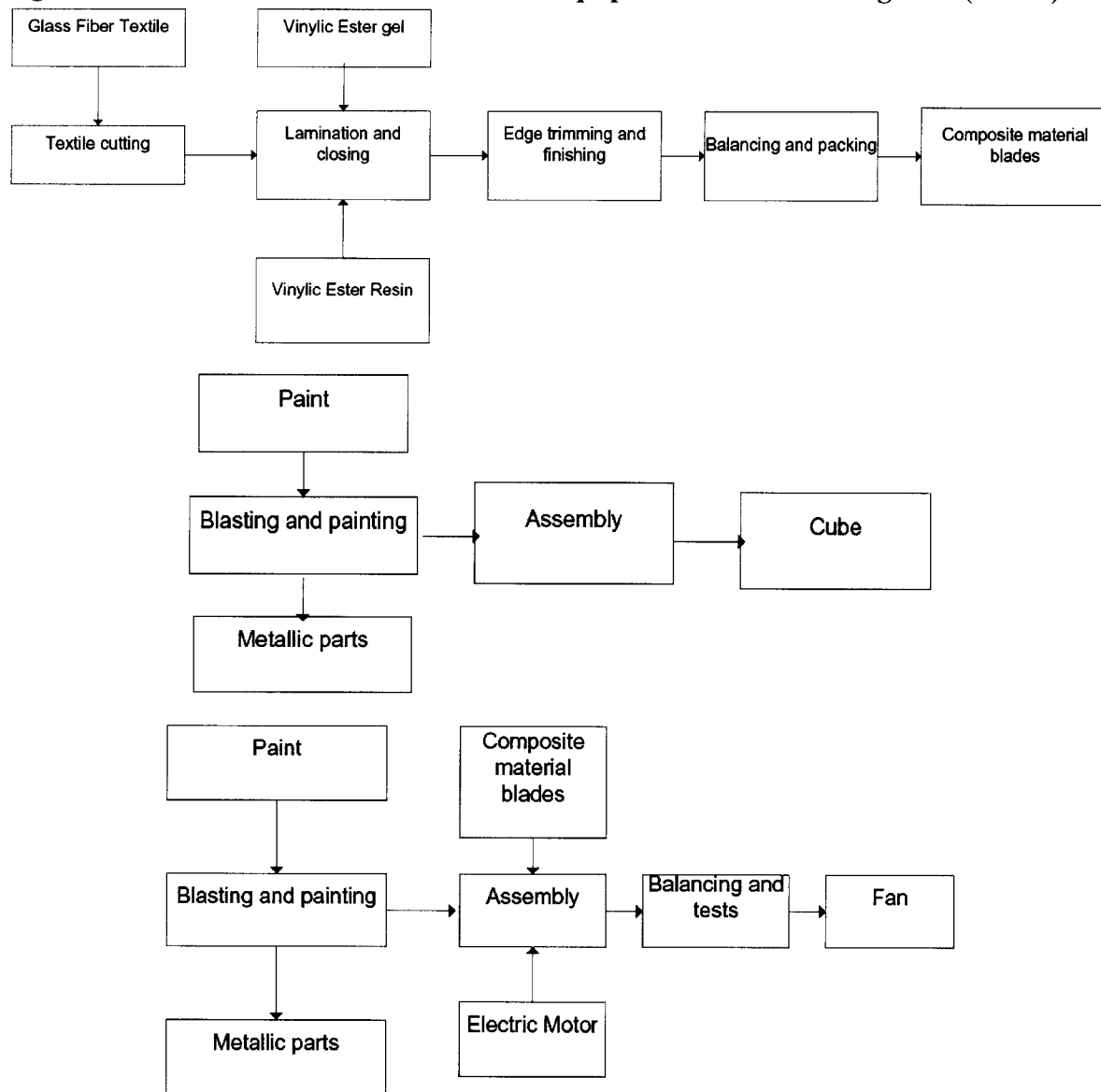


Figure 4. - Process Workflow - Nacelle Production Unit (Unit 2)



- 2.8 The blades are manufactured by laminating glass fiber with a vinyl ester gel and vinyl ester resin, and subsequent edge trimming and finishing. All fans are assembled in the same unit, after sandblasting and painting of the metallic parts (**Figure 5**).

Figure 5. - Process Workflow - Ventilation Equipment Manufacturing Unit (Unit 4)



- 2.9 TECSIS industrials fans are supplied to road tunnels, subways, mining, air conditioning towers, and cooling in petrochemical applications. The blades, made of composite materials and/or aluminum, are protected against corrosion, erosion and UV rays. Materials such as carbon and aramid⁽³⁾ fibers are used in special cases. Hubs are made of carbon steel, stainless steel or aluminum.
- 2.10 TECSIS further has a Distribution Center, in a 262,289 square meter land area with 3743 square meters building area, to store raw materials, as well as a land area in Sorocaba to store wind generator blades.

(3) **Aramid** fibers are a class of heat-resistant and strong synthetic fibers. They are used in aerospace and military applications, for ballistic rated body armor fabric, and as an asbestos substitute. The name is a shortened form of "aromatic polyamide". They are fibers in which the chain molecules are highly oriented along the fiber axis, so the strength of the chemical bond can be exploited.

B. Environmental Licensing Compliance

- 2.11 The Company has in place and valid environmental operating licenses and permits required by law, or are in the process of obtaining for some more recent facilities.

III. ENVIRONMENTAL AND SOCIAL CONDITIONS

A. Physical Environment

- 3.1 The city of Sorocoba is found in the Southwestern region of the state of São Paulo, 87 km from the city of São Paulo, bordering Porto Feliz in the north, Votorantim in the south, Mairinque in the east, Itu in the northeast, Araçoiaba de Serra in the west, Salto de Pirapora in the southwest and Iperó in the northwest.
- 3.2 Regarding the prevailing climate, the city has an average high temperature of around 30°C in the summer and an average low temperature of 12°C in the winter. The average annual precipitation is 1350mm and around 80 percent of that occurs between October and March. The predominant winds come from the East to South quadrant. Similarly to other nearby regions in the state, the relative humidity during the dry period may reach as low as 15 percent, mainly during the month of September.
- 3.3 The municipality of Sorocoba is located exactly on top of the *Bacia Sedimentar do Paraná* (Paraná Sedimentary Basin) and crystalline basement rocks. In geomorphologic terms, Sorocoba is located on the border of the *Depressão Periférica Paulista* (Paulista Peripheral Depression), and has a slightly bumpy relief, characterized as a plain, with altitudes in the urban region varying from 574 m to 642 m.
- 3.4 Regarding water resources, Sorocoba is in the *Unidade de Gerenciamento de Recursos Hídricos* (Water Resources Management Unit) - UGRHI-10, Sorocoba/Médio Tietê, which encompasses 34 municipalities, 16 being in the basin of Médio Tietê, and 18 being in the basin of the Sorocoba River. The basin of *Médio Tietê* includes the stretch of the Tietê River from the Pirapora Reservoir to the Barra Bonita Dam, extending 367 km, involving a drainage area of approximately 6830 km². The main tributaries are the rivers Jundaí, Capivari, and Piracicaba, belonging to the UGRHI-05 on the right bank, and the Sorocoba River on the left bank.

B. Biotic Environment

- 3.5 The region of Sorocoba presents an extensive urbanized area, around 294 km², constantly growing, and has few areas of vegetation in the core of the city (squares and parks). The majority of the rural areas are occupied by cattle raising, and to a less extent, by food plantations, pines, and eucalyptus. The agricultural census done by IBGE in 2006 identified 9466 hectares of agricultural land, only 915 hectares being occupied by areas of woods and forests.
- 3.6 The location of greatest significance in terms of native vegetation in the administrative region of Sorocoba is located in Iperó, about 30 km from the center of the city. In accordance with Federal Decree N. 530/92, the National Forest – FLONA Ipanema, established approx.

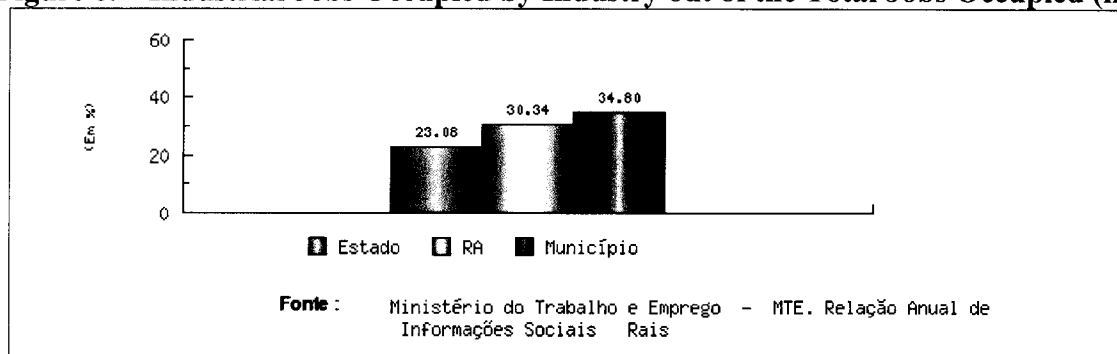
5069 ha of protected area, which is divided between stationary semi-deciduous forest, tall bush lands, savanna, low second-growth bush lands, and flood plains.

- 3.7 The fauna of the region is not greatly represented, due to the intense urbanization and occupation of agricultural/livestock activities. Because of its rich forest, the FLONA Ipanema is the location with the greatest concentration of animals in the region, sheltering 52 species of mammals, 218 species of birds, 18 species of amphibians, 15 species of reptiles, and 35 species of fish, which live in this territory, representing 21.6 percent of the fauna found in the state of São Paulo.
- 3.8 The TECSIS units are located in urban areas, more specifically in industrial zones; therefore there are no conservation units in its area of influence.

C. Human Environment

- 3.9 The City of Sorocaba has a population of approx. 610,000 inhabitants (IBGE, 2007), distributed over an area of 456 km², being 249 km² of urban area and 207 km² of rural area. It is the third most populated community in the São Paulo hinterland, and is part of the *Macrorregião Metropolitana de São Paulo* (Great Metropolitan Region of São Paulo). It is currently going on a procedure in the Legislative Assembly of the State of São Paulo, Complementary Law Project nº 33/2005 which creates the Metropolitan Region of Sorocaba, made by grouping the municipalities: Alumínio, Araçoiaba da Serra, Cabreúva, Capela do Alto, Iperó, Itu, Mairinque, Piedade, Porto Feliz, Salto, Salto de Pirapora, Sapuraí, São Roque and Votorantim. Together, these communities have a population of around 1,310,000 inhabitants (IBGE, 2006).
- 3.10 Sorocaba is mainly accessed through the airport, *Aeroporto de Sorocaba Bertram Luiz Leupolz*, or through highways that interconnect urban centers to other cities registered in the metropolitan region of Sorocaba.
- 3.11 Nowadays Sorocaba represents the fifth city that takes part in the economic development of the State, counting in 2006 about 1700 installed industries, 15,300 commercial units, 9900 services, and 25,000 self-employed workers, generating a GDP of approx. R\$ 9.2 billion.
- 3.12 The industry is spatially concentrated and includes from the traditional spinning and textile sector to aeronautical components. In recent years, new companies from diverse types of industries, especially those capital intensive were installed in the region, attracting diverse chains of suppliers. The industrial sector in the region accounts for a significant part of the city, with around 35 percent of the workforce in Sorocaba active in this sector (**Figure 6**).

Figure 6. – Industrial Jobs Occupied by Industry out of the Total Jobs Occupied (in %)



Source: SEADE, 2003.

Green: State, **Red:** Sorocaba Region Administrative (*Região Administrativa de Sorocaba*), **Blue:** Municipality.

Source: Ministry of Work and Employment, Annual Register of Social Information (RAIS).

- 3.13 Regarding municipal zoning, nine divisions are established on the Master Plan, which regulates types of activity according to the current use in the area. They are: (i) Central Zone (ZC) – area that concentrates on commercial and service activities; (ii) Predominantly Institutional Zone (ZPI); (iii) Residential Zones 1, 2, and 3; (iv) Industrial Zone (ZI); (v) Special Activities Zone (ZAE) - regions of transition between industrial, residential, and institutional use, which should be green and wooded areas; (vi) Urban Ranch Zone (ZCH), areas not intending to make use of the public sewer system, where only lots with the area over 1000 m² are permitted, and (vii) Environmental Conservation Zone (ZCA).
- 3.14 It is emphasized that all of TECSIS units in Sorocaba are in the Industrial Zone (ZI). This zone is made up of areas with industrial concentration already established and areas that are meant for expansion of these activities. The standards for division of land, use, and occupation of soil are indicated in the Master Plan for Development of the Physical Territory of the Municipality of Sorocaba⁽⁴⁾, as follows: “(i) reserve land exclusively for the implementation of large industries and correlating installations; (ii) define distance and retreat with the goal of safety and the reduction of neighborhood conflicts; (iii) make circulation and operation of loading and unloading of large vehicles possible without conflict with general traffic”.

IV ENVIRONMENTAL AND SOCIAL IMPACTS, RISKS AND MITIGATION MEASURES

- 4.1 The Company’s facilities are located away from any conservation or indigenous areas, and the land acquisition and preparation process did not require or involve relocation of people. Thus, TECSIS’s facilities and operations do not: (i) convert or degrade critical natural habitats or damage critical cultural sites; (ii) significantly convert or degrade natural habitats; (iii) raise any significantly negative indigenous issues; and (iv) generate any resettlement issues.
- 4.2 The main potential environmental, social, health and safety impacts and risks associated with the existing facilities and operations are related to: (i) generation of noise and vibration; (ii) emissions of odorous substances and other air contaminants; (iii) discharge of liquid effluents; (iv) disposal of solid wastes; and (v) risks of accidents with workers in the working

(4) Municipal Law 8.181 of 06/05/2007.

environment. Also, some of the future projects being planned by the Company may entail impacts typically associated with small to moderate size industrial facilities.

- 4.3 These risks are expected to be of limited magnitude, as the Company has some procedures and systems to manage these risks, which include: (i) capacity and commitment to address and manage environmental matters; (ii) an environmental policy in place and specific procedures and resources to address environmental, social and health and safety impacts and risks; (iii) equipment and units to treat air emissions and liquid effluents, and some procedures to handle and dispose wastes generated; and (iv) provision of all the necessary personal protective equipment for the workers and specific training. It should further be pointed out that TECSIS's units have ISO certification 9001:2000.
- 4.4 Besides the very relevant environmental benefits related to TECSIS activities highlighted in **Paragraph 1.6**, other positive social impacts associated with the Company's activities are related to the offer of jobs in the region, increase in the income of local population and tax revenues for the municipality (TECSIS currently employs more than four thousand workers).
- 4.5 Nevertheless, the Team identified a few areas that could be improved regarding the Company's capacity to manage environmental, social, health and safety aspects associated with the existing facilities, as well as with the new projects being planned or developed by TECSIS. These recommendations will be addressed by the Company through an environmental, health and safety action plan requested by the Bank.

A. Potential Negative Impacts, Risks and Mitigation Measures

A.1. Environmental

- 4.6 *Modification in the level of noise and vibration.* The potential impacts of noise during the production activities occur mainly during the cutting, cleaning and finishing of the blades for the generators. Alterations in the noise levels are also related to the activities of storing, finishing and loading of the blades, which occur outside, and the moving of heavy vehicles on the access roads to the production units. Nevertheless, these impacts are mitigated by enclosing of the production units, restriction of the external finishing processes and activities to daytime or performing such activities inside the facilities.
- 4.7 *Generation of solid waste.* The solid waste management classification in the Technical Brazilian Standard - NBR 10004 establishes two groups: Class I - Hazardous; and Class II - Non-hazardous. The latter is further subdivided into Class II A - Non inert and Class II B - Inert. Of the wastes generated in the TECSIS facilities, the main ones are: metal drums and plastic containers impregnated with epoxy and polyester resins, wasted raw materials used in the production of the parts for the wind generators and equipment for industrial ventilation; sludge from the sedimentation tank in the refrigeration unit; filter from the paint cabinet dust collector system; activated charcoal filters; glass trimmings; cured resin; used Personal Protective Equipment (PPE); old resin; iron, aluminum and copper scrap; acetone and other solvents; glass fiber textile trimmings; wooden pallets; rubbish; office waste (paper, glass, plastic and light bulbs). For the disposal of waste classified as hazardous, TECSIS complies with the Standard NBR 10.004 for the temporary storage and such waste is disposed in certified companies. It should be further noted that TECSIS has Certificates of Approval for the Destination of Industrial Waste (CADRIs) for each industrial unit, thus complying with the applicable legislation for the state of São Paulo.

- 4.8 *Generation of Liquid Effluents.* No discharge of raw effluents is performed in any of the stormwater drainage galleries, public roads or bodies of water. Industrial liquid effluents generated at TECSIS's units come mostly from the refrigeration activities, cutting and boring of the bases of the blades, which are captured and pass through sedimentation tanks and filtration system, for reuse. In 2006, several physical and chemical analysis were made to determine the quality of these effluents, and it was noted that most of the parameters analyzed were found to be below the upper limit defined in legal standards for effluents, according to the State Decree 8468/76. Relative to domestic effluents, from seven to 65 m³/day are generated. This type of liquid effluent is discharged in the public sewage collection network, after internal treatment in a septic tank and filter in each unit. At Unit 7, a wastewater treatment plant has been constructed based on the activated sludge process.
- 4.9 *Interference in Ecologically Sensitive Areas.* Among the eight units, only Plant 7 is located in the vicinities of a Permanent Preservation Area (APP), and it is distant approximately 50 m.
- 4.10 *Emission of atmospheric contaminants and odorous substances.* The emission of atmospheric contaminants is associated mainly to the activities related to post-curing and painting areas. The resulting gases are mainly composed of carbon dioxide at a temperature of 80 to 150° C. For the dilution of these emissions, Units 1 and 7 are equipped with four chimneys each, each 10 m tall and 1 m² area for an approximate flow of 0.024 to 0.036 Nm³/h. It should further be noted that the activities in the painting area in Unit 7 are carried out in a painting booth equipped with glass fiber filters and activated carbon. Odors are associated with the use of resin as a raw material in manufacturing the parts. Epoxy resins are used in all units, with the exception of Units 2 and 8, which use a polyester resin that has a stronger odor due to the presence of the styrene.
- 4.11 *Use of Water.* Water consumption in the TECSIS's units is done mainly for sanitary and industrial use. Currently, each unit consumes from approx. 9 to 80 m³/day for sanitary use and 0.1 m³/day to 12.8 m³/day for the replacement of loss by evaporation in the cooling of the cutting activities. An additional 3 to 10 m³/day is consumed in garden irrigation and maintenance of the reservoirs for fire protection. Water is supplied by the public network (*Serviço Autônomo de Água e Esgoto – SAEE*) and private suppliers.
- 4.12 *Risk of spills through the handling and storage of hazardous substances including toxic and inflammable products.* The loading and unloading of products handled by TECSIS is done carefully in order to avoid rupture of the packaging and subsequent spill of products to the environment. It should be noted that the State Environmental (CETESB) established, in its conditions, that liquid raw materials and solvents shall be stored in covered areas, provided with a concrete and impervious base, containing a holding basin in order to avoid contamination of soil and water.

A.2. Social

- 4.13 *Interference with local and regional roads and risk of accidents due to traffic of heavy vehicles.* The transport of raw materials and finished products may result in interference with traffic in the main access road systems. It is estimated that the number of heavy vehicles per Units is on the order of: 25 per week in Unit 1, 25 per week in Unit 3, 114 per week in Unit 7, 20 per week in Unit 9. This type of interference can be noted in both local and regional access

roads, such as the Castelo Branco Highway (SP-270) and Imigrantes Highway (SP-160) to the port of Santos, where the production is shipped to importing countries.

- 4.14 Relative to the transport of special loads, especially parts that can measure up to 37 m in length and that are transported in convoys, sometimes with almost 2 km in extension, the Company has a transportation logistics based on the safety rules set forth by the National Department of Transportation Infrastructure (*Departamento Nacional de Infra-estrutura de Transporte - DNIT*) through Resolution number 11/2004. TECSIS vehicles are loaded and leave the Units at approximately 9 PM, as per authorization from DNIT. The vehicles in convoy are monitored by the Highway Patrol, and vehicles of the highway concessionaire, during the passage through Imigrantes Highway, all the way to the Port of Santos. Associated with the traffic of the Company in the region, accidents may occur involving passenger vehicles and persons, who can be local dwellers or TECSIS workers. Therefore, appropriate signage and other procedures have to be adopted.

A.3. Health and Safety

- 4.15 *Risk of explosion and fires.* The major raw materials used in the manufacture of blades are epoxy resin and polyester resin, which are inflammable resins. Polyester resin is especially inflammable because it contains styrene. Styrene vapor is heavier than air and can travel large distances before it finds a source of ignition. Polymerization occurs when exposed to the heat of a fire. If polymerization occurs in a closed recipient, the possibility of violent rupture of this recipient can occur. Risks of fires and explosions are also associated with the storage of inflammable substances such as diesel and liquefied petroleum gas (LPG) and other inflammable raw materials, such as solvents (acetone, naphtha, toluene, ethanol and isopropyl alcohol). To minimize these risks, TECSIS adopts contingency and emergency procedures plans and systems as described in **Sections V.B, V.C and V.D.2.**
- 4.16 *Occupational risks.* The main occupational health and safety aspects related to TECSIS activities held involve: (i) aspects related to ergonomics at work; (ii) inhalation and contact with toxic and inflammable chemicals; (iii) use of heavy equipment and machinery; (iv) lifting of parts and final products (blades and components); (v) use of tools; (x) use of power equipment, such as sanding machines, drills, etc. (x) use of compressed air; (vi) exposure to non-ionizing radiation (small electric welding services; (vii) exposure to noise and heat; (viii) risk of falling; (ix) risk of fires and explosion; and, (x) risk of being run over .
- 4.17 Considering the TECSIS operating system, the major concern is in connection with the contact and inhalation of chemicals during the cutting, spar cap, infusion, application, lamination of accessories, closing, false edge, removing from molding and reinforcement. Contact may also occur with hazardous substances during the activities of stove, painting, cutting and drilling and laboratory activities. Throughout these activities, resin particles may be inhaled, as well as fibers and wood dust. Gases and vapors from resins may also be inhaled, as well as from acetone, styrene, welding and other organic vapors. Handling of resins may cause Allergic Contact Dermatitis (ACD).
- 4.18 Such risks can be mitigated or even avoided with the proper use of Personal Protective Equipment (PPEs), earplugs, safety shoes, gloves and safety glasses, welders mask, facial protector, adequate clothing and PFF2 masks; Collective Protective Equipment (CPE), such as a system to blow refrigerated air, painting booth; and through training and monitoring.

Documents provided by TECSIS indicate a reduction in the number of accidents in the last five months.

A.4. Labor and Working Conditions

- 4.19 *Working conditions and worker rights.* At TECSIS all workers are registered and legally employed, have their rights respected as established by the Brazilian Consolidated Labor Laws, and are entitled to health and other benefits provided by the Company. The Company is responsible for medical care and welfare facilities for the personnel.
- 4.20 *Risk of unfair or discriminatory treatment.* To assure a selection process without discrimination TECSIS adopts a transparent selection process, coordinated by a Department of Human Resources. The Company employs also persons with physical impairment, in compliance with the Federal Law 7853/89 and Decree 3298/89.

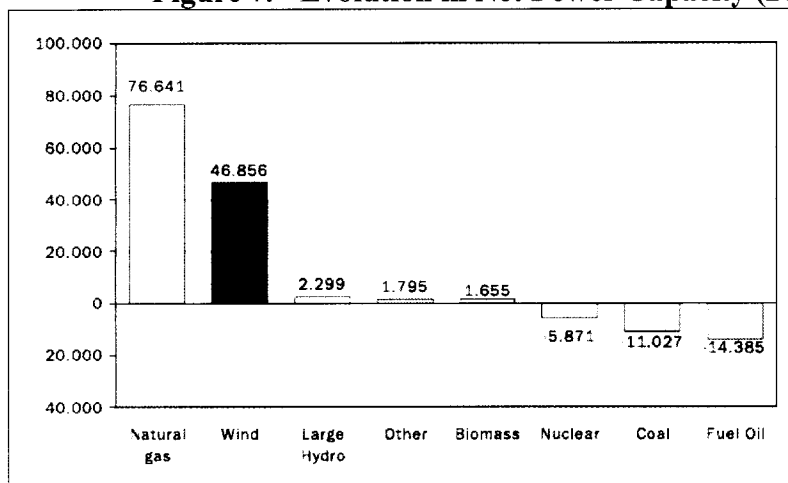
B. Potential Positive Impacts and Benefits

- 4.21 The main positive impacts associated with the TECSIS activities are in the economic and social areas, especially those pertaining to the offer of jobs in the region, increasing the income of the local population and a collection of taxes. TECSIS currently employs more than 4000 people (direct and indirect).
- 4.22 In order to perform its activities, there is a need to obtain products and services, such as raw materials, machinery, equipment, and technical services. These needs generate an increase in the income of the local and regional population, which results in the increase of commercial activities and local services. It should be further noted that with the acquisition of products and services, as well as the hiring of qualified labor for the activities carried out by TECSIS, tax revenues are generated at federal, state and municipal level. It is also worth noting that the entire production at TECSIS of blades for wind power generation is oriented towards the international market; thus, providing an important impact in the Brazilian trade balance with the increase in exports from Brazil.

C. Other Potential Positive Indirect Environmental and Social Impacts

- 4.23 The major advantage of producing electric energy from wind turbines is the lack of emissions of atmospheric contaminants. The European Wind Energy Association (EWEA), developed a study of scenarios for the years 2010, 2020 and 2030, confirming the positive benefits of the wind energy, and demonstrating its efficiency. The production of wind energy has been growing rapidly in recent years and presented an increase of around 46 percent in the period from 2000 to 2007 (**Figure 7**). Currently, it is responsible for almost 4 percent of the European power matrix, having reached second place in alternative clean energy in the last eight years. EWEA indicates that the European target for the participation of wind energy of 12 – 14 percent by 2020 will be surpassed, and may reach 34 percent by 2020 and 46 percent in the 2030 decade.

Figure 7. - Evolution in Net Power Capacity (2000-2007 MW)



Source: EWEA Pure Power Report, 2007.

V ENVIRONMENTAL, SOCIAL, HEALTH AND SAFETY MANAGEMENT

A. Environmental and Social Monitoring Programs

- 5.1 *Monitoring of industrial and domestic wastewaters.* Physicochemical analyses of wastewater deriving from cutting and boring systems are sometimes performed. Parameters such as pH, temperature, oil and grease, total suspended solids, heavy metals, sulfates, among others were analyzed, in accordance with Decree 8.468/76. It should be emphasized, however, that the water from cutting and boring is recycled and reused, through a closed circuit system, so there is no discharge of industrial wastewater.
- 5.2 TECSIS also monitors wastewaters originated at the *Estação de Tratamento de Efluentes – ETE* (Wastewater Treatment Plant - WWTP) from Unit 7, for evaluation of its efficiency. According to reports presented between December 2007 and March 2008, this ETE presented efficiency of about 80 percent in the removal of BOD, in compliance with Article 18 of State Decree 8468/76.

B. Health and Safety Procedures and Measures

- 5.3 TECSIS concluded recently a detailed set of safety instructions for all activities, including compulsory training. Eleven instructions were prepared for all workers, Company employees and contractors, and temporary employees. The first of these refers to the *Fundamentos Jurídicos das Normas de Segurança* (Legal Foundations of Safety Standards), and has as its goal the awareness of all legal foundations, rights and obligations according to the *Convenções da Organização Internacional do Trabalho - OIT* (ILO), (International Labor Organization Agreements) and to Brazilian legislation.
- 5.4 The other standards refer to the following aspects: (i) Personal Protective Equipment – PPEs, with the goal of establishing the obligatory use of PPEs according to risk and activities developed by the Company; (ii) Respiratory Protection, with the goal of disciplining the use of respirators or masks in locations where chemical vapors, toxic and non-toxic dust, vapors, and gases are emitted; (iii) Use of Machines and Equipment, in accordance with the Regulating Standards of the Work Ministry RSs 06 and 12, restricting the use of electric

machines and equipment with starting and stopping devices exclusively to individuals who are duly competent; (iv) Movement and Transportation of Suspended Loads, in accordance with RS 11, with the goal that all workers are taught the importance of not staying underneath suspended loads (windmills and their components); (v) Protective Skin Cream, in accordance with RS06; (vi) Compressed Air, with the goal to inform the workers of risks deriving from the inadequate use of compressed air; (vii) Movement and Carrying of Loads, in accordance with RS11; (viii) Changing Templates, in accordance with RS17, with the goal to make workers and employees conscious of the risks and accidents associated with the changing of templates; (ix) Height Work with the use of Safety Belt, in accordance with RS06 and RS18; and, (x) Use of Ear Plugs.

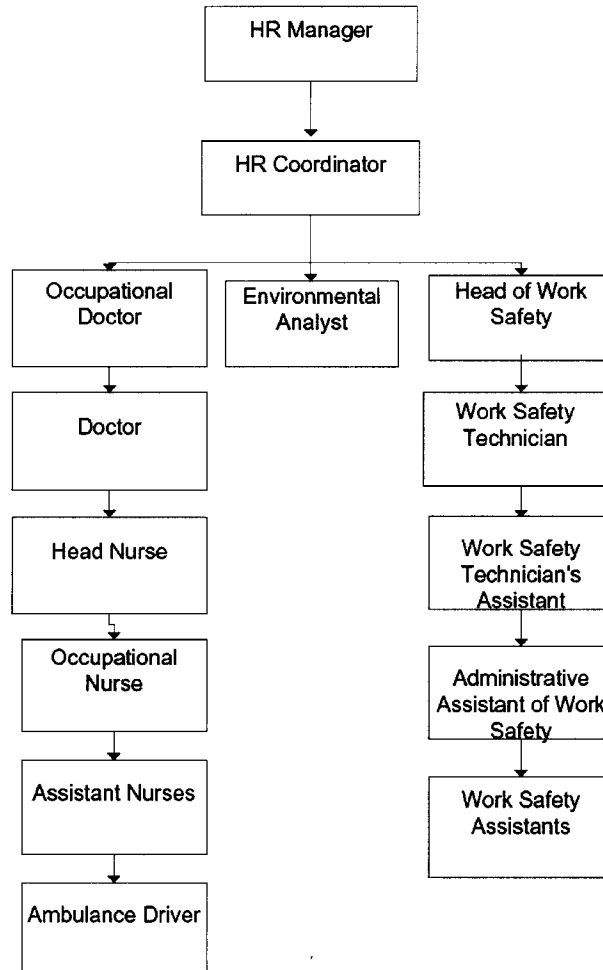
C. Contingency Plan

- 5.5 TECSIS has some procedures and guidelines to address contingency and emergency situations. However, these procedures and guideline are not structured in a organized system. Therefore, TECSIS shall develop a Risk Management Plan (RMP) and an Emergency Action Plan (EAP) to address emergency situations that may represent environmental and occupational risks. Additionally, it will present an Emergency Fire Plan, which shall be duly approved by the Fire Department. As part of these plans, TECSIS shall prepare fire brigades duly trained at each location.
- 5.6 The RMP shall be based on the minimum scope proposed on the CETESB Standard. CETESB P4.261 - Orientation Manual for the Preparation of the Risk Assessment Study, which includes: (i) security information; (ii) analysis, evaluation, and revising of risks; (iii) operation procedures; (iv) management and modification; (v) maintenance and guarantee of the integrity of critical systems; (vi) training and empowerment program; (vii) investigation of incidents and accidents; (viii) Emergency Action Plan (independently of the preventive actions on the RMP, the Emergency Action Plan shall be considered part of the process of risk management); (ix) auditing; (x) maintenance of the RMP.
- 5.7 TECSIS has a risk management plan prepared for LPG installations, with the goal of providing a system geared toward the establishing requirements containing general management orientation, for maintenance, control and prevention of accidents. However, this Plan was prepared in 2000, and needs to be revised by all units and incorporated into the Risk Management Plan (RMP) for all TECSIS activities.
- 5.8 The Emergency Action Plan (EAP) is considered an integral part of the Risk Management Plan (RMP), and in it the necessary corrective actions for the minimization of impact on the environment, human health, and property generated from the consequences of possible accidents which may occur during the TECSIS's activities. The Emergency Action Plan should include events related to operational accidents with hazardous products (toxic and flammable), fire in installations, and accidents with workers and local inhabitants.
- 5.9 The Contingency Plan shall establish rules and criteria of actions which will provide the reestablishment of order after the occurrence of an accident, including all activities at all units of TECSIS. The steps to formalize the plan should include activities indicating corrections, instructions or procedures for crisis management after the occurrence of an accident; and a recovery plan for the progressive return to activity, management of personnel and evaluation of loss associated with the interruption.

D. Environmental, Health and Safety Management System

- 5.10 TECSIS Environmental, Health and Safety (EHS) Department Structure is shown in **Figure 8**. The structure encompasses a Human Resources Manager supported by one EHS Coordinator.

Figure 8. - TECSIS's EHS Organizational Chart



- 5.11 TECSIS has a Policy demonstrating its commitment to environmental, social, health and safety health issues, as follows: *“promote sustainable development in Health, Safety, and Environment as the responsibility of us all; comply with all regulations and current laws in Health, Safety, and Environment, as well as meeting other requirements pertinent to our activity; integrate Health, Safety, and Environment into all company actions, from the creation of products to production, distribution, and delivery and services; minimize the environmental impact of our activities and conserve natural resources, decreasing the generation of waste and pollution, reusing and recycling materials; and establishing systems, objectives and goals which search for the continuous improvement of Health, Safety, and Environment”*.
- 5.12 The rapid growth of TECSIS in recent years is reflected in its social, environmental, health and safety actions. Business procedures, especially those related to the environment, are not yet entirely established and do not have a structured and organized management system with clear definition of responsibilities to be applied in all units.

- 5.13 The management of environmental and social aspects related to the activities in the units, the environmental monitoring, the control of compliance with legal requirements in all installations, particularly in regard to licensing and environmental permits, are among the aspects which need to be improved by development of specific procedures.
- 5.14 TECSIS shall develop structured and organized Environmental and Social, and Health and Safety Management Systems (EHSMS) compatible with the principles of the standards ISO 14.001 and OHSAS 18.001, even if not intending to quickly bring the system into certification. The EHSMS shall also incorporate all environmental and social requirements established by environmental authorities.

D.1. Environmental and Social Management System

- 5.15 The basic guidelines of the EHSMS shall be directed by the following principles: (i) guarantee of compliance with applicable legislation and IDB Policies and guidelines; (ii) minimize and control risks to the environment; (iii) minimize the risks to health and promote well-being and satisfaction to all employees and surrounding community; (iv) promote measures that lead contractors and suppliers to gradually improve their environmental and health and safety performance; (v) provide information and training to all employees, making them aware of risks and direct and indirect environmental impacts associated with the activities at TECSIS; and, (vi) communicate environmental and social impacts with total transparency to all employees and the community in general.
- 5.16 The EHSMS shall include programs for monitoring noise and vibrations, managing wastewaters and solid wastes, controlling and monitoring of odorous substances, as well as a program of social communication and a program that follows the process of licensing and related documents.
- 5.17 The EHSMS shall also recognize the importance of implementing a safety program for the transport of materials and products by heavy vehicles, addressing measures for appropriate road signage and safety for Company employees and inhabitants who live in the vicinities of TECSIS units.

D.2. Health and Safety Management System

- 5.18 In compliance with the Regulatory Standards of the Labor Ministry - RS4, which deals with the sizing of Services Specializing in Engineering, Safety, and Occupational Health - SESMT, TECSIS has on its technical team 52 employees responsible for occupational health and safety matters, being: a work safety engineer, eight security technicians, twenty safety assistants, two occupational doctors, one occupational nurse, sixteen assistant nurses and four ambulance drivers. The sizing of the SESMT is linked to the grade of risk of the main activity and the total number of employees in the Company.
- 5.19 The NRs 7 and 9, approved by Ordinance 3214/78, made it obligatory to have the preparation and implementation of a Medical Control and Occupational Health Program - PCMSO and a Program of Environmental Risk Prevention - PPRA. The PCMSO was prepared for Units 1, 2, 3, 4, 7 and 8, between June and December, 2006. The Program has as its goal the promotion and preservation of health of their group of workers, and has a preventive nature, screening, and early diagnosis of work-related health threats. The PPRA was prepared for

Units 1 and 7, in the reference year 2006, in accordance with RS9. This Program has as a goal the anticipation, recognition, evaluation, and control of risk in the work environment, taking into consideration the protection of the environment and natural resources. The PCMSO, as well as the PPRA, should be prepared for all Units and should be revised annually.

- 5.20 In accordance with Law No 6.514 of 12/22/77 (regulated by NR-5), an Internal Commission for Accident Prevention (CIPA) was instated at TECSIS in February, 2008. The CIPA is a commission composed of representatives of the employer and employees, and has as its main mission the preservation of health and physical integrity of the workers and of all those who interact with the Company.
- 5.21 TECSIS shall develop a structured and organized Health and Safety Management System (separated or integrated with the Environmental and Social Management System) containing a safety policy, annual goals and plan of actions for mitigating risks; detailed definition of responsibilities; scope and frequency of training for employees; state of compliance with legislation, regulations, and standards; process of risk management; system of investigation and analysis of incidents and accidents; system for the collection and analysis of information about safety performance; and a system of development, approval, and monitoring of corrective actions.

D.3. Environmental and Social Responsibility

- 5.22 In 2007, the Company began the Support Project, with constant improvement actions relative to the internal public (i.e. employees and collaborators) of TECSIS. This Project intends to provide a healthy work environment, and invest in the quality of life of all employees. The key points of these actions are: change of behavior and attitude, in which self-discipline will be put into practice; work in a clean and organized environment; reduction of harm associated with the repetition of tasks; action founded in safety in all stages in the work environment; improvement in work routine and coexistence; establishment of processes which will serve as a basis for constant improvement; and, encouraging participation and commitment.
- 5.23 TECSIS also develops a program of inclusion of physically impaired individuals in partnership with the National Service for Industrial Training (*Serviço Nacional de Aprendizagem Industrial* – SENAI), in accordance with the Federal Law 7.853/89 and Decree 3298/89 and Federal Law 8213/91. This Program encompasses inclusion activities for physically impaired individuals, identification of work positions, preparation of employees to work with individuals with deficiencies, professional training and follow-up of these individuals in their work position.
- 5.24 As a part of its social responsibility actions, TECSIS supports the *Associação de Cultura e Arte Djemberê* (Djemberê Association of Culture and Art), with headquarters in São José dos Campos. This Association has the mission of achieving social change for children and adolescents through folklore, art and national culture, and supports the education and formation of citizens through the promotion of activities, events, and shows featuring folklore, art, and national culture.

VI PUBLIC CONSULTATION

- 6.1 TECSIS has submitted a Development Characterization Guide during the environmental licensing process with CETESB, which contained information on the facilities, operating activities, water consumption, atmospheric emissions, generation of wastes and effluents.
- 6.2 In compliance with legal determination, the licensing process required the communication and availability of information to the community, in local large circulation newspapers in the city, considering the beginning of the licensing process up to obtaining the Operating License.
- 6.3 TECSIS maintains the following channels to communicate information to the general public:
 - (a) Sustainability Program, which aims at providing a better workplace environment. It is part of a program to distribute internal newsletters, booklets and a mural in which information concerning the work environment, safety and occupational health is presented;
 - (b) Program for inclusion of physically impaired individuals and support to the Djemberê NGO;
 - (c) Intranet system for internal communication and availability of information to TECSIS employees.
- 6.4 TECSIS shall develop a social communication program, aimed at maintaining an appropriate communication channel with the internal community (employees and suppliers) and the external public (public agents and the neighboring community). This program shall be developed taking into account the requirements of IDB's OP-102 Disclosure of Information Policy.

VII RECOMMENDATIONS

- 7.1 IDB will require as part of the Loan Agreement that the Company and all portions of the Project shall, at all times during the life of the Loan Agreement, comply with each of the following:
 - 1. All applicable environmental, health and safety Brazilian regulatory requirements and all applicable IDB's environmental and social policy and requirements.
 - 2. All requirements associated with any environmental, health and safety related permits, authorizations, or licenses that apply to the Project or the Company.
 - 3. All environmental, health and safety requirements of the Project contracts, and any subsequent modifications.
 - 4. All aspects and components of all of the Project environmental, health and safety documents.
 - 5. Applicable aspects of the World Bank General Environmental Guidelines (Pollution Prevention and Abatement Handbook, 1998).
 - 6. Applicable aspects of the World Bank Monitoring Guidelines (Pollution Prevention and Abatement Handbook, 1998).
 - 7. Applicable aspects of the International Finance Corporation Health and Safety General Guidelines (2007).
 - 8. Consult with IDB before approving or implementing any and all substantive changes to the Project or its timetable that could potentially have negative environmental, social, or health and safety effects.

9. Send written notice to IDB of any and all non-compliances with any environmental, social or health and safety requirements of the Loan Agreement and any significant environmental, social, or health and safety accident, impact, event, claim or material complaint.
 10. Ensure that all companies contracted for construction and operation activities comply with the applicable environmental, social and health and safety requirements of the Loan Agreement.
 11. Implement ongoing information disclosure and consultation activities related to environmental, social, and health and safety aspects of the Project, including, if applicable, information from environmental and social, health and safety monitoring reports prepared by external consultants, in compliance to Bank's OP-102 Disclosure of Information Policy.
 12. Implement and/or maintain Environmental and Social, and Health and Safety Management Systems that are consistent with the principles of ISO 14001 and OHSAS 18001.
- 7.2 Prior to Financial Closure the Company shall submit an environmental, health and safety action plan (EHSAP), in form and substance satisfactory to IDB, properly addressing the environmental, social, health and safety improvement recommendations, as well as any relevant pending non-compliance and/or liability associated with the Project or the Company. This Action Plan shall clearly address the following aspects:
1. The proposed actions, programs and plans to be adopted to improve environmental, social, health and safety management procedures, and correct any pending non-compliance and/or liability, including: (i) continue to comply with all applicable Brazilian environmental, health and safety regulations, and all applicable IDB's environmental and social requirements; (ii) develop and implement formalized and structured Environmental and Social and Health and Safety Management Systems to encompass the Project and the activities of the entire Company; (iii) promote the up-streaming of responsibilities and accountability regarding environmental and social issues to upper management level; and (iv) provision of adequate environmental staff to better address environmental and social issues.
 2. A time schedule for implementing such proposed actions, programs and plans, including due dates and key milestones.
- 7.3 Prior to each disbursement, the Company shall certify compliance with all environmental social, and health and safety requirements in the Loan Agreement.
- 7.4 During the life of the Loan Agreement, the Company shall present, in form and substance satisfactory to IDB, the applicable documents, reports and plans indicated in the EHSAP, and prepare and submit periodic Environmental and Social Compliance Reports (ESCRs), in form, substance and frequency satisfactory to IDB.
- 7.5 The Bank will monitor the environmental, social, health and safety aspects in the Loan Agreement via internal Bank supervision actions (e.g., site visits, review of documentation) and will contract an external independent Environmental and Social Consultant to perform more detailed supervision/monitoring actions during the life of the Loan Agreement. In addition, the Bank will have the right, as part of the Loan Agreement, to contract for the performance of independent environmental, health, and safety audits, if needed.