



# GREEN ECONOMY

& DEVELOPMENT  
ENVIRONMENT  
QUALITY OF LIFE  
IN THE STATE OF SAO PAULO

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# PRESENTATION

## *Development, environment and quality of life in the State of São Paulo*

With the establishment of the 20% GHG emission reductions in 2020 based on 2005 by the State Policy on Climate Change<sup>1</sup>, sanctioned by Governor José Serra in November 2009, the migration from a traditional development model to a low-carbon economy has become strategic to the future of the State.

The Sao Paulo State has recognized the importance of the issue by creating in 1995 the PROCLIMA (State Program for the Prevention of Climate Change), now responsible for the State GHG Inventory, which will be completed in 2010 with information from 1990 to 2008.

Green Economy is a development proposal that aims to create new drivers of economic growth, new sources of employment and consistent solutions for the improvement of environmental conditions. It is a new perspective in debate based on the certainty that today's production and consumption standards, although highly efficient in creating jobs and income, is environmentally unsustainable.

The proposal encompasses ideas and good practices that are consistently gaining ground in national and regional development policies due to the fact that, while questioning global environmental impacts caused by today's economic systems – climate change and ecological scarcement, for example –, it searches for pragmatic and functional solutions for key questions of the contemporary world – such as economic decarbonization, climate change adaptation, natural capital maintenance and rebuilding and the creation of green jobs.

Considering its multidisciplinary and multisectorial character, the Green Economy agenda includes innovative subjects that demand broad collaboration efforts among agents. From sustainable transports to initiatives towards developing new green industries, from environmental services to a renewable energy matrix, from sustainable alternatives to tourism, from sustainable construction to a tax system reform that would positively influence the preferences of the private sector, its proposals create interesting interfaces for interinstitutional cooperation, always considering the environment as a key element in the equation. In today's interconnected society claiming for transdisciplinary and multiscale visions, it comes as an integrated proposal that considers innovation as the main tool in the search for real sustainable solutions.

The "*Green Economy: Development, Environment and Quality of Life in the State of São Paulo*" document, produced by the Environmental Planning Division of the Secretariat for the Environment of the State of São Paulo, results from a first wave of internalization of the Green Economy debate at the institution, as a response to the international movement led by the United Nations Environment Program's Green Economy Initiative and the contemporary economic and ecological challenges of the contemporary world.

Inspired by the British tradition of *green papers* – official documents launched in the beginning of the policymaking process with the purpose of raising the debate about critical matters – it aims to deepen the concept's emerging social diffusion and as a foundation for the future development of a Green Economy State Policy.

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1 SÃO PAULO. *State Law 13.798*, from 11/09/2009. Available at <http://www.al.sp.gov.br/repositorio/legislacao/lei/2009/lei%20n.13.798,%20de%2009.11.2009.htm>. Accessed in nov/09.

## The State of São Paulo – overview

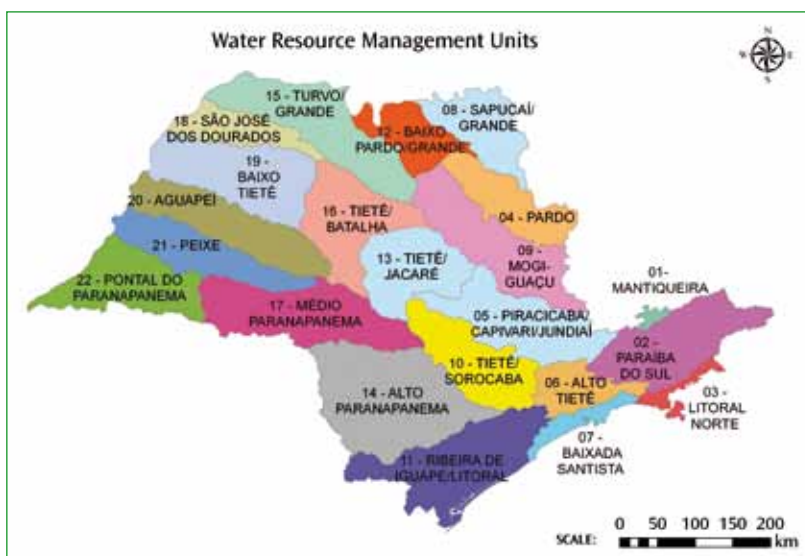
**Population:** São Paulo is the most populous state in Brazil, occupying approximately 3% of the national territory and representing 22% of the total Brazilian population.

**Workforce qualification:** With a highly qualified workforce, the state has a great network of educational centers and a wide range of qualified undergraduate and graduate institutions. It also manages 3 of the most important universities of the country, among which the University of São Paulo, the world's 38<sup>th</sup> best university and 1<sup>st</sup> in Latin America<sup>3</sup>.

**Economy:** With a very relevant and diversified economy, it accounts for 33.86% of the national GDP. The agricultural sector has high levels of productivity while the industry has a solid technological background. The state has also the country's largest tertiary sector, with more than 30% of the commerce enterprises of Brazil<sup>4</sup>.

**Human Development and the Environment:** The State of São Paulo has one of the best scores on the Human Development Index (HDI) in Brazil, of 0.833. It administers 27 State Parks, 21 Ecological Stations, 17 Experimental Stations, 13 State Forests, 1 State Reserve, 3 Forest Gardens and 2 Forest Nurseries<sup>5</sup>, outside of the 3 Ecological Stations, 1 National Park, 1 Area of Environmental Protection, 6 Areas of Relevant Ecological Interest, 3 National Forests, 1 Extractive Reserve managed by the federal government and 25 officially established Private Reserves of the Natural Heritage<sup>6</sup>.

**Capital:** São Paulo  
**Number of Municipalities:** 645  
**Surface Area:** 248.209,426 km<sup>2</sup>  
**Population (2007)<sup>2</sup>:** 39.827.570  
**GDP:** R\$ 802.5 billions  
**GDP per capita:** R\$ 19.548,00



Fonte: CPLA, 2008

- 2 INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA – IBGE. *Estados@*. Available at <http://www.ibge.gov.br/estadosat/perfil.php?sigla=sp>. Accessed in nov/2009.
- 3 WEBOMETRICS RANKING WEB OF WORLD UNIVERSITIES.
- 4 INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA – IBGE. *Contas Regionais do Brasil 2003-2006*. Available at [http://www.ibge.gov.br/home/estatistica/economia/contasregionais/2003\\_2006/contasregionais2003\\_2006.pdf](http://www.ibge.gov.br/home/estatistica/economia/contasregionais/2003_2006/contasregionais2003_2006.pdf). Accessed in nov/09.
- 5 INSTITUTO FLORESTAL. *Unidades de Conservação*. Available at [http://www.iflorestal.sp.gov.br/unidades\\_conservacao/index.asp](http://www.iflorestal.sp.gov.br/unidades_conservacao/index.asp). Accessed in nov/2009.
- 6 INSTITUTO BRASILEIRO DO MEIO AMBIENTE E DOS RECURSOS NATURAIS RENOVÁVEIS. Available at <http://www.ibama.gov.br/siucweb/listaUc.php>. Accessed in nov/2009.

# RENEWABLE ENERGY

Renewable energy is a subject of great potential and can be the base for the cleaner development of other economic activities such as industry, transports and tourism, among others.

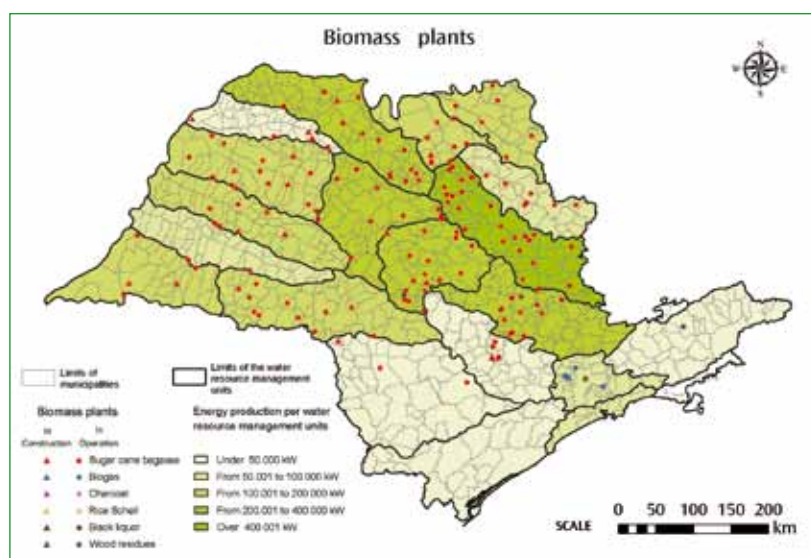
Even considering the importance of actions such as conservation, efficiency and reduction of energy consumption, the focus of this section is on renewable energy supply and its opportunities.

## Overview of the energy sector

The energy matrix of the state of São Paulo is already highly renewable. In 2007,  $367 \times 10^9$  kcal were produced by sugarcane (74%), hydropower (19%), wood (2%) and natural gas (1%), among others. Even though the state's energy production is renewable, when the final consumption energy structure is considered, the relevance of the non-renewables becomes clear: petroleum products (37%), biomass (23%), electricity (21%), natural gas (8%), ethyl alcohol (7%) and others (4%).

## Recommendations

- 1 Renewable Energy Strategic Plan
- 2 Renewable Energy Tech Park
- 3 Renewable Energy Advanced Research Center
- 4 Multicriterial energy auctions
- 5 Renewable energy and green economy paper



Source: Brazil's Electric Energy Atlas (ANEEL, 2009)

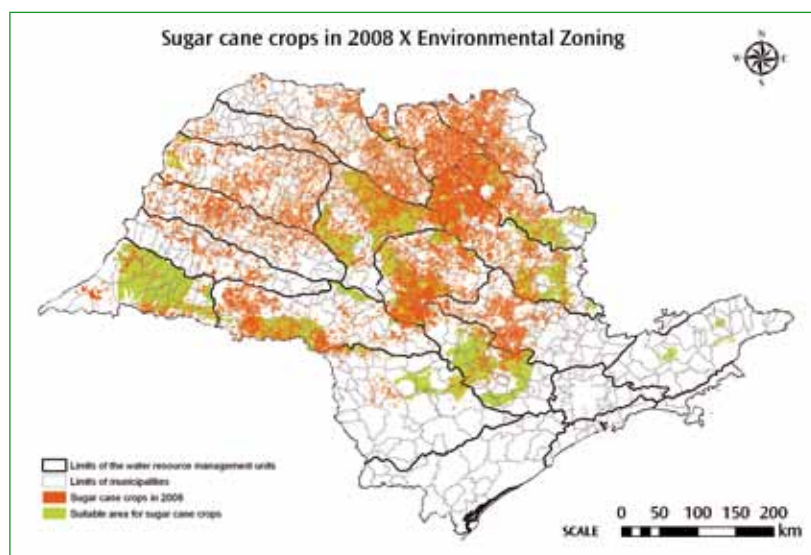
## Biomass

The amount of government-sanctioned biomass power in the State of São Paulo represents 4.27 GW, 95% of which being from sugar cane bagasse, 3% out of wood residues, 1% from black liquor and 1% from biogas. The international stimuli for CDM (Clean Development Mechanism) projects is key to the expansion of biomass use in the matrix.

## Biofuels

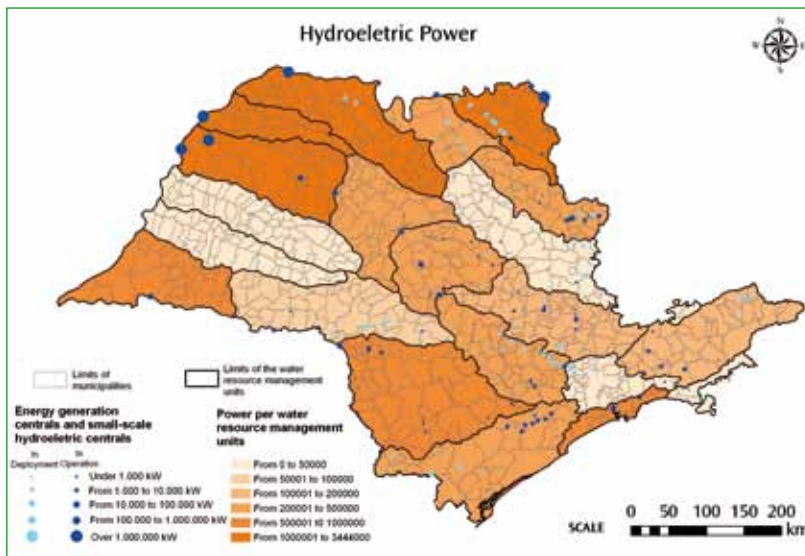
The state of São Paulo is the national leader in biofuel production, being responsible for 16% of the biodiesel (185,594 thousand liters) and 60.8% of the sugar cane ethanol (16,722,478 thousand liters) produced in Brazil.

In 2007, the Environmental State Protocol, created through a partnership between the Secretariat for the Environment and sugar and ethanol producers aims at reducing the deadline for allowing the burning of the straw sugar cane, among 10 other actions aimed at preserving the environment. At least 90% of São Paulo plants have joined the Protocol, or 155 units, and 23 associations of sugar cane suppliers.



Source: Environmental zoning for the sugar cane sector (SMA, SAA, 2008) and CANASAT (INPE, CEPEA, CTC, UNICA)

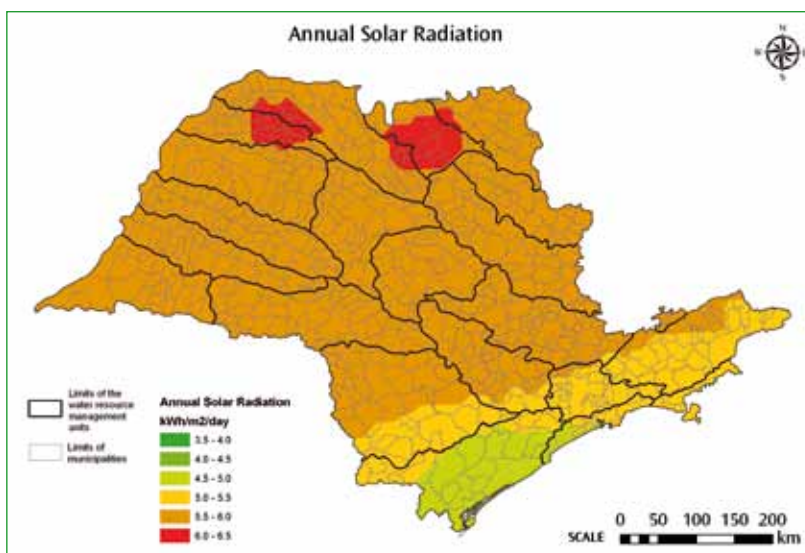




Source: Brazil's Electric Energy Atlas (ANEEL, 2009)

### Hydropower

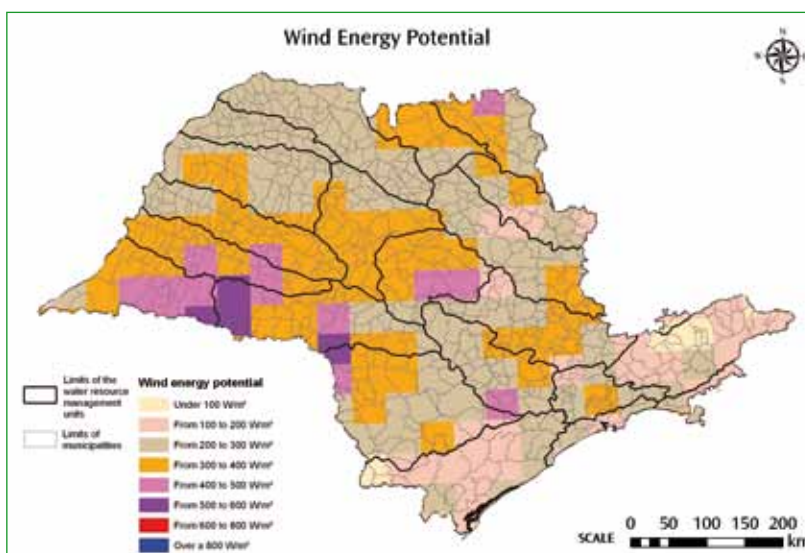
The state of São Paulo has an installed capacity of 14 GW, with an hydroelectric system of 102 plants in operation, of which 25 are energy generation centrals (EGC), 48 are small-scale hydroelectrically centrals and 29 are large hydroelectric power plants.



Source: Brazil-SR Solar Model Annual and Seasonal Latitude Tilt Radiation for Brazil (INPE/LABSOLAR, 2005)

### Solar energy

The state of São Paulo receives a solar radiation of approximately 512 TWh per year. It is a great potential yet to be exploited, with the installation of solar panels in households and the installation of solar farms.



Source: SWERA Project (INPE/CEPEL/UFRJ)

### Wind Energy

The state of São Paulo has good wind power generation potential, amounting up to 403 GW, but it would be necessary to improve the business environment for wind power companies to make the source competitive.

# GREEN TECHNOLOGIES

In a world of rapid transformations, the urgency for economic systems decarbonization is motivating governments to develop and implement policies to bridge the gap between the traditional economy industrial paradigm and a model guided by green economy principles.

The state of São Paulo is already coordinating efforts to drive investments and attract capital to enable green technology development and adoption, both as a response to the recent crisis and in anticipation to the future of world industry.

## *Green tech alternatives for São Paulo*

### *Photovoltaic Cells Production*

Photovoltaic solar cells are devices that convert solar light into electricity through the photovoltaic effect. They are used in solar panels manufacturing, an activity with a high green job creation potential – six jobs per MW, the highest compared to other energy sources<sup>1</sup>.

### *Plastics: recycling and bioplastics*

Although the great majority of conventional plastics can be recycled, only about 20% of the plastics are indeed recycled in the state of São Paulo, in a constant *per capita* consumption growth scenario. In fact, the main challenge is to structure and to ensure the sustainability of the recycling chains and businesses in the various regions of the state. Regarding bioplastics, moldable polymeric materials comparable to conventional plastics but with the additional features of being made of renewable materials and of being compostable (or biodegradable)<sup>2</sup>, there is also great potential.

### *E-waste recycling*

Technological waste (or e-waste) is one of the main issues regarding solid waste in Brazil. In the state of São Paulo, State Law No. 13.576/09<sup>3</sup>, which defines e-waste as computers and peripherals, television sets, monitors, energy storage devices and magnetized products, rules the principle of shared responsibility among producers, retailers and importers. Yet to be regulated, it will enable and strengthen profitable recycling chains.

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- 1 UNEP/ILO/IOE/ITUC. *Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World*. September 2008.
  - 2 BNDES/CGEE (Coord.). *Sugarcane – based Bioethanol: energy for sustainable development*. 2008.
  - 3 SÃO PAULO. *State Law no. 13,576/09*. Available at <http://www.al.sp.gov.br>. Accessed in sep/2009.



### *Cleantech Industrial Parks*

With the sanctioning of the São Paulo State Innovation Law<sup>4</sup> in 2008, the state now has a powerful tool to provide stimuli to technological innovation – the São Paulo Innovation System, which induces many cooperation frameworks and creates mechanisms to promote research and technological development. Maximizing knowledge flows and shaping entrepreneurial clusters, it can be driven towards enabling cleaner technologies.

### *Pro-industrial ecology and symbiosis initiatives*

Industrial ecology is a field of environmental studies and a production organization paradigm based on the idea that the sustainability of industrial systems is founded on the natural principles of material cycle enclosure and energy use optimization. In the Green Economy context, it creates interesting environmental impact reduction opportunities and allows for innovative planning-based environmental policymaking and wide synergies with subjects such as industrial parks or recycling.

### Recommendations

- 1 Incentives for green technologies
- 2 University-private sector linkages
- 3 Consolidation of recycling chains
- 4 Greentech parks
- 5 Pro-sustainable innovation policy
- 6 Eco-industrial parks



COURTESY FROM UNICA / PHOTO: NIELS ANDREAS

Bioplastics made from sugarcane: made from renewable materials.

4 SÃO PAULO. *Complementary Law no. 1,049/08*. Available at <http://www.legislacao.sp.gov.br>. Accessed in sep/2009.

# SUSTAINABLE TRANSPORTS

The state of São Paulo represents 33.86% of the Brazilian GDP<sup>1</sup>, with various economic activities and the country's most advanced technological and agro-industrial park. To guarantee the national and state competitiveness, its transport system is a key element to efficiently provide the domestic and international demands.

## Overview of the transport sector

### Urban Transport

The State Government of São Paulo counts on the Integrated Plan of Urban Transports – PITU<sup>2</sup>, a permanent process of planning, which proposals must be reviewed periodically, in order to adjust it to juncture changes, as long as its basic objectives are maintained. In this context, it was created the SP Expansion Plan<sup>3</sup> to improve efficiency and quality service of the public transport in the metropolitan areas of São Paulo, Campinas and Santos. With investments of R\$ 21 billion, the plan will quadruple over the network paths in the metropolitan region of São Paulo to 240 km; create new bus lanes and light metro. More bicycle parking interconnected with the Metro and CPTM will help users to reduce the travel time. Altogether, 40 thousand jobs and thousands of indirect jobs are being created.

### Cargo Transport

Nowadays, 93.2% of São Paulo's production flows are carried out through roads and highways. The state Secretariat for Transports<sup>4</sup> targets the withdrawal of 70 billion TKU from the road as the potential gain from the reequilibrium of the state's modes of transports. Fuel savings would reach 850 million liters per year. The potential for income increase would lie in the reduction of 39% of the costs caused by accidents, the creation of 500,000 direct and indirect jobs and the reduction of the transport matrix distortion of Brazil, which spends 25% of its GDP in logistics.

### Road Transport

The state of São Paulo has the best road transportation system of the country, with a vehicle fleet of almost 20 million vehicles<sup>5</sup> and 35,000 Km of highway networks<sup>6</sup>. With an enormous representation in the transport matrix, the trucks travel an average of 300 km per trip, with 30,000 daily trips of over 500 km. Today, the main construction work of the sector already in implementation is the Rodoanel Mario Covas (SP-21), a ring road that will connect ten major roads that lead to the capital city of São Paulo.

### Air Transport

The state has 31 airports administered by the Air Transport Department of the State of São Paulo – DAESP, and 5 airports under the responsibility of INFRAERO, the Brazilian national aviation authority.

- 1 INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA – IBGE: *Contas Regionais do Brasil 2003-2006*. Available at [http://www.ibge.gov.br/home/estatistica/economia/contasregionais/2003\\_2006/contasregionais2003\\_2006.pdf](http://www.ibge.gov.br/home/estatistica/economia/contasregionais/2003_2006/contasregionais2003_2006.pdf). Accessed in nov/09.
- 2 SECRETARIA DOS TRANSPORTES METROPOLITANOS DO ESTADO DE SÃO PAULO. *Plano Integrado de Transporte Urbano – PITU*. Available at [http://www.stm.sp.gov.br/index.php?option=com\\_content&view=article&id=2078&Itemid=93](http://www.stm.sp.gov.br/index.php?option=com_content&view=article&id=2078&Itemid=93). Accessed in nov/2009.
- 3 SECRETARIA DOS TRANSPORTES METROPOLITANOS DO ESTADO DE SÃO PAULO. *Plano Expansão SP*. Available at <http://www.expansao.sp.gov.br/>. Accessed in nov/2009.
- 4 SECRETARIA DOS TRANSPORTES DO ESTADO DE SÃO PAULO. *Plano Diretor de Desenvolvimento dos Transportes – PDDT Vivo 2000/2020*. Relatório Executivo.
- 5 DEPARTAMENTO ESTADUAL DE TRÂNSITO DE SÃO PAULO – DETRAN. Available at <http://www.detran.sp.gov.br/frota/frota.asp>. Accessed in oct/2009.
- 6 CONFEDERAÇÃO NACIONAL DOS TRANSPORTES. *Pesquisa Rodoviária 2009*.

## Rail Transport

Railways are the mode of transport with the highest potential to balance the transport matrix of the state. A ring-like railroad is about to be constructed surrounding the São Paulo Metropolitan Area, giving support for the cargo distribution in the Integrated Logistics Centers.

## Water Transport

The region that can be accessed from the state's navigable rivers comprises a system of 2,400 km of waterways, considering that the center is made by two branches of a navigable "T" of 1,700km (between São Simão - Itaipu and the Tietê river<sup>7</sup>). The state's stretch of the waterway Tietê-Paraná has 800 Km of navigable ways, 10 canal locks, 10 dams, 19 shipyards and 30 intermodal cargo terminals<sup>8</sup>. The cargo motion is 4 million tonnes per year, taking products such as soy, sugar cane, alcohol, chalk and corn<sup>9</sup>. The River Transport Department (State Secretariat for Transports) intends to increase the waterways' participation in the state matrix to 6% of total transport mode (in TKU) by 2020.

## Recommendations

- 1 Environmental efficiency indicators for every mode of transport, including the possibility of establishing a specific tax policy
- 2 State vehicle inspection
- 3 Truck fleet renovation program
- 4 Tax Reductions for vehicles with good environmental indicators
- 5 Creation of an environmental agenda for transports
- 6 Implementation of urban tolls in the expanded centre of the city of São Paulo.

PIERRE DUARTE/SÃO PAULO IMAGE STOCK



Road-rail bridge in Rubinéia, SP. 2600 meters long, 10 meters high and 15 meters wide, it is the world's largest road-rail bridge of its kind.

- 7 SECRETARIA DOS TRANSPORTES DO ESTADO DE SÃO PAULO. *Balanço Anual dos Transportes 2007*.
- 8 SECRETARIA DOS TRANSPORTES DO ESTADO DE SÃO PAULO. *Hidrovia*. Available at <http://www.transportes.sp.gov.br/v20/hidrovia.asp>. Accessed in oct/2009.
- 9 SECRETARIA DOS TRANSPORTES DO ESTADO DE SÃO PAULO. *Balanço Anual dos Transportes 2007*.

# SUSTAINABLE BUILDING

The civil construction productive chain represents 9% of the nation's GDP and created 700,000 new jobs in 2008. The building industry is growing rapidly due to the need for reducing the housing deficit and improving the urban infrastructure of Brazil.

## Overview of the construction sector

Investment in public housing projects are one of the main activities stimulating the national economy. The state of São Paulo is investing R\$ 1.6 billion focusing in the urbanization of the *favelas* and government integrated projects.

This favourable scenario created a job increase of almost 18% in the construction chain<sup>1</sup>. The state has approximately 642,000 workers in the industry<sup>2</sup>. In the first semester of 2009, the state's construction industry opened 28,803 job vacancies, overcoming the 17,950 job losses occurred between November and December 2008 due to the economic crisis<sup>3</sup>.

## Environmental impacts

The building industry is responsible for consuming between 30% and 40% of all natural resources. 15% of the wood produced in the Amazonian region are consumed by civil construction in the state of São Paulo. The sector is also responsible for greenhouse gas (GHG) emissions. In Brazil, with an annual production of 38 million tonnes of Portland cement, the calculated emissions are of 22,8 million tonnes per year of CO<sub>2</sub><sup>4</sup>.

Considering that the production and transportation of materials cause great environmental impacts, buildings consume more energy than any other sector<sup>5</sup>. They represent 35% of all of society's energy consumption, approximately 80% of which due to the use and operation of buildings, 30% of solid waste generation and 20% of water consumption<sup>6</sup>.

- 1 DIAS, E.; GARCIA, F. Investimento em construção cresce 27% em três anos. In: *Conjuntura da Construção*, ano VII, n.3, p. 8-10, 2009.
- 2 SINDUSCON-SP, FGV PROJETOS, MTE. Emprego da construção por Estados. In: *Conjuntura da Construção*, ano VII, n.3, p. 29, 2009.
- 3 AE (AGÊNCIA ESTADO). Construção civil recupera vagas fechadas na crise em São Paulo. *Jornal O Estado de São Paulo*. Available at <http://www.estadao.com.br>. Accessed in oct/2009.
- 4 STACHERA, T. Avaliação de emissões de CO<sub>2</sub> na construção civil: um estudo de caso da habitação de interesse social no Paraná. In: *XXVIII Encontro Nacional de Engenharia de Produção – A integração de cadeias produtivas com a abordagem da manufatura sustentável*. Rio de Janeiro: n/a, 2008.
- 5 WORLD RESOURCES INSTITUTE. *Navigating the numbers – Greenhouse gas data and international climate policy*. 2005.
- 6 CONSELHO BRASILEIRO DE CONSTRUÇÃO SUSTENTÁVEL. Eficiência Energética. In: *II Simpósio Brasileiro de Construção Sustentável*. São Paulo: n/a, 2009.





SOLETROL INSTITUTIONAL

The installation of 300,000 m<sup>2</sup> of solar panels would save 122 MW of electric energy.

### ***Energy efficiency, job and income creation***

In Brazil, it is becoming more evident that there is a need for the creation of benefits towards using complementary technologies to the hydroelectric power plants. Solar energy is known to be a technically feasible solution to reduce the electric energy consumption in the Brazilian housing sector, creating positive effects in job and income generation as well as new business opportunities and market transformations.

If 300,000 m<sup>2</sup> of solar panels were installed in Brazilian houses with electric energy savings of 122 MW, the investment savings in the electric sector would amount up to R\$ 365 millions, while the sector would create 11,200 new jobs and the annual emissions would be reduced to 12,500 tCO<sub>2</sub>-eq (corresponding to a green area capture capacity of 16.8 km<sup>2</sup>), besides the savings of 112,000 MWh annually<sup>7</sup>.

### **Recommendation**

**1 Sustainable Building Program**

7 CUNHA, A. Sol para todos. *Construção & Negócios*, ano 3, pp.03-09, 2009.



# SANITATION

In Brazil, 97.9% of municipalities have water supply but only 52.2% have installed and operating sewage systems, and from these only 20.2% do waste treatment. Municipal solid waste management needs improvements, specially considering the final disposal, since 63.6% of the Brazilian municipalities use dump yards as the main way for municipal solid waste disposal, 18.4% use controlled landfills and 13.8% dispose the waste in sanitary landfills<sup>1</sup>.

In Latin America, each dollar invested in sanitation brings direct and indirect payoffs of least four. If the US\$ 133 million necessary to accomplish the goals stipulated by the United Nations were invested until 2015, it is estimated that the subcontinent would save US\$ 1.817 billion in the period – for each dollar spent there would be a return of US\$ 13.63<sup>2</sup>.



Sewage Treatment Station in the state of São Paulo: expanding access to sanitation to protect water sources.

- 1 INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA – IBGE. *Pesquisa Nacional de Saneamento Básico 2000*. Available at [http://www.biblioteca.ibge.gov.br/visualizacao/instrumentos\\_de.../doc0561.pdf](http://www.biblioteca.ibge.gov.br/visualizacao/instrumentos_de.../doc0561.pdf). Accessed in sep/2009.
- 2 WORLD HEALTH ORGANIZATION. *Evaluation of the costs and benefits of water and sanitation improvements at the global level*. Available at [www.who.int/entity/water\\_sanitation\\_health/wsh0404.pdf](http://www.who.int/entity/water_sanitation_health/wsh0404.pdf). Accessed in sep/2009.



SMA/CETESB ARCHIVE

Landfill in Santos, SP.  
Adequate waste disposal in the state of São Paulo has increased 12 times over the recent years.

### Overview of the sanitation sector

With a generation of 27 kt/day, the state of São Paulo has improved municipal solid waste management over the last few years. The number of municipalities whose household waste treatment and disposal facilities were framed as appropriate in 2008 is about 12 times higher than in 1997<sup>3</sup>.

In order to expand the access to sanitation services, the Treated Sewage Project of the Environmental Agency of the State of São Paulo (CETESB) has the objective of protecting the water resources from domestic sewage charges, ensuring water quality use. Two other projects greatly contribute to the sanitation improvements and solid waste management in the state of São Paulo – Minimum Waste and Green Municipality.

### Recommendations

- 1 Incentives towards reduce, reuse and recycle.
- 2 Post-consumption responsibility and Recycling Credits
- 3 Implementation of Lyfe-Cycle Analysis
- 4 Waste-to-energy
- 5 Biogas recovery from sanitary landfills
- 6 Anaerobic digestion of solid and liquid waste
- 7 Solid waste incineration with energy recovery
- 8 Effluents reuse and recycling

3 COMPANHIA AMBIENTAL DO ESTADO DE SÃO PAULO – CETESB. *Inventário Estadual de Resíduos Sólidos Domiciliares 2008*. Available at <http://www.cetesb.sp.gov.br/Solo/publicacoes.asp>. Accessed in sep/2009.

# RATIONAL WATER USE

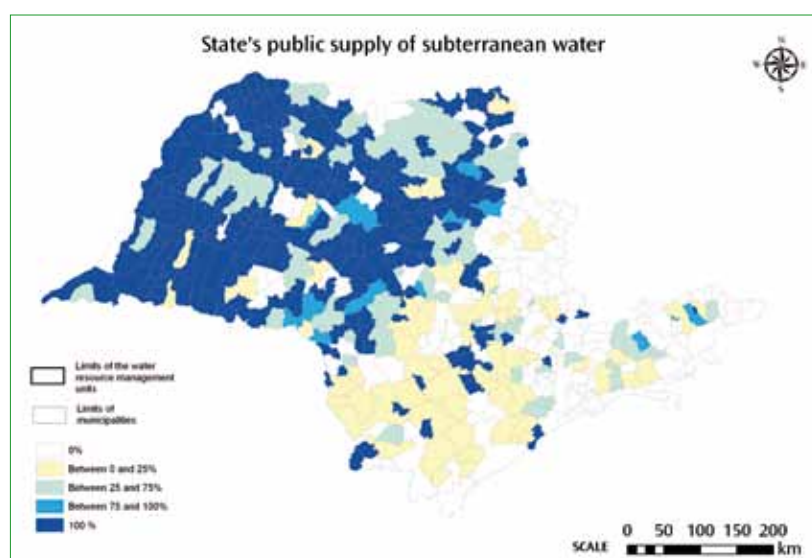
Brazil is located in a privileged position regarding water resources. Of the small percentage of available fresh water for human consumption in the planet, approximately 11% are in the country. In spite of this, there is a great regional inequality in its availability – 74% of this water are in the Amazon, a less populated region, whereas areas with larger population such as the Northeastern and the Southeastern regions of the country present scarcity<sup>1</sup>.

## Overview of the water sector

The state of São Paulo has good water availability, but there are inequalities that may in part be explained by the unequal population distribution. From the 40 million inhabitants, approximately 50% live in the “Macrometropolis” region – composed by the metropolitan areas of Campinas, Santos and São Paulo, the state’s largest cities, and other populated areas such as Sorocaba, Jundiaí and São José dos Campos.

In the capital city of São Paulo, since 2003 the City Hall estimates to have saved R\$ 9 million with the implementation of a water reuse project. With it, public spaces are cleaned or irrigated with water from the sewage treatment stations of the state sanitation company SABESP at the cost of R\$ 0.70 per cubic meter. If drinkable water was used for this purpose, the total spent by the City Hall would have amounted up to R\$ 10 millions, according to SABESP.

The project was implemented after a law draft based on alarming data, stating that each inhabitant of the city of São Paulo consumes an average of 170 liters of water per day. According to the City Hall, almost a billion liters of water have already been saved in the last 6 years.



Source: Water Resources State Plan (2004-2007)

1 AGÊNCIA NACIONAL DE ÁGUAS. *Plano Nacional de Recursos Hídricos*. Brasília, 2005

## Technological innovation – urban and industrial use

The production sector has incorporated various technologies concerning the reuse of rain water and sewage water. The technology diffusion in the sustainable building sector has found public appeal, with the growth of the search for environmentally-friendly products. Among the various products to have their use encouraged there are:

- Sewage treatment with compact stations of modules;
- Wetlands;
- Use of rain water systems.

## Agriculture use

It is estimated that 60% of water use in Brazil are related to irrigation. This activity is traditionally developed without deep efficiency-enhancement efforts and could widely benefit from technical improvements. According to a study made by the Minas Gerais Energy Company (CEMG), the introduction of methods and water reuse systems in irrigation could represent 20% savings of water and 30% savings in energy<sup>2</sup>.

In the state of Sao Paulo, 37.3% of the water resources are used in irrigation. Although this number is much smaller than the one presented at the national level, it still represents the largest percentage of consumption, compared to the domestic sector (32.4%) and industrial (30.4%).

## Recommendations

- 1 Payment for Environmental Services Program
- 2 Incentive towards equipment development and application for rational water use
- 3 Rational Water Use education program for the population
- 4 Technology research program
- 5 Natural water treatment

Water reuse in agriculture: irrigation systems using this kind of water could save 30% of energy and 20% of water consumption.



SMA/CETESB ARCHIVE

<sup>2</sup> REBOUÇAS, A.C., BRAGA, B. & TUNDISI, J.G. *Águas doces no Brasil: capital ecológico, uso e conservação*. São Paulo: IEA-USP, 1999.



# AGRICULTURE AND FORESTS

Agriculture is an essential activity to human survival and has always had a decisive role in the development of society. But it is also responsible for great environmental transformations.

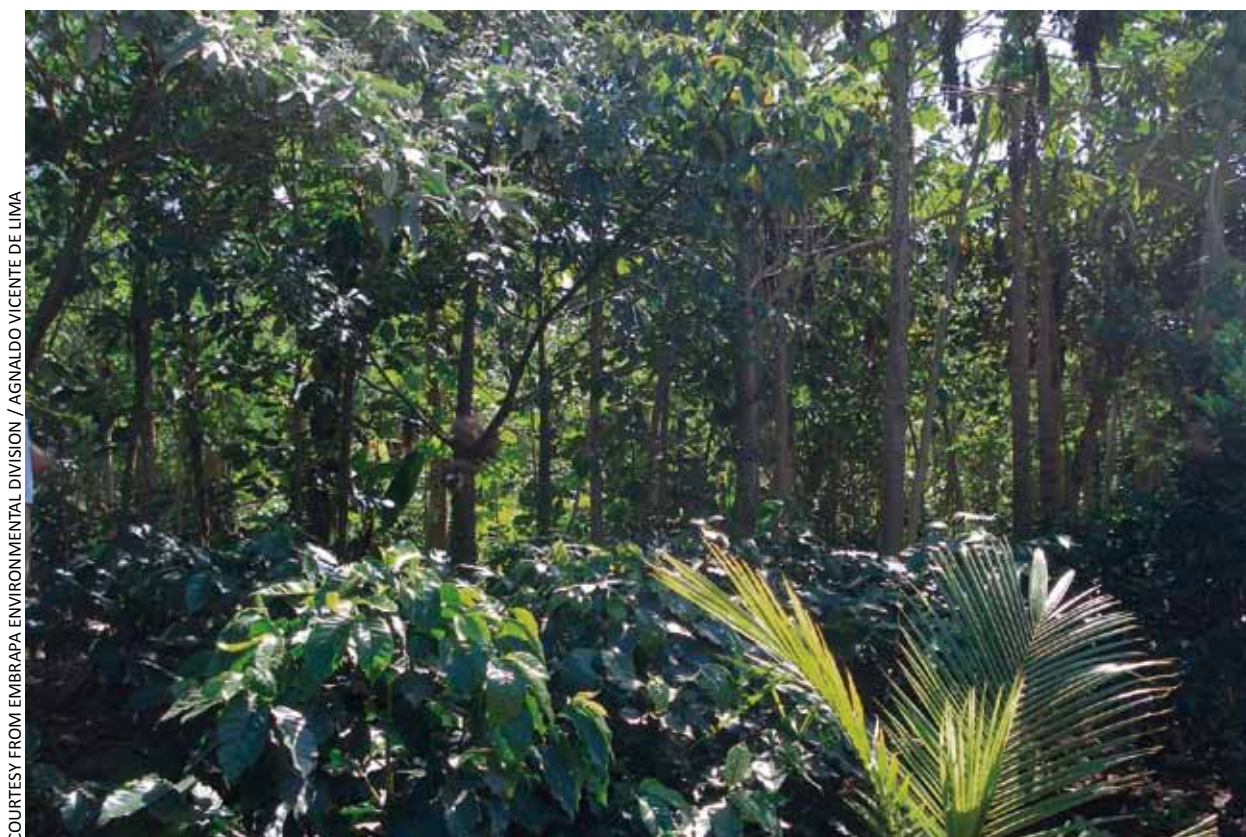
The agriculture and forests sector occupies a strategic position in São Paulo's Green Economy proposal, aiming towards sufficient production of food and other agricultural products, product quality guarantees, occupational health and rural worker dignity and efficient resources use, as well as combating negative externalities of the activities and enforcing environmental law in agricultural production units (APU's), thus promoting the economic growth of the sector.

## *Overview of the agriculture and forests sectors*

Agribusiness occupies a privileged position in the Brazilian economy for its participation in income and employment generation as for its role in the country's insertion in world trade.

Including agriculture, forests harvesting, cattle-breeding and fishing, the sector had a participation of 5.5% of the national GDP in 2006. In 2008 agriculture and animal husbandry in the state of São Paulo was responsible for 3.2% of the employments, accounting for over 375,000 jobs.

Agroforestry system:  
experiences with coffee in  
the Ribeirão Preto, SP region.





In 2008, the state production was responsible for 15.6% of the R\$ 148.4 billions generated by Brazil in the 64 main cultures produced, corresponding to R\$ 23 billions. There are 324,621 agricultural production units in the state.

Sugar cane is the dominant product in the state's agriculture: it is present in 69.1% of cultivated land (5.5 millions of hectares), and is the main culture in almost 100,000 agriculture production units, corresponding to over 30.7% of APUs<sup>1</sup>. It is the first rural product in the state's economy, with a production value of R\$ 11.2 billions in 2008<sup>2</sup>. The state is also Brazil's biggest orange producer with a participation in 2008 of 78.4% of the national production, totalizing 36.4 millions of 40.8 kg boxes and generating a production value of almost R\$ 4 billions; and cattle-raising is also very relevant – in 2008 beef was the second rural product in the state's economy, representing 13.3% of the production value and corresponding to an estimated value of R\$ 5 billions.

During the past year the state's forests production was of 41.6 millions of m<sup>3</sup> of wood, 45,900 tons of pinus resins except latex, oils and seeds. The value production for this sector, according to commercialized products (wood and resin) was R\$ 4 billion, 3<sup>rd</sup> in the state<sup>3</sup>.

## Recommendations

- 1 Economic instruments for forests conservation and recovery
- 2 Incentives towards the insertion of agricultural activities in the formal carbon market
- 3 Incentives towards the productivity increase
- 4 Dialogue promotion and association among the sectors
- 5 Incentives towards agricultural products certifications
- 6 Institutional support to family agriculture

## Agriculture in the São Paulo state

PRODUCT	HARVESTED AREA (ACRES)	PRODUCTION (TONS)	NATIONAL PRODUCTION PARTICIPATION (%)	POSITION OF THE STATE'S RANKING	PRODUCTION VALUE (R\$ 1,000)
SUGAR CANE	4,530,784	386,061,274	59.8	1st	11,258,701
ORANGE	592,566	14,537,610	78.4	2nd	3,996,018
CORN	965,907	4,681,177	7.9	6th	1,621,556
SOY	525,940	1,446,108	2.4	8th	995,494
COFFEE	186,544	256,011	9.1	3rd	881,023
BEANS	179,670	283,954	8.2	4th	635,426

Source: IBGE <sup>4</sup>

- 1 GOVERNO DO ESTADO DE SÃO PAULO. SECRETARIA DE AGRICULTURA E ABASTECIMENTO. CATI/IEA. *Levantamento Censitário das Unidades de Produção Agropecuária do Estado de SP – LUPA 2007/2008*. Available at <http://www.cati.sp.gov.br/projetolupa/dadosestado/DadosEstaduais.pdf>. Accessed in oct/2009.
- 2 INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA – IBGE. *Produção Agrícola Municipal*. Vol. 35, 2008. Available at <http://www.ibge.gov.br/home/estatistica/economia/pam/2008/pam2008.pdf>. Accessed in oct/2009.
- 3 CASTANHO FILHO, E. P. *et alli*. Valor da Produção Florestal do Estado de São Paulo em 2008. In: *Informações Econômicas*. São Paulo, v. 39, n. 6, june/2009. Available at <ftp://ftp.sp.gov.br/ftpiea/publicacoes/IE/2009/tec9-0609.pdf>. Accessed em out/2009.
- 4 INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA – IBGE. *Levantamento Sistemático da Produção Agrícola – Setembro 2009*. Available at [http://www.ibge.gov.br/home/estatistica/indicadores/agropecuaria/lspa/lspa\\_200909\\_5.shtml](http://www.ibge.gov.br/home/estatistica/indicadores/agropecuaria/lspa/lspa_200909_5.shtml). Accessed in nov/2009.

# TOURISM

Tourism is one of the largest and fastest growing economic sectors of the world. Nowadays, tourism ranks the 4<sup>th</sup> place in global export income, only after fuel, chemicals and automotive products<sup>1</sup>. In many developing countries tourism is the main income source.

São Paulo is the state that receives the most tourists in Brazil. Besides attracting 29% of the domestic flow, the state is the entrance gate for 47% of the foreign tourists who visit the country. In December 2006, it concentrated 19.4% of the jobs in the Brazilian tourism sector<sup>2</sup>.

## Overview of the tourism sector

In the recent global economic crisis context that brought alarming numbers such as the loss of 655,000 jobs in Brazil only in the month of December 2008, São Paulo was one of the main states struck by unemployment. Differently from what was expected, touristic activities experienced softer crisis impacts than other sectors of economy, which suggests tourism has to some extent an interesting crisis resilience capacity, at least in the short term<sup>3</sup>.

Rafting in Brotas, SP.  
Pionnering adventure  
tourism in Brazil.



RUBENS CHIRI/SÃO PAULO IMAGE STOCK

- 1 WORLD TOURISM ORGANIZATION. *Tourism Highlights 2008 Edition*. Madrid: UNWTO, 2008.
- 2 SÃO PAULO. *Bill no. 579/2008*. Mensagem nº 139/2008 do Sr. Governador do Estado. Diário Oficial do Estado de São Paulo, São Paulo, SP, 118 (164), 02 set. 2008. Poder Legislativo, p. 43.
- 3 ZAMBONI, R. A. CARARGO, R. S. *Uma leitura dos impactos da crise sobre o setor de turismo a partir das estimativas de emprego no setor*. IPEA, 2009.

In a green economy policy, touristic activities have a competitive advantage over other economic sectors considering natural environments<sup>4</sup>. Besides, tourism is one of the activities that creates more jobs and yields better return per unit of invested capital<sup>5</sup> – for instance, it is estimated that for each dollar invested, 6 dollars return<sup>6</sup>.

Tourism and climate change are related in two ways: on one side it is considered a victim, and on the other side a vector of these changes. As victim, tourism is extremely sensitive to climate variations. Climate defines seasons and seasonality (high and low seasons), considered an important issue in the decision making process of the tourist. In many locations, the attractions are strictly connected to the environment, when the environment is not itself the main attraction, such as the national parks. Climate affects a wide array of resources that are essential for tourist attraction, such as snow conditions, sunny beaches, biodiversity, levels and quality of water and infectious diseases<sup>7</sup>.

Recognizing the close relation between tourism and climate change the United Nations World Tourism Organization (UNWTO) states that the touristic activities are responsible for 5% of total CO<sub>2</sub> emissions in the planet. Among these, 75% are due to travel derived activities, in the transports sector.

### *Tourism and sustainable development*

Tourism is frequently referred to as one of the economic sectors with the highest potential to promote sustainable development, being a strategic activity in the creation of policies to reduce poverty and to reach the Millennium Development Goals. Through tourism, there is income and job creation for the local communities, aggregating value to natural protected environments and stimulating the knowledge and cultural exchange among people.

Sustainable tourism policies have a lot to contribute towards a green economy in the local, national and global levels, through job and income generation and the environmental quality maintenance, provided by the development of the touristic activity. These subjects are related in such a way that makes it impossible to think of the green economy without considering the search for sustainable development.

### Recommendations

#### 1 Tourism State Plan

- Stimuli to the increase of stay of tourists in the state
- Stimuli to ecotourism
- Diversification of attractions

#### 2 Stimuli to tourism practice inside the state – Paulistas visit São Paulo

#### 3 Sustainable transports policy

#### 4 Sustainable building in tourism infrastructure

4 WORLD TOURISM ORGANIZATION. *Climate change and tourism: responding to global challenges*. Madrid: UNWTO, 2007.

5 LICKORISH, L. J. JENKINS, C. L. *An introduction to tourism*. Oxford: Butterworth – Heinemann, 1997.

6 SÃO PAULO. *Op. Cit.*

7 WTO. *Op. Cit.* 2007.

# ECONOMIC INSTRUMENTS

The use of environmental economic instruments is a tool to improve the efficiency of environmental policy – it is thought that the best results in environmental preservation can be achieved by acting in a complementary manner with the traditional tools of command and control, inducing socially desirable behaviors, maximizing welfare and financing social activities.

## *Cross-Subsidies*

Cross-subsidies applied to the environmental issue are mechanisms created with the objective of providing benefits or tax to the polluters or users, according to the different amounts of natural resources used, amount of electricity consumed, types and quantities of pollutants emitted or by amount and type of waste generated.

Thus, by adding tariffs to polluters, a scale for taxation can be created with the objective of providing some stimulus for those searching for best practices and pollution reduction. The two main state taxes that could be used for this purpose are ICMS<sup>1</sup> (state tax on the circulation of goods and services) – the collection of ICMS in real terms in the state of São Paulo was R\$ 80.2 billion, representing 34.3% of the total ICMS collected throughout the country; and the IPVA (municipal tax on motor vehicles), whose revenue in 2008 was R\$ 7.71 billion, representing 8.9% of revenue of the state<sup>2</sup>.

## *Payment for environmental services*

Payment for Environmental Services (PES) is a promising economic instrument for the sustainable management of natural resources and for conservation and environmental restoration. Associated with the recognition of the fact that the environment provides for free a wide range of goods and services that are of direct or indirect interest of human beings, this instrument is applied to pay or reward the ones who take initiative to conserve, restore or expand ecosystem services.

- 1 BANCO CENTRAL DO BRASIL. *Impostos e contribuições federais, e impostos estaduais e municipais*. Available at <http://www.bcb.gov.br/htms/Infecon/FinPub/cap2p.pdf>. Accessed in sep/09.
- 2 SECRETARIA DA FAZENDA DO ESTADO DE SÃO PAULO. *Relatório da Receita Tributária*. Available at <http://www.fazenda.sp.gov.br/relatorio>. Accessed in sep/09.





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Payment for Environmental Services: economic instruments for conservation, forest restoration and sustainable management.

### *Categories of PES in the context of climate change*

Not considering the conceptual differentiation between the terms “ecosystem services” and “environmental services”, examples of these initiatives are represented by programs such as conservation of water resources (payment for the production of drinking water), environmental taxes (payment for the implementation and maintenance of conservation areas), environmental compensation (private companies pay the state or the surrounding population for environmental impacts and inevitable losses), subsidies to extractive reserves (payment for the sustainable use of natural resources) and carbon credits (payment for the capture or the additional reduction of greenhouse gases).

In Sao Paulo, the Secretariat for the Environment developed the strategic project called Riparian Forest and within, the Water Producer program. Through this program, two pilot projects in the cities of Nazareth and Joanópolis Paulista are being implemented with partnerships between the Department of Agriculture and Supply, the National Water Agency and non-governmental organization TNC (The Nature Conservancy). The project area covers 2,800 hectares and provides compensation for farmers using techniques of soil conservation, recovery of Permanent Preservation Areas (PPA's) and maintenance of existing forests through water use tax collection from the Piracicaba, Capivari and Jundiá (PCJ) rivers basin.

### Recommendations

- 1 Cross-Subsidies
- 2 Payment for environmental services (PES):
  - PES for garbage collectors
  - PES for coastal communities
  - PES for landowners



# GREEN ECONOMY INDICATORS

Many factors, including the absence of other indicators, led to the association of GDP not only with growth, but also with the economic development of countries. Lately, the deficiencies of GDP have become more visible and some advances were made in other areas – resulting in the fact that the range of indicators now available to policymakers is extensive and also quite complex, including indexes created from several variables with different weights and dimensions.

Since 1990, the establishment of the Human Development Index (HDI) by the United Nations Development Program (UNDP), the social dimension has been gaining ground, bringing to the surface a largely neglected subject so far: the life conditions of the population. The emergence of HDI drove to the creation of numerous other indicators of socio-economic development. Later, this dimension would be addressed after the final document of the United Nations Conference on Environment and Development (Rio-92) raised the need to establish indicators measuring sustainable development.

Responsible for implementing Agenda 21, the Commission on Sustainable Development (CSD) of the UN in 1996 produced its first version of sustainability indicators.

The Brazilian Institute of Geography and Statistics (IBGE) has created, for the years 2002, 2004 and 2008, a publication with sustainable development indicators (SDI). The latest version includes 60 indicators, divided into four dimensions: environmental, economic, social and institutional.

## Recommendation

### 1 Green Economy Panel of Indicators

## Panel of Indicators

In the context of Green Economy in the State of São Paulo, it is essential to use a panel of indicators to assist in monitoring and evaluating the actions and results of the Plan for each theme. The election of indicators took into consideration the relevance of the variables, the ability to measure the data and information availability.

## Green economy panel of indicators

ASPECT	INDICATOR	DESCRIPTION	MEASUREMENT UNIT		SOURCE
RENEWABLE ENERGY	RENEWABLE ENERGY USE	Percentage of renewable energy in total consumption, by sector (transports, industry, residential, agriculture, etc.)	%		State Secretry of Energy and Sanitation
	ENERGY EFFICIENCY	Useful renewable energy made available, in relation to total generated energy involved in the process.	%		E
	ENERGY INTENSITY	Energy consumption per unit of generated wealth, by sector/source.	kWh by GDP unit (in brazilian reais)		State Secretry of Energy and Sanitation
	INCOME AND JOB GENERATION	Total generated wealth and number of jobs created by renewable energy, cleantech and related areas investment.	Monetary unit (Brazilian Reais)	Job number	E
	GREENHOUSE GAS EMISSIONS	Greenhouse gas emission (GHG) intensity by population and generated wealth, considering sector participation in total emissions.	Per capita GHG emission	GHG emission by unit of gdp (in Brazilian Reais)	% State Secretry of Energy and Sanitation
GREEN TECHNOLOGY	RESEARCH AND DEVELOPMENT	Volume of public and private resources destined to cleantech research and development.	Monetary unit (Brazilian Reais)		E
	TECHNOLOGICAL INNOVATION	Index considering cleantech innovation-related variables to be defined.	E		E
	E-WASTE	Index evaluating e-waste collection, destination and treatment.	E		E

ASPECT	INDICATOR	DESCRIPTION	MEASUREMENT UNIT		SOURCE
TRANSPORTS	MASS TRANSIT	Percentage of mass transit fleet operating on renewable energy.	%		State Secrety of Transports
	TRANSPORTATION MATRIX COMPOSITION	Relative participation of each transportation mode in total volume of transported passengers and cargo.	%		State Secrety of Transports
	ENVIRONMENTAL EFFICIENCY OF TRANSPORT MODES	Index composed of three variables: fuel efficiency (l/TKU); energy efficiency (t/hp); and CO <sub>2</sub> emissions (emissions/TKU).	E		E
	ENVIRONMENTAL PERFORMANCE OF AUTOMOBILES	Index composed of three variables: renewable fuel use, energy efficiency and pollution emissions.	E		Brazilian vehicle eco-labeling, and PROCONVE/IBAMA.
	TRANSPORTATION MATRIX COST	Transport mode cost.	Monetary unit (Brazilian Reais)/tku		E
	PUBLIC HEALTH	Relation between pollution-related diseases and transport emissions.	E		E
SUSTAINABLE CONSTRUCTION	CERTIFIED WOOD	Percentage of civil construction enterprises utilizing certified wood.	%		Environmental Planning Division/State Secrety of the Environment
	WATER USE EFFICIENCY	Percentage of households with water reutilization systems.	%		E
	CIVIL CONSTRUCTION WASTE MANAGEMENT INDEX	Index evaluating collection, transportation, destination and treatment of civil construction waste.	0-10 Scale		Green Municipality Program
	MATERIALS CONSUMPTION	Efficiency of sand, stone, and cement use, among other materials.	E		E
	ENERGY CONSERVATION	Percentage of households with energy conservation improvements.	%		E
	WORKFORCE INFORMALITY	Percentage of civil construction workers without official registration.	%		Civil construction industry syndicate – sinduscon
SANITATION	WASTE MANAGEMENT INDEX	Index evaluating waste management, considering landfill quality, compost units and waste sorting.	0-10 Scale		São Paulo State Environmental Company – CETESB
WATER	WATER USE STRESS	Water demand over 40% of available supply.	%		Environmental Planning Division/State Secrety of the Environment
	WATER QUALITY INDEX	Water quality evaluation based on 9 parameters: temperature, ph, dissolved oxygen, oxygen biochemical demand, coliform bacteria, nitrogen, phosphor, total dissolved material and turbidity.	0-100 Scale		São Paulo State Environmental Company – CETESB
	WATER LOSS INDEX	Percentage of lost water from total distributed water by public infrastructure.	%		São Paulo State Sanitation Company – SABESP
AGRICULTURE AND FORESTS	ORGANIC AGRICULTURE	Index considering variables as organic agriculture participation in total agriculture and relation between conventional and organic product price, among others.	E		E
	WATER USE EFFICIENCY	Water consumption variation by unit of product of a given culture over time.	E		E
	AGROTOXIC CONSUMPTION	Percentage of areas with agROTOXIC use and total product application according to environmental class (as defined by Decree n. 98.816/90).	%	kg by thousand acres	Brazilian Institute of Geography and Statistics methodology used in the state of Parana.
	IRRIGATION IN WATER-STRESSED REGIONS	Percentage of irrigated area coinciding with water-stressed regions.	%		Environmental planning division/state secrety of the environment
	INTENSIVE CATTLE-RAISING	Percentage of areas with intensive cattle-raising activities, in relation to total cattle-raising activities.	%		Environmental Planning Division/State Secrety of the Environment
	FOREST USE	Comparison of silviculture-dedicated areas with illegal deforestation.	E		E
TOURISM	TOURISM ECONOMY	Participation of tourism in the services sector, expressed by added value and generated jobs.	Monetary unit (Brazilian Reais)	Number of jobs	E
	SHORT-DISTANCE TOURISM	Percentage of touristic travels by São Paulo state residents to other state municipalities.	%		E
ECONOMIC INSTRUMENTS	PAYMENT FOR ENVIRONMENTAL SERVICES	Amount raised by water use charging and values transferred to municipalities via the Eco-ICMS (product and services circulation tax) program.	Monetary unit (Brazilian Reais)		Environmental Planning Division/State Secrety of the Environment

Note: E – indicator demanding elaboration or source.

# BUILDING THE AGENDA

A Green Economy agenda is, by definition, a multisectorial proposal which gathers multiple public policy actions around the purposes of economic growth, job generation and environmental quality improvement. The São Paulo State Government is already developing many actions with impacts on Green Economy related issues:

## *PROCLIMA*

The State Program of Climate Change Prevention – PROCLIMA, created in 1995, is in charge of the State Inventory of Greenhouse Gases (to be concluded in 2010 with the emissions from 1990 to 2008), of the participation and representation of the Secretariat for the Environment in the meetings related to climate change, and of the collaboration with the federal government on the implementation of international agreements, among other actions.

## *Strategic Environmental Project Riparian Forest*

The Strategic Environmental Project *Mata Ciliar* (Riparian Forest) has the objective of promoting the recovery of the State's riparian forests, contributing to the growth of forest cover. Among the specific goals of the project are the delimitation and demarcation of 1.7 million acres of riparian forests, the interdiction and protection of 1 million acres for natural regeneration and the forestation of areas amounting up to 180 thousand acres.

## *Strategic Environmental Project Green Ethanol*

Created in 2007, the Paulista Agroenvironmental Protocol – a partnership between the Secretariat of the Environment and associations of sugar and ethanol producers – aims to eliminate the practice of sugarcane straw burning in the State, among other environmental preservation-related actions. At least 90% of the ethanol plants of São Paulo have already joined the Protocol, totalizing 155 units.

## *Strategic Environmental Project Minimum Waste*

The Strategic Environmental Project *Lixo Mínimo* (Minimum Waste) aims to promote the minimization of municipal solid waste through technical and financial support to the municipalities. Aligned with the principles established in the Solid Waste State Policy, it stimulates the adoption of environmentally suitable practices of reutilization, recycling, reduction and energy recovery and, eventually, the adequate appropriate destination of unusable rejects.

## *Strategic Environmental Project Ecotourism*

The Strategic Environmental Project *Ecoturismo* (Ecotourism) aims to consolidate ecotourism and sustainable tourism as strategies of nature conservation and preservation, besides contributing to regional socioeconomic development. Developed by the State's Forest Foundation, its main actions are the Ecotourism Project in the Atlantic Forests (*Mata Atlântica*) and the Trails of São Paulo Project (*Trilhas de São Paulo*).

## *Expansion SP*

Expansion SP is a broad program toward the improvement of efficiency and quality of services of public transportation in the metropolitan areas of São Paulo, Campinas and Santos. The investments of the State Government exceed R\$ 21 billion, constituting the largest volume of resources ever used in the country to widen and modernize mass transportation.

### *Revitalization of Waterways*

The Secretariat of Development and the Secretariat of Transports are improving and integrating waterways in the transport matrix of the State of São Paulo. Among the activities are the attraction of new users for the water transport system, modeling, the identification of investors and the development of the municipalities that have boundaries with waterways.

### *São Paulo Duct Network*

The Secretariat of Development of the State of São Paulo is studying with other seven State secretariats the implantation of a São Paulo Duct Network, aiming to reduce the flow and the emissions of cargo vehicles in the metropolitan regions, widening the accessibility to State's ports, reducing freight costs and increasing the economy's competitiveness.

### *Cleantech for public transportation*

The State Government of São Paulo takes part in the BEST project – Bio-Ethanol for Sustainable Transport, which aims to stimulate the use of ethanol-fueled buses which reduce up to 90% of the particulate material emissions. Furthermore, it was proposed a project to substitute diesel-fueled by electrical buses. Regarding the State fleet, a decree from 1998 determines the preferential purchase of ethanol-fueled vehicles.

### *Tax incentives for cleaner fuels*

The Government of the State of São Paulo practices the country's lowest tax rate for the Merchandise and Service Circulation Tax (ICMS) to hydrated alcohol, primarily used as a clean automotive fuel, of 12%. Until 2003, this rate was 25%. Gasoline, for instance, is taxed at 25% by the same instrument – a difference which favors the consumer, ensures ethanol competitiveness and stimulates job generation in the sector.

### *Substitution of oil by gas in the industry*

Market forces are already driving the substitution of oil-based burners by gas-based burners. Not only this measure improves economic and energetic efficiencies and substantially reduces pollution, it paves the way for a future utilization of biogas, which can be burned in the same systems. To the State Government, a role of stimulation through favorable credit conditions and other forms of support is key.

### *Biomass energy*

The generation of renewable energy from biomass is one of the most promising alternatives for the State of São Paulo. Already corresponding to 23% of the energy consumption in the State, biomass energy is a zero CO<sub>2</sub>-emission source which can be generated both in small or large scales. According to the sugar and ethanol sector, R\$ 45 billion are to be invested until 2015 in combined cycle energy plants.

### *Research on climate change*

The Foundation for the Support of Research in the State of São Paulo (FAPESP) has launched in 2008 Brazil's largest and more articulate multidisciplinary effort to enhance knowledge about global climate change. R\$ 100 million will be invested in the next 10 years in the development of basic and applied research on the causes of climate change and its impacts in social, environmental and economic systems.



# GREEN ECONOMY

DEVELOPMENT, ENVIRONMENT AND QUALITY  
OF LIFE IN THE STATE OF SAO PAULO

## *Governor of the State of Sao Paulo*

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## *Secretary of State for the Environment*

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GREEN ECONOMY  
DEVELOPMENT  
ENVIRONMENT  
QUALITY OF LIFE  
STATE OF SAO PAULO  
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QUALITY OF LIFE  
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SECRETARIA DO  
MEIO AMBIENTE



**GOVERNO DE  
SÃO PAULO**