Annual Report

2010
2010 ANNUAL REPORT

IPT – Institute for Technological Research of the State of São Paulo
Secretariat of Science, Technology, and Economic Development
IPT’s 2010 Annual Report

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To Alberto Pereira de Castro
(1915-2010),
who in 32 years of hard work
at IPT left a legacy of defense of
knowledge and ethical conduct
Research focused on innovation

With the beginning of our administration at the head of the São Paulo State Government in January 2011, we found the Institute for Technological Research (IPT), linked to the Secretariat of Science, Technology, and Economic Development ready to take one more step towards the future after consolidating a R$120 million investment cycle for new laboratory capabilities and professional training.

Technology is one of the pillars of development and a strategic agent for national action in the international scene. This is a reality that becomes more evident each day and the challenge for IPT is to look towards the future and detect the demands and opportunities that can promote innovation, bringing industry and services closer to the knowledge produced in our universities.

Investment in technology is ongoing. For this reason, the State Government is directing this year more than R$ 50 million to IPT in order to enable the Institute to continue its modernization process.

In 2011, IPT will inaugurate the facilities of its new bionanomanufacturing laboratories which will conduct important biotechnology, particle technology, and micro equipment manufacturing research. Other of the Institute’s projects, to be inaugurated in 2012, is the Light Structure Laboratory (LEL); currently in experimental operation at the São José dos Campos Technology Park, this laboratory will help to allow the aviation industry to build more efficient aircraft, for example.

IPT will also start a biomass gasification plant project in Piracicaba that will enable the production of second generation ethanol from sugarcane bagasse, currently used from burning to generate energy. With the gasification the productivity of mills could be doubled without increasing the size of cultivated areas. This project will also impact IPT’s position as well as the nation’s, in a global technology race now that gasification – with bagasse, coal, or other biomass – is yet to be conquered.

Geraldo Alckmin
Governor of the State São Paulo
Technology and Entrepreneurship

The nation’s economic development and that of the State of São Paulo depends on coordinated actions that envision factors such as strengthening new companies, job creation, workforce training and technological research for innovation.

Based on this perspective, the Secretariat of Science, Technology, and Economic Development sees the modernization of the Institute for Technological Research (IPT) as a project in line with the training of technical personnel and higher learning graduates for even further integration of development initiatives.

The Secretariat serves as a connector between the agencies and universities under its structure and the industry. IPT plays an important role as a mediator of this link, having the ability to participate in initiatives for fast absorption of technological know-how by companies and for process quality improvement.

More technology also means speedy responses to the market demands for companies. One of the missions of the Secretariat under Geraldo Alckmin’s administration is to promote IPT capabilities and in this way take technological innovation to the small and medium business owners. The trademark of entrepreneurship is the trademark of São Paulo, and technological innovation along with entrepreneurship is one of our main objectives.

Paulo Alexandre Barbosa
State of São Paulo Secretary of Science, Technology, and Economic Development
In 2010, the Institute for Technological Research (IPT) completed a three-year investment cycle for the modernization of laboratories and its administration, starting to operate its new infrastructure and to project social benefits. During the 2008-2010 period, the Institute consolidated projects that allowed the invigoration of its historic role as partner in the development of the State and nation.

From these new capabilities, the Institute returns its attention to the 2020 Plan focusing on strategic action that will guide technological development in this decade. Technological innovation is one of the pillars of the globalized world. The strengthening of IPT is an action that should make a huge impact on areas that depend on knowledge and create demands for sustainable solutions.

Through this report, the reader can verify that the modernization of IPT is a challenge that also takes its human resources in strong consideration. The Institute hired professionals through public examinations and consolidated an international program for professional training in cutting edge research institutes, as well as it works to restructure their careers to reflect the new realities of the job market.

The reader can also learn about the various new areas of laboratory capabilities, such as oil flow metrology, corrosion, and light structures, which area inserted into strategic contexts for national research and industrial development. Also worthy of mention is the series of projects completed in 2010 which show the value of IPT’s multidisciplinary focus.

João Fernando Gomes de Oliveira
CEO of IPT
Brazil is currently a highlight in the international economy, projecting positive indicators and heading along the path of sustainable growth. Today the country is promising, most of all, on the energy issue, regardless of which aspect is addressed. Due to the discovery of oil reserves in the pre-salt layers and the history with biofuel production, Brazil maintains promising perspectives in the old economy, also known as “oil civilization”, as well as in the new world energy model which will continue to search to more renewable alternative sources.

In this scenario, technology emerges as a strategic ingredient for the nation to continue in the spotlight and help to confront the problems of global warming, mitigating the impact of production systems.

In 2010, IPT consolidated a three-year investment cycle applying approximately R$120 million in a more modern technological structure to face the challenges of the country’s development. This new technological base promotes a transformation of the Institute’s role, which is evermore present in society as a mediator and source of innovation, enabling the application of technological knowledge in companies.
IPT’s new laboratory capabilities aim at producing solutions focused on sustainable development, covering bionanotechnology, renewable energy, highly efficient energy materials and infrastructure projects with lower environmental impact. New laboratories such as bionanomanufacturing, naval, corrosion, light structures and oil flow metrology, among others, now provide support in order for the Institute to develop research and services of greater added value.

The IPT modernization involves human resources, new administrative procedures and equipment. The human aspect is essential to this transformation. In 2010, 80 new employees were hired through a civil service selection process in 2008 – considering the 140 in 2009; the Institute has 220 new employees. And in 2011 it will hold a new selection process to qualify another 250 professionals.

Another important aspect of research valorization is the International Development and Training Program (PDCE) which, in 2010, sent 13 more researchers to complete training programs in IPT partner institutes abroad, such as Fraunhofer in Germany, Imperial College in the United Kingdom, the U.S. Geological Survey, and VTT in Finland. These researchers join 12 others that participated in the Program in 2009 and 2008.

The next IPT development cycle, which is now set for a planning project named “IPT 2020”, will also include indicators that will reveal the operational effectiveness of the Institute on its role as liaison between industry demands and scientific knowledge. Such indicators involve not only the effective technology transfer but also its own innovation initiatives such as software, patents, and publications allowing an overview of the Institute’s performance in the same approach adopted in other developing countries such as South Africa, South Korea and India, among others.

Through this initiative as well as new management tools, IPT is reorganizing its administration in a way that will make it a performance model for the nation’s public research institutes.
The new capabilities

In 2010-2011, IPT started performing with the investments made throughout the last three years. 2011 also marks the advance of the Institute’s modernization project, which is mainly supported by resources from the State of São Paulo Government, FINEP (the Brazilian Innovation Agency), and BNDES (the Brazilian Development Bank). In addition to complementing investment planning, which will reach the R$180 million mark, the Institute also receives R$50 million from the State of São Paulo Government for investments in 2011. The modernization project is a mark in IPT’s history and its results can be seen through the new capabilities in different topics.
Pipe corrosion and weathered paint

The Corrosion and Protection Laboratory (LCP) of the Center for Integrity of Structures and Equipment (Cinteq) received R$11.8 million in investments. A complete infrastructure modernization process turned it the most advanced laboratory of its kind in the Southern Hemisphere. The study of corrosion is important to avoid collapse of metallic material in bridges, poles, pipes, tanks, and all and any solution using steel as the construction material. Knowledge on the subject supplies subsidies for the correct material specification whether in large elements like storage tank slabs or even screws or other fasteners. IPT’s work in corrosion research has contributed to the development of international standards as in the case of corrosion in pipes to be used for petroleum byproducts. IPT also provides subsidies for standards related to paint weathering, a rarely studied topic.

Light structures

The Light Structures Laboratory (LEL/Cinteq) is the first of the genre in the country that will play a strategic part in the development of new materials and processes for various fields in the industry, including aviation. The laboratory was set up in five thousand square meters at the São José dos Campos Industrial Park. LEL has two basic physical areas: one dedicated to metallic material and the other to composite materials like carbon fiber. In the case of composites, it will have a 1.2 thousand square meter cleanroom conforming to the standard aviation industry regulations which will guarantee ideal conditions for the development and testing of parts. LEL has a total investment of R$90 million for its installation and operation along with research projects. In 2010 the laboratory began conducting its first operational tests. This project was developed with resources from the State of São Paulo Government, the São Paulo Research Foundation (FAPESP), FINEP, and Embraer. The initiative will bring together the work of universities in this field, such as the University of São Paulo (USP) and the Air Force Technology Institute (ITA).

Hydrodynamic testing

The Center for Naval and Ocean Engineering (C-Naval) revamped its activities with a R$9.5 million investment in order to receive new facilities aimed to meeting the
demands of technological support for the maritime transport and offshore oil platform sectors which are experiencing a historical resumption of activities after nearly failing during the 1980s and 1990s. The project was fostered in the framework of an agreement between Transpetro and the Ministry of Science and Technology (MCT). As the owner of the continent’s largest ship fleet, Transpetro is one of the main organizations demanding from the laboratory. 90% of the applied resources come from Petrobras and 10% from FINEP, which is part of MCT’s structure. The new laboratory project was designed based on three objectives: create a multi-use center with 15 work stations for researchers, project team members and the Institute’s clients; increase the C-Naval’s laboratory capabilities with modern measurement equipment for testing in test tank, wind tunnel and cavitation tunnel (propeller studies); and reduce physical model construction time for testing in these laboratories.

Propulsion studies

The C-Naval cavitation tunnel completed 47 years of existence in December and resumed operations as service provider after reformulation of instrumentation designed for testing propellers on a reduced scale. The new measuring equipment was acquired in the Petrobras Thematic Networking Project for revitalizing the Center laboratories. The tunnel consists of a closed water circuit, steel built, constructed in a way that allows the installation of a propulsion model in its test section. The water circulating inside the tunnel makes it possible to measure the parameters of the propeller’s operation (push and torque) not only in the so-called static condition, but in all phases of operation.

Anchoring device testing

The new building for heavy testing begins a technical support operations in 2011, mainly for Petrobras, for pre-salt oil exploration and production. The laboratory will conduct long term static and dynamic fatigue testing in structures and equipment of large scale which are applied to components of offshore platform anchoring, risers, umbilical cables, flex and rigid pipes, among others. The greater part of a total of R$21.7 million for building the laboratory involves new investments: Petrobras is participating in the project with R$9.4 million towards the purchase of equipment and the São Paulo State Government with R$8.5 million for construction of the building on the IPT campus, totaling R$17.9 million. The other R$3.8 million which complete the sum involve investments already made in equipment with resources originating from FINEP and private companies in the heavy mechanical sector interested in new laboratory capabilities. The laboratory is relevant considering the depths of pre-salt exploration on high seas, which can reach over three thousand meters. The increased water space means a bigger hydrodynamic effect on the anchor lines and other offshore structures with load tension that can reach 2 thousand force tons (tf). The tests conducted by IPT will support the certification of processes and products according to the standards for these applications.

New research in compressed air systems

In October 2010, IPT inaugurated the new Compressed Air and Gas Systems Laboratory (Lasag/CMF), developed in partnership with the Brazilian Association of Machinery and Equipment (Abimaq). The laboratory is the nation’s first dedicated to testing and analysis of equipment and compressed air and gas systems such as compressors, filters, valves, dryers and pneumatic installations, among others, enabling the quality certification of these systems in industrial, commercial, and hospital facilities. Lasag received R$1.1 million in investment, including R$700 thousand from FINEP, R$250 thousand from Abimaq, and R$150 thousand from IPT itself. In addition, laboratory equipment was donated by manufacturers.

Side page

top: Internal duct corrosion studies provide subsidies for the correct specification of systems and additives

middle: Laboratory that will hold equipment for dynamic testing with loads that may reach 2 thousand tons force (tf)

bottom: Ship model performs tests in the test tank to optimize the hull’s hydrodynamics
New flow measurement capabilities

The Oil Flow Metrology Laboratory, linked to the Center for Fluid Metrology (CMF), was inaugurated in December 2010 after receiving R$6.7 million in investments, of which R$4.0 million came from Petrobras by way of the Metrology Network Project; R$2 million were invested by the São Paulo State Secretariat of Economic, Science and Technology Development as part of the IPT modernization project; and R$700 thousand from FINEP. Based in a 750 square meter building at IPT campus, the laboratory was planned and built mainly for the purpose of meeting the needs of the nation’s oil industry and the sector’s regulatory departments execution of calibration, testing, comparative testing, research and development in different types of measuring devices and measurement system components for oil and byproduct flow.

Electromagnetic compatibility

The new Cinteq electromagnetic compatibility chamber is dedicated to research on avoiding interference between electronic equipment like TVs, radios, mobile phones, computers, and electronic systems, among others. The State of São Paulo Government invested R$4 million in the chamber, including the technological resources and construction projects. The new laboratory will give technological support to the electronics industry so that its products are compatible with each other. The chamber consists of a room equipped with polyurethane foam with graphite infiltrations by way of a combination of cones, pyramids and panels through which the goal is to restrict the echoes of electromagnetic waves, guaranteeing precision in measurements taken by the latest generation equipment.

Wave metrology

The Electrical Metrology Laboratory (LME) from the Center for Mechanical and Electrical Metrology (CME) is enabling itself for tracking capabilities of magnetic greatness. The work, groundbreaking in Brazil, will make it possible to take reliable measurements and the magnetic characterization of a wide range of field intensities and magnetic induction. Applications include testing, calibration and development of components and equipment used in geophysical prospecting, spectroscopy and chemical analysis, diagnostic medicine and therapeutics, in addition to electric machines and cars. IPT invested, through its modernization project, more that R$ 250 thousand in equipment and capabilities in this field. These resources will allow even more development of simple methods for characterization of magnetic nanoparticles. In medicine, these nanoparticles can help to identify and destroy tumors and magnetically guide the path of medications to the point of interest avoiding collateral damage in healthy tissues. In a macroscale, magnetic methods can be used to verify the structural integrity of components like pipes, risers, and umbilical lines in industrial installations and oil exploration platforms.
The new anechoic chamber is used to study the electromagnetic interference between electronic products.

side page: The new Oil Flow Metrology Laboratory will be reference in this kind of measurement.
New chemistry infrastructure

In October 2010, IPT inaugurated the new Chemical Analysis Laboratory (LAQ) from the Center for Metrology in Chemistry (CMQ). An investment of R$5.3 million allowed the replacement of old equipment, purchase of latest generation machines and restoration of the physical LAQ area. The resources came from the São Paulo State Government for the IPT modernization project. The laboratory received R$4.7 million in instrumentation and an additional R$600 thousand for upgrades in the building located at the IPT campus. On the ground floor the necessary infrastructure was built for trace and ultra-trace analysis; the tests used to determine the presence of contaminants in minimal quantities such as heavy metals and combustibles and pesticide residues in natural waters. For the execution of the tests, a gas chromatograph coupled to a high resolution mass spectrometer and a mass spectrometer with an inductively coupled plasma source was purchased. These allow the laboratory total coverage of client solicitations. New capabilities will be available with the restructuring. Two 9.4 Tesla (T) MRI machines will make molecular research easier, structural and dynamic determination of samples in a solid state or in solution. The ample array of benefitting sectors includes the petroleum industry, agriculture (soil, seeds, fertilizers), chemical (detergents, pigments), cosmetics, pharmaceuticals, and food (milk, wine, rice and fats in general), in analysis for unknown substance identification, determination of pureness and chemical identity.

Reference materials for industry

IPT revamped and modernized its measurement structure for high quality chemistry definitions in the Metrological References Laboratory (LRM) at CMQ, which will allow the development of new certified reference materials (CRM), and the promotion of new inter-laboratory proficiency programs that support the quality guarantee of measurements in the steel industry, metallurgy, mining, and oil in addition to universities and research institutions in Brazil and abroad. From its establishment in 1976, the laboratory developed and made available more than 130 types of materials with a variety of certified properties (in alloys, minerals, oil products), which are used in instrument calibration, chemical analysis methodology validation and physical and chemical testing. With the technological evolution, the industry and the university now need standards with more certified properties, at levels up to 10 thousand times smaller than those necessary in 1990, for example.
Metrotomography measurements

In 2010 a partnership between IPT and Werth Messtechnik GmbH, a company from Germany, was established when a metrotomography machine and high precision coordinate measurement machine, both made by the company, were purchased. The partnership, with a three-year term, includes the donation of two coordinate measurement and measurement sensor machines to IPT in exchange for support in the development of measurement techniques involving the machines and sensors acquired. Through this partnership, the Institute becomes an essential part of the process of developing measurement techniques representing what is most modern in the sector. Due to this new technology, IPT sent in 2010 two researchers to Germany for training at Werth. These trips were possible through the Institute’s International Development and Training Program (PDCE).

Solar energy research

In 2011 IPT will complete the assembling of its new solar simulator, at the Building Installations and Sanitation Laboratory (LIP), at the Center for Technology of the Built Environment (Cetac). The simulator will allow the assessment of various electrical and hydraulic components of the building facilities with emphasis on compliance assessment and on meeting the demands of energy efficiency in water heaters (electrical and solar). The new resource will be essential for the development of alternative energy technologies. Few countries have solar simulators. IPT’s simulator will allow conducting not only collector efficiency tests but also of construction systems. Its installation will amount to the beginning of new capabilities for the Institute — which already develops projects for the usage of alternative energy.
New Photometric Assessments

Cinteq’s Electrical and Optical Equipment Laboratory (LEO) started to operate in 2010 a strategic piece of equipment with which the industry can develop fixtures for commercial, public, residential, and industrial use with more energy efficiency and lower environmental impact. Such equipment, the goniophotometer, is a computerized system that measures the characteristics of the emitted light which the researchers and technicians call “photometric curves”. The acquisition of this German equipment was possible through a R$1 million project through IPT’s partnership with FINEP and the Brazilian Lighting Industry Association (Abilux) – the two partners invested, respectively, R$750 thousand and R$50 thousand. IPS has also invested R$200 thousand in the project. The goniophotometer is strategic because it is the first photometric service option with this type of equipment in Brazil.

Very low pressure measurement

The Mechanical Metrology Laboratory (LMM), linked to the Center for Mechanical and Electrical Metrology (CME), modernized its facilities for very low pressure calibration. Measurement with precise levels of very low pressure and vacuum, significantly lower than those of atmospheric pressure, is important for the industry, for example, for the evaluation of component compliance for the automotive sector, oil and gas sector process controls, monitoring conditions of clean rooms, pharmaceutical ingredient production and altimeters for aircraft. The calibration of transducers and instruments used for ultra low pressure measurement is the foundation for the process of metrological confirmation. It is through this calibration that information for evaluating the service of metrology requirements in measurement equipment is obtained, ensuring the potential monitoring of the measurement results.

New electron microscoping capabilities

Beginning operations in 2010, the new scanning electron microscope (SEM) plays a fundamental role in the classification of material thickness and morphology. The microscope is one of IPT first pillars in enabling research and testing on a nanometric scale. With the possibility of use in several laboratories, the new equipment works with two types of beams: the main electron beam (FEG) is able to produce high resolution images which are magnified up to 300 thousand times (as compared to the conventional models which are limited to 15 thousand times), while the gallium ions beam performs the milling of samples — it is now possible to make an orthogonal cut on surfaces for 3D viewing. The São Paulo State Government invested €1.046 million for the microscope’s acquisition, including accessories.
The new capabilities

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top: The electron scanning microscope with focused ions beam device (FIB) is one of the pillars in capabilities for nanometric scale research and tests

above: Goniophotometer measures the characteristics of light and helps to develop more efficient and economical luminaries

side page: Industrial applications from pressure measurement include the assessment of automotive components compliance
New bionanomanufacturing building

IPT will house Brazil’s most modern center for bionanomanufacturing research. The construction of the new building started in December of 2010 and throughout 2011 the laboratories will be equipped with already acquired equipment. With investments of R$ 46 million from the State of São Paulo Government, the Institute will establish an eight thousand square meter building for the study of biotechnology (development with living organisms), particle technology (microencapsulation of chemicals and medical therapy components, such as cosmetics), micromanufacturing of equipment, and metrology. The new construction cost R$ 21 million and another R$ 25 million are related to equipment and facilities.
The new capabilities IPT 2010 Annual Report
Services with a greater added value

The IPT modernization program launched infrastructure operations that already add value to the group of services the Institute offers to the market. This is the case, for example, of laboratorial research that use high precision scanning electron microscoping (SEM) – which also produces knowledge in addition to meet the demands for services.

An aspect of the strategic knowledge IPT produces can be found, for instance, at the Residues and Contaminated Areas Laboratory (LRAC), linked to the Center for Environmental and Energy Technologies (Cetae), which is working on a project for remediation and revitalization of contaminated areas with the support of R$ 14 million from the Brazilian Development Bank (BNDES). This project will favor the fight against environmental liabilities and the recuperation of areas currently contaminated with industrial residues like organochlorides.

Also worthy of mention is the research for obtaining solar grade silicon (SiGS), designed for the manufacturing of photovoltaic cells for generation of electricity, a project that receives R$ 11.6 million from the BNDES.

The key element to make these new capabilities available is the planning process through business plans managed by the Institute’s Technology Administration Management (GGT). Through this process the IPT Centers establish goals and broad strategic lines for market performance, adopting objective criteria under the perspective of the four IPT lines of action – pre-salt, sustainability, infrastructure, and bionanomanufacturing.

This whole process of IPT transformation also has the support of its directors in the form of getting even closer to the client, which will surely enable the alignment of decisions with market demands in the different sectors in which the Institute operates.
In this context, among other initiatives, an agreement between IPT and the State of São Paulo Dersa – Highway Development Company was established in November 2010. The Institute began operating in Dersa transportation infrastructure projects since its establishment, expanding the range of preventative action and mitigating the need for corrections based on unwanted incidents like the November 2009 accident in which beams of a bridge under construction fell on the road. The agreement with Dersa is also important because there is no specific work or projects, but instead it acts as a reference that can cover all the company’s demands, improving its management efficiency in new projects.
IPT in numbers

Last year IPT served 3.5 thousand companies, the greater part of them small and medium organizations. As a result of the Institute’s work, 26,794 technical documents were released in 2010, including calibration certifications, reference material certifications, technical advice, technical references, and technological service reports, among others, and 75,852 technical regulations were accessed. The Institute filed six invention patents in Brazil and one abroad. The technical staff’s scientific production resulted in 194 national and international papers.
IPT in numbers

**Revenues from R&D and Services**

- 2007: R$ 61.8 million
- 2008: R$ 74.8 million
- 2009: R$ 74.9 million
- 2010: R$ 85.3 million
- 2011: R$ 92.4 million

**Total annual financial resources**

- 2007: R$ 108.6 million
- 2008: R$ 148.4 million
- 2009: R$ 172.3 million
- 2010: R$ 165.5 million
- 2011: R$ 204.9 million

**Administrative expenses over revenues for cost**

- 2007: 30%
- 2008: 30%
- 2009: 27%
- 2010: 23%
- 2011: 21%
Modernization indicators

The table above represents the main information on IPT’s modernization, such as the Institute’s total resources—which practically doubled from 2007 to 2011, increasing from R$ 108.6 million to R$ 204.9 million (projected amount). The income from funding agencies also grew significantly, increasing from R$ 1.3 million in 2008 to R$ 9.5 million in 2011. In the organizational indicators, the table shows the increased efficiency in administrative activities within IPT. Expenses in this area were reduced from 30% of funding income in 2007 to 21%. Another indicator is the average time of purchasing-related operations, which decreased from 45 to 20 days. In the period analyzed, the tax liabilities are also being resolved and there are no more pending utility bills.

In terms of human resources, a highlight is the operational/administrative employee ratio, which increased from 3.67 in 2007 to 5.53 in 2011 and allowed the Institute to focus the greater part of its professional staff on core activities.

Planning performance indicators

The evolution presented in the table above reflects an improvement of institutional capacity in annual planning by the Technology Administration Management (GGT). This planning process results in the technical centers’ business plans, completed with precision in 2010 and revealing a new operational standard for the establishment and achievement of goals. Likewise, the table also illustrates the implementation of investments coordinated by the Modernization Management (GMI) and also testifies to the institutional performance in the definition and development of laboratory projects and equipment.
12 technology centers
40 laboratories
1381 professionals
106 thousand m² of built area
240 thousand m² of total area
Technical activities
The following are some of the main projects IPT developed in 2010, organized by private and public sectors:

PROJECTS FOR THE PRIVATE SECTOR

Heterogeneous catalyst to reduce pollution in biodiesel production

Despite the fact that biodiesel is still a fuel under development and with no supply chain nor structured final use for establishing an evaluation of its life cycle, its production has some proven problems in the step where heterogeneous catalysts are added to conversion reactors. The purpose of such substances is to accelerate the transformation of oil (or fats) in fuel which results in the formation of residues like soap, leading to the development of emulsions and ending up consuming raw material, thus reducing its yield. The Chemical Processes and Particle Technology Laboratory (LPP) at the Center for Process and Product Technology (CTPP) is looking for a solution to the problem by developing a heterogeneous catalyst that will not mix (or that will not dissolve) with the fluids in the reactor as the fuel is manufactured.

The policy’s restrictions cover the control of lead, cadmium, hexavalent chromium, mercury, polybrominate biphenyls (PBB) and polybrominate biphenyl ethers (PBDE). For these substances and chemical elements, the standard amount permitted must be less than 1,000 mg/kg with the exception of cadmium, for which the allowance is 100 mg/kg. These parameters were determined due to the potential harm to the health and well being of consumers and also to the environment after product disposal.

Analysis of electronic products for export

In 2010 the Chemical Analysis Laboratory (LAQ) at the Center for Chemical Metrology (CMQ) accounted for the examination of more than three thousand electronic and appliance component samples since it began, three years ago, to verify the levels of restricted substances in products exported to the European Union. This project is done to allow exporters to comply with the terms of the RoHS directive (Restrictions of the use of Certain Hazardous Substances) which took effect on July 1st, 2006 and applies to all European countries. The IPT laboratory was the first in Brazil to service and analyze all the restricted substances under this commercial barrier.

The concern regarding toxic residues results in positive aspects for the development of sustainability concepts related to production processes. IPT’s action has also been essential in order for industrial products to keep their presence in the country’s trade balance which currently is approximately 70% of total exports.

Nanofibers for medication delivery

The substitution of pills for patches in the treatment of some illnesses is already a reality but some big challenges are yet to be overcome in the mechanism for controlled release of the active drugs in this type of administration. To solve this problem, researchers at the CTPP worked in 2010 on a project for the preparation of nanofibers to be applied and for the controlled release of active ingredients for this new type medication use – and the new scanning electron microscope (SEM) is playing a key role in characterizing the thickness and morphology of the materials.

Pollution emissions and reduction of environmental impact

A group of IPT professionals specialized in the study of nitrogen oxide (Nox) emissions – basically nitrous oxide (NO) and nitrogen dioxide (NO2) – completed a project that measured these pollutants in their magnesium oxide sinter furnace for the for the Magnesita manufacturing branch in Brumado (Bahia), which produces refractory materials from magnesite and talc mining activities. This will be essential for allowing the company to make precise decisions and to mitigate such emissions.
top: Research on biodiesel aims to mitigate the formation of residues in its industrial process

above: Detection of heavy metals in electronic products for export to Europe is a pioneer work
The measurement of atmospheric pollutant emissions in industrial combustion equipment, like furnaces and boilers, together with the interpretations of results and proposal of mitigation measures is a project underway for several companies at the Laboratory for Thermal Energy, Engines, Fuels and Emissions Laboratory (LETMCE) at the Center for Environmental and Energy Technologies (Cetae). A mobile unit is used for the project which is specially designed for the installation, operation and transportation of instruments. The vehicle is equipped with instrumentation for the analysis of energy consumption and the emission of pollutants in industrial combustion and gasification equipment.

Use of starch in toilet paper

IPT is studying starch used in the suspension of cellulose fibers that make sheets of paper. The Pulp and Paper Laboratory (LPC) project, linked to the Center for Forest Resource Technology (CT-Floresta), aims at evaluating the resistance of manual paper made at the laboratory under controlled conditions with the addition of polysaccharide which is mainly corn and manioc extract. The choice of starch for the study took into consideration the favorable cost-benefit relation for industry due to its natural abundance and ease of handling (compared to other substances used for increasing paper durability) and also for being a natural and biodegradable polymer.

Starch can either be used for making paper for printers/writing or be added to tissue papers, like toilet paper and disposable wipes, and for increasing mechanical durability of the finished product. However, these two areas of paper have specifically different properties. Paper used for printing needs to be durable to avoid ripping pages when under pulling force in a printer, for example; toilet paper needs to be moisture resistant so it won’t break during use and its structure needs to be soft to the touch.

Precision casting

The Metallurgy and Ceramic Materials Laboratory (LMMC) at CTPP began studying a new procedure for precision casting which can mean more economic and agile development of parts on a reduced scale for vessel component simulations at the Institute’s Center for Naval and Ocean Engineering (C-Naval).

Researchers are working to substitute the traditional wax model of parts cast in ceramic molds for resin models, made by a rapid prototype machine. This machine, actually a 3D printer, makes resin layered parts which are designed in CAD.

The financial advantage of this substitution is the elimination of the machined steel mold for making the wax model, a component needed in the traditional process. For small scale production, the new process also enables the development of parts with complex shapes. The parts to be produced are propellers with two or three blades for vessel propulsion.

Cement for Pre-Salt

Teams at the Construction Materials Laboratory (LMCC), linked to the Center for Infrastructure Construction Technology (CT-Obras), and the Petrobras’ América Miguem de Mello Center for Research and Development (Cenpes) develop studies and simulations regarding the behavior of cement mix under different marine conditions in the pre-salt area. This is the project called “Hydration studies and the characterization of class G Portland cement mixes (used for cementing wells) submitted to different conditions of exposure and curing”.

Through this study it will be possible to find the setting conditions for cement mix in the presence of salts and
Technical activities

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crédito: Petrobras

top: New procedure for precision casting, 3D printer produces a resin model replacing the ceramics mold

above, left: Exploit of oil in pre-salt is a source of studies and several projects at IPT

above, right: Toilet paper with starch grants more resistance for the product and comfort for the user
carbon gas, which are abundant in the pre-salt conditions like those found in, for example, the huge Tupi field; located 300 kilometers from the Santos Basin and at seven kilometers deep, it contains high quality oil under a layer of two-kilometer thick saline rock.

In this project, Cenpes formulates and simulates with mixes and IPT analyses the information on performance which is essential since this cement forms the well in which the probe will be placed, attaching the offshore platform to the oil and gas pocket. This cement mud seals and gives structural stability to the well. This project involves IPT capacities in the area of cement chemistry – in which the institute excels – and geology.

Fuel storage

The Center for Fluid Metrology (CMF), which houses the IPT wind tunnel, conducted a series of tests on the forces of wind for the project on a new floating roof system for fuel storage tanks for Transpetro, a Petrobras logistics and fuel transport company. This new system, called Câmara GB by Transpetro is built with a textile membrane and will be the replacement for the current geodesic domes which have aluminum structures designed to prevent water infiltration in the tanks from rain and guarantee fuel quality in addition to avoiding environmental contamination. According to Transpetro’s estimates, the system will cost only 2% of the amount of the dome and will have similar efficiency with the added benefits of installation within 15 days – whereas the dome needs six to eight months to be built – and durability for five to eight years. For the system’s technological qualification, Transpetro hired IPT for the purpose of executing a series of tests to simulate the effects of wind on the membrane fabric.
Bridge testing in the wind tunnel

The new cable-stayed bridge under construction in the northern part of São Paulo, which will link the road Avenida do Estado to the Marginal Tietê road in the direction towards Castello Branco highway, went through a series of tests for evaluation of the structural effects due to wind in the region. The tests were conducted at CMF’s wind tunnel. The project focused on determining the effects of wind on the sectional model of the bridge deck since this is the structural element that is subject to the greatest wind loads.

To make experimental analysis, a model was built, instrumented and monitored on a scale of 1:50, by the partner company for this test, called the Structural Systems Laboratory (LSE). The model had, on a reduced scale, the geometric shape, mass, rigidity and damping of the prototype. In this way, in the wind tunnel the deck is coupled to a set of springs and fixtures that simulated these dynamic characteristics of the bridge deck. The structural effects of the reduced model were recorded by monitoring the force of lift, drag and the acceleration of the deck, magnitudes measured with load cells and accelerometers.

During the bridge test performed at IPT’s wind tunnel, measurements were taken on a rigid model (static test) and on an aeroelastic model (dynamic testing). In the first, drag, lift and deck momentum coefficients were obtained. In the dynamic tests lock-in velocity was determined as well as the critical velocity of aerodynamic instability.

The largest bridge in construction in the city of Constantine, Algeria, was also the object of study in the IPT’s wind tunnel, which conducted a series of tests to determine the effects of wind loads in a sectional model on a scale of 1:50 of the Constantine Viaduct, which extends 800 meters and displays a central span of 245 meters. This was the second project conducted by the Institute on bridges in the city of Constantine: the first took place in 2008, when a team from CT-Obras carried on an evaluation of the bridge Sidi Rached.

Section model at the Constantine bridge, in Algeria, underwent tests at IPT’s wind tunnel to verify loads.
**Reduction in fuel consumption**

In June 2010, representatives from Braskem promoted at the “2010 Honeywell Users Group Americas Symposium” (Phoenix, USA), a project that IPT carried on in the boilers at the Triunfo (RS) branch of the company and that generated savings of US$ 300 thousand in one year. Braskem’s boilers 2 and 3 are tangential fired; operate with coal and gaseous effluents and liquids from the fuel plant. This equipment was monitored by the Thermal Energy, Engines, Fuels and Emissions Laboratory (LETMCE), seeking to gather information for calculating the thermal yield by direct and indirect methods.

The monitoring process, which lasted 15 days, included supervising the boilers’ main operational variables using IPT instrumentation and data from the equipment itself, and the collection for laboratory analysis of fuel samples and grey material that is removed from the bottom of the furnaces, reservoirs, heat exchangers and electrostatic precipitators. Eleven tests were conducted which varied with the conditions of boiler operations. The report also allowed observation of aspects related to the equipment such as: atmospheric pollutant emissions, infiltration of air for combustion and gas line environment in addition to instrumentation and techniques employed in measurement of coal leakage. From the methodology of yield calculation developed by LETMCE a program was configured that when attached to the boiler supervision system (Honeywell), it enabled the obtained amounts to be made available in real time for the operation team allowing adjustment and consequent reduction in the consumption of fuel.

**Helicopter access to oil platforms**

The research team at the IPT wind tunnel conducted a test for Petrobras on offshore oil platforms that have increased safety and operational effectiveness. The tests have been conducted on models scaled at 1:150 or 1:120. The more frequent tests are related to the safety on approach, landing and take-off for helicopters on the platform’s helipad and are divided into two types: temperature and velocity. In the first, the temperature field of the plumes of hot gases produced by the platforms’ flare lines since the hot air suddenly reduces the lift of the air craft. In the second type, the air speed and the intensity of its turbulence are measured. These measurements are compared to defined limits and established by technical standards.

**Test accreditation for export products**

After a technical audit by the National Institute of Metrology, Standardization and Industrial Quality (Inmetro), the Chemical Analyses Laboratory (LAQ) was accredited in November. The accreditation allows the laboratory to conduct, with Federal recognition, tests and adjustments of Brazilian products for export under the restrictions of the RoHS directive as well as determination of phthalate plasticizers in PVC.

The Fuels and Lubricants Laboratory (LCL) had already been recognized by Inmetro. With the new initiative, IPT’s technical capabilities recognition has expanded. The Institute earned a new qualification and the recognition of technical competency and quality management system, guaranteeing the monitoring of adequate measurement standards for meeting the technical needs of the national industry in a strategic area for international business, particularly exporters of industrial products which must comply with restrictive regulations contained in the RoHS directive as well as the commercialization of toys, baby products and party items.

The RoHS directive is the European standard that places limits and restricts the use of products like lead, cadmium, mercury and chromium - heavy metals - and polybrominate flame retardants, due to the risk they pose to the environment and human health. The accreditation includes the procedures for quality analysis by fluorescent X-ray, dispersive energy, preparation and testing of metals by Atomic Emission Spectrometry (ICP-OES), Hexavalent Chromium by UV-Visible spectrophotometry, as well as preparation and testing of Phthalate Plasticizers in PVC.
top: Accreditation of the Chemical Analyses Laboratory (LAQ) increases the reliability of tests of export products

above: Monitoring of the thermal yield in industrial boilers allowed to promote fuel savings
PROJECTS FOR THE PUBLIC SECTOR

Urban trees in Brasília

In February 2010, IPT technicians implemented in Brasília (DF) the Exemplary Tree Management System, a software for survey management, registration of internal and external defects and phytogeography organization of the region’s trees. They also trained professionals at NOVACAP, the Urbanization Campaign of the New Brazilian Capital, the company responsible for forestation, maintenance and urban infrastructure in Brazil’s capital.

Historical building evaluation

Throughout 2010, IPT worked in São Luiz do Paraitinga (SP) with a team of multi-skill researchers, including specialists in geology, civil engineering and wood. The team instructed workers on structural shoring of the city’s buildings that were more seriously compromised by flooding from the Paraitinga River in early January 2010, when waters rose 15 meters.

Secure algorithm for public policy support

In July 2010, IPT worked on a housing lottery drawing in Cuiabá (MT) for families with an income of up to three minimum salaries, as part of the “My House, My Life” Federal Government programs. The smoothness of the process was ensured with an algorithm that the team from the Center for Information Technology, Automation
and Mobility (CIAM) developed. Five hundred homes were randomly selected from among 50 thousand registrants.

For this process, the same software developed for the São Paulo tax coupon was used. The public algorithm internationally recommended by NIST (the U.S. National Institute of Standards and Technology) is the Advanced Encryption Standard (AES), one of the best in the world for random number distribution.

**Risk management in Caraguatatuba**

Throughout the year, IPT developed a management plan for the areas at risk in Caraguatatuba, on the northern coast of São Paulo state. Researchers from the Environmental Risk Laboratory (Lara) reevaluated the risk areas starting from results arising from the Municipal Risk Reduction Plan, elaborated by the University of São Paulo State (Unesp) in 2006.

IPT’s role was to guide the city’s technical team and elaborate a management plan together, considering the measures of structural (work and control) and non-structural intervention, like occupation planning and forming city civil defense teams.

The work of researchers was done from field work with information reports on the risk level, legislation analysis, master plan, identification of Permanent Conservation Areas (PCAs) and other instruments that relate to discussion of risk management.

**Tax coupon quality**

IPT was licensed by the National Agricultural Political Council (CONFAZ) for conducting technical analysis of thermo sensitive paper that is used for tax coupon emission systems (ECF). The tests were conducted on samples received from the paper manufacturers, converters, or manufacturers of the machines that print the thermal paper. The physical characteristics—such as weight, thickness and smoothness—and the quality of thermal printing were studied. Test were also conducted for strength in thermal printing, involving variations in temperature, humidity, effects of light beyond aesthetics, PVC tape and water. The optical density of the print was measured before and after execution of the tests.

This project was carried on by the Pulp and Paper Laboratory (LPC). The license was possible thanks to the acquisition of two pieces of equipment, provided through the Institute’s modernization project: one is a printing
Technical activities IPTS 2010 Annual Report

top: The geophysical survey of the Santos channel was carried on with side-scanning and continuous seismic profiling sonar

above, left: Fixed radars technologies were evaluated for the State of São Paulo Department of Highways and Roads

above, right: Survey of risk locations, elaborated for the Secretariat of Regional Administrations, mapped 407 areas in the city of São Paulo
tests machine, Atlantek 400, and the other is used for studying the characteristics of the paper surface according to Bekk smoothness standards.

Study of the Santos Channel (SP)

The team from the Environmental Risk Laboratory (Lara), of Cetae, conducted a study called “Geophysical survey of the Santos channel” with a side-scanning and continuous seismic profiling sonar. The goal was to provide information for the consortium DragaBrasil, hired by the Port Ministry to conduct dredging in the canal at the Port of Santos allowing transit of ships with a larger draft. The dredging in this area had its schedule compromised due to physical barriers that made it difficult and even impeded the advance of machines. The characteristics of the ocean floor was mapped (floor and subfloor) in the external portion of the Santos Canal in areas where dredging could not proceed at an adequate pace. Approximately 110 linear kilometers of profiling was performed. With modern instruments, geophysics allow the scanning of large underwater stretches in short time intervals, offering an excellent cost-benefit ratio in dredging projects.

Fixed highway radars

The team at Ciam provides technical support to the State of São Paulo in large acquisitions of technology products and services. An example in 2010 was the State of São Paulo Department of Highways and Roads which, after approving the item price of the fixed radar systems offered by four companies, wanted to purchase a product of better technology to meet the public call demands. For this purpose, IPT developed test methods and applied them on the selected equipment to determine their performance. Technical knowledge is an essential tool for enabling the public to obtain better technology for its demands at a lower price. Procurement law directs the issue of pricing, but in the case of smart devices for traffic control using specific resources and software, tests and trials on a real scale are necessary. Government organizations need specialized assistance in these acquisitions.

Chemistry kits for the state school system

Starting this year, high school chemistry teachers in the São Paulo state school system can plan more interesting classes based on practical experience. A project coordinated by the Foundation for Educational Development (FDE) and detailed within IPT in 2010 made it possible for schools to receive 6,622 chemistry kits with reagents and glassware, flasks for preparations and case and packaging for transport. The project was developed by the Chemical Analyses Laboratory (LAQ), from CMQ. To enable the project, IPT specified and later conducted quality control of the kits, setting up a multi-subject project within the Institute which also had the help of researchers from the packaging area.

Areas at risk in the city of São Paulo

The research team from Lara and Cetae concluded in 2010 the survey of risk areas in São Paulo, reaching a total of 407 mapped areas. The project was under contract of the Secretariat of Regional Administration of São Paulo. This total included the 205 areas mapped by IPT and Unesp in 2003/2004 as well as another 90 areas mapped by the Municipality of São Paulo itself between 2005 and 2009. The 407 areas are currently the most significantly vulnerable.
Management

In 2010, IPT consolidated an administration model implemented in 2008 in Information Technology, Human Resources and Supplies. Administration is the key word summarizing the action taken in these three areas, with a structure geared to the essential processes of the Institute and focused on the management of goals. The first phase of the Cadac project, by FINEP, was completed. Steps from the purchasing process were reduced. Moreover, the structure of career researcher positions was defined and required by a civil service selection process launched by the end of 2010.
IPT’s Human Resources Coordination (CHR) consolidated the performance model to meet the needs of the Institute’s core activities. Highlighted actions include:

- Hiring of 62 new workers from the civil service selection process held in 2008 and the inauguration of a new selection process for 251 positions in 2011;
- Structure design of the researcher position, with the support of Mercer consulting company. The position and salary plan envisioned the creation of a competency model for IPT professionals based in five qualifications: knowledge of technology and its application, production of knowledge, knowledge of the market, negotiation, and projects management. The selection process administered in 2011 expects the future researchers will be selected based on these competencies;
- Hiring of 190 interns with education on the college, professional education, and high school education levels through a civil service selection process held each semester in various professional areas;
- Integration events for new employees and interns, including joint activities and visits to laboratories;
- Continue the International Development and Training Program (PDCE) launched in 2008, with 13 new researchers who trained abroad in 2010 in order to improve capabilities and acquire new abilities which are yet to be developed at the Institute;
- 2nd and 3rd editions of the PDCE Forum, in which participant researchers present technological solutions that can be offered to the industry with the knowledge they acquired abroad. The PDCE Forums spread the experience of researchers and promote integration and partnership among the technical centers;
- Corporate Training Program – Training of Researchers: to meet the needs of career development and empowerment in additional competencies, IPT promoted courses on Project Management (47 participants), Financial Economic Viability (37 participants) and Intellectual Property – Information Security (57 participants).
• Corporate Training Program – Training at the Technical Level: for support in the development of technical levels, IPT promoted Technical Instrumentation courses – Basics & Applications (33 participants), Basics of Estimating Uncertainties in Measurements (25 participants) and Criteria for Analysis of Results Presented in a Calibration Certificate (27 participants). The technical expertise of researchers at the Institute who work as course instructors was used to spread and multiply knowledge;

• Job Safety Training Program with 153 participants on Safety and Health while Working at Heights, Fire Fighting, Electrical Installation and Services, Confined Spaces, Forklift Operations, and Boiler Operations, among others;

• Continuation of the Language Training Program – English and German, in conjunction with the Human Resources Coordination and the International Relations Sector of the Corporate Relations Management (GRC), with 71 participants in 2010. The objective is to support the researchers that intend to participate in PDCE and encourage participation in technical meetings, project presentations and partnerships with international institutions and entities;

• Subcontracting of nutrition and food services, with the remodeling of the restaurant’s kitchen;

• Maintenance of the Day Care within the Institute campus for the children of employees;

• Environmental Risk Prevention Program (PPRA);

• Program for clarification of occupational risks related to activities developed in the laboratories, implemented by Job Safety and Health professionals and by internal accident prevention specialists; followed by vaccine administration and the supply of Personal Protection Equipment, including sun block and repellants.
• Accomplishment of projects focused on the quality of life of workers, such as:

  > Project IPT/Well being – nutrition, health and quality of life. Developed in partnership with the São Camillo University Center, this project evaluates the nutritional condition of IPT employees using anthropometrical data (weight, height, skin folds and circumference), results of periodical medical exams, eating habits, and physical activity, with 101 individual visits in 2010;

  > Prevention and Early Diagnosis of Chronic Disease Program, like hypertension, breast cancer, prostate, diabetes, cholesterol, triglycerides and elevated uric acids;

  > Prevention of Infectious Contagious Disease Program, with the common cold vaccine and H1N1 flu campaign;

  > Occupational Health Medical Control Program;

  > Oral Hygiene Program;

  > Continuation of the campaign against tobacco, with the promoting of seminars and monthly support meetings to provide support to those who give up tobacco addiction or have fell back. In the last group meeting, 80% of the participants have adhered to and succeed in the treatment;

  > Program for the eradication of dengue-carrying mosquito concentrations on the Institute’s campus;

  > Social Services Care: in 2010, approximately 250 cases of social support were offered to the employees, with intervention related to health insurance, hospital visits, interviews, follow-up with those on leave due to diseases, and social-economic evaluation of financial demands.

Processos informatizados

Definition of clear strategies for action and new tools in the area of Information Technology – with consolidation in the Corporate IT area, created in 2007 – and Supplies also had a part in the Institute’s modernization process. Throughout 2010, a highlight is the implementation of the first step of the Cadac project, with a total forecast investment of approximately R$ 1.6 million.

In this first step of the project, the Cadac hosting and management rooms were physically restored, with laminate floor, 75 kVA transformer tied to the network, a diesel engine generator unit at 81 kVA, and a 25 kVA no-break that takes on the supply of the system’s sensitive part during automatic transmission from one source to the other.

The project was developed in compliance with the current policies is the establishment of redundancy levels in the supply of electricity. When power is out from the primary source, the generator takes over and in the event these
fail, the no-break is activated. The fourth level, underway, will be given by the generator and transformer in building 48, at the Center for Chemical Metrology (CMQ), which will be integrated to the system, thus guaranteeing Cadac’s data security.

The room is totally climate controlled, with an air conditioning system providing precision control of temperature and humidity, which guarantees its functionality without interruption, and an automatic fire detection system.

Racks were set up in the Cadac room for the servers that support the IPTNet, the cluster (set of high performance servers) for running computer simulation programs involving R&D projects and the pilot implementation of the Electronic Document Management system - EDM.

Another important point is the acquisition by IPT of two “Blade” type servers for starting consolidation of the Institute’s servers enabling the creation of a virtualization environment where several virtual machines with their respective operational systems running within a single physical server, allowing better efficiency and management of existing computer resources.

The second phase of the project (in the final phase of the tender process) will acquire a storage system that will allow safe and centralized information storage alongside with the automatic backup system.

Google system

IPT researchers now search the Institute’s collection of documents through Google Search Appliance, which is in operation at http://google.ipt.br. The system went online after more than two months tracking the internal database to facilitate the work of researchers and technicians, mainly as it relates to gathering bibliographic information that in general marks the first step in the development of new projects.

The tool developed under the concept of knowledge management facilitates the search for any document generated at IPT through its metadata, if the project is confidential or displays all the data in the case of public documents. Approximately 800 thousand titles were mapped from the Institute’s collection. If the user is outside IPT, access can be granted via a VPN connection, the same way the intranet content is accessed.

There are 16 categories of documents linked to Google Search Appliance, such as test and calibration procedures, certificates, technical opinions and technical reports, among others. The contents from IPT’s website and library can also be searched.

Supplies

The changes in the management of the Supplies Coordination reduced the steps for requesting and purchasing. Previously, 23 steps of approval were necessary on paper and the same text needed to be typed. The request for purchase transactions at IPT took on average three weeks and it was possible to reduce this process to eight essential steps to this process, electronically. Approval can currently be obtained in up to five hours with the available information for all the critical sectors involved in the process.

A corporate wireless network was implemented along with the installation of 40 access point devices distributed through the Institute’s main buildings.

The Supplies Coordination adopted a plan of action aiming mainly for the satisfaction of internal clients by way of actions based on the needs of these clients promoting changes in the area’s administration. These actions stood out:

• Elaboration and implementation of Client Satisfaction Research earning 88.7% satisfaction of internal clients;

• Announcement of approval times for purchase requisitions and reduction of steps for these approvals;

• Announcement of the steps for purchase and reduction in the execution time of the procurement process in up to 20 days, in all the forms of procurement governed by Law 8.666/93.

Another highlight is the amount of 2,193 purchases, equivalent to approximately R$38.7 million, which represents 11% of the budget originally proposed.
New Cadac’s room houses the high performance servers and the supercomputer that runs simulation programs.
In 2010, IPT’s Innovation Office faced two real challenges. The first was to develop the biomass gasification project that, if successful, could pave the way for an innovative “green chemistry” — more precisely, green and yellow. The second is to foster innovative processes at IPT, including the monitoring of innovation goals, and to encourage an increase in the Institute’s knowledge production.

For the first time in its history IPT had innovation goals to pursue in 2010. The results obtained show the level of difficulty for advancement in each of these items: the number of patents surpassed the goal; the number of new tests entered in the quality system was well beyond the goals, a result of the new instruments from the Modernization Program resources; the number of published papers did not meet its goal, but it increased by 30%.
Throughout the year, the Innovation Office promoted actions to stimulate innovative attitude among its researchers. Many meetings were held for the discussion of technological issues for the future, in addition to communication that emphasized the need to produce more innovation. This need was also translated into a performance indicator, with which the technological centers can be compared, enabling their evolution to be assessed along the way. These actions directly reflect the performance achieved in these indicators.

The registration of 190 new testing and calibration procedures in the quality system signaled an important valorization of the innovation IPT produces in metrology. This fact reflects the introduction and installation of a significant portion of equipment acquired with the Moderniza resources, the program headed by the State of São Paulo Government that handles IPT laboratory infrastructure investments.

One of the indicators was changed: increased research and innovation at the Institute is best measured by the percentage of revenue associated with such projects than by the number of projects originally proposed. The number measured in 2010, is still sensitive to the calculation method, showing the economic impact of this activity is much less that that associated to metrology and technological services. The current indicator version shows it as the most important between the current indicators since it translates the main challenge proposed by IPT’s Advisory Board.

A fifth indicator was abandoned as a primary indicator: the number of contracts with an intellectual property clause. The concept is still valid with the need to spread recognition of the value associated with creating something new. IPT values this issue, having participated in the Innovate São Paulo Project, which aims at improving methods of characterization, assessment, and commercialization of technology and patents in cooperation with teams from the innovative technology cells of seven São Paulo-based institutions. The setting of numeric goals for the indicator, however, conflicted with the profile of R&D project amounts at the Institute, which lead to a smaller number of projects, yet with greater value. The indicator remains, however, as a form of internal management control.

### Productivity indicators in the generation of knowledge and innovation at IPT

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Results 2009</th>
<th>Goals 2010</th>
<th>Results 2010</th>
<th>Goals 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filed Patents</td>
<td>4</td>
<td>6</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>New testing in the quality system</td>
<td>80</td>
<td>100</td>
<td>190</td>
<td>230</td>
</tr>
<tr>
<td>Published papers</td>
<td>150</td>
<td>205</td>
<td>196</td>
<td>230</td>
</tr>
<tr>
<td>% Revenue in R&amp;D projects (R$ million))</td>
<td>12.1%</td>
<td>-</td>
<td>12.5%</td>
<td>13.5%</td>
</tr>
<tr>
<td></td>
<td>9.0</td>
<td>10.5</td>
<td>12.5</td>
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</tr>
</tbody>
</table>

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### Patents filed by IPT in 2010

<table>
<thead>
<tr>
<th>Patent Title</th>
<th>Subject</th>
<th>IPT Technology Center and co-owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emulsifier free latex production by way of emulsion polymerization and the resulting product</td>
<td>Process + viscous product containing immersed active substances</td>
<td>CTPP</td>
</tr>
<tr>
<td>Nano-structured solar protection agent and process</td>
<td>Process + solar protection for UVA and UVB</td>
<td>CTPP</td>
</tr>
<tr>
<td>Colloidal nanocarriers for active hydrophilic and the production process</td>
<td>Process + product with water soluble active substance with oil and fat soluble coating</td>
<td>CTPP/USP/FAPESP</td>
</tr>
<tr>
<td>Positive or negative pressure alteration development system with simultaneous hyperbaric and hypobaric layers for humans or animals of diverse sizes and respective operation process</td>
<td>Hypo-hyperbaric layer for tests and treatment of humans and animals subject to pressure</td>
<td>Cinteq/USP</td>
</tr>
<tr>
<td>Improvement in cyanide free alkaline copper bath aiming to obtain satisfactory adherence to Zamak and increase brightness</td>
<td>&quot;old gold&quot; coating for zinc and aluminum jewelry</td>
<td>Cinteq</td>
</tr>
<tr>
<td>Electronic device for independent sensor and remote monitoring</td>
<td>Flow meter with long distance data transmission</td>
<td>Ciam</td>
</tr>
<tr>
<td>&quot;Micro encapsulated mono-calcium phosphate&quot;</td>
<td>Process + industrial grade powdered yeast</td>
<td>CTPP/ICL</td>
</tr>
</tbody>
</table>

*Top:* Preparation for test to be made within the electromagnetic anechoic chamber; new procedures in the quality system overcame the target in 90%

*Below:* Tests with developed nanocarriers indicate efficiency in protection against degrading in the incorporated active substance, increase of reliability, improvement of bioavailability, and skin permeation
Examples of new procedures

- Testing for immunity to electromagnetic interference emitted on radio frequency: for studying the functionality of electronic equipment affected by the application of electromagnetic wave fields, such as those emitted by radio and TV broadcasts and cellular communication, administered inside an electromagnetic anechoic chamber.

- Imported pigment quantification procedure by x-ray diffraction used in the paint and remodel industry: procedure developed by the Chemical Analysis Laboratory – Center for Chemical Metrology.
An additional indicator of innovation is under construction. It is related to the testing procedures that are developed for executing technological service and research projects. This is an innovative aspect that needs more transparency, considering that IPT is often demanded into creating new tests – its technical team capable and experienced with this type of challenge – to measure certain characteristics that are not included in international standards and are specific to a particular application. The establishment of a methodology is underway for registering these new tests in order to make them part of the institute’s technical culture.

A benchmark for innovation effort took place in 2010 with the identification of research institutes with profiles similar to IPT’s. The innovation indicators were analyzed from institutions in different countries including Australia’s CSIRO (Commonwealth Scientific and Industrial Research Organization) and the South African CSIR (Council for Scientific and Industrial Research). The results show that IPT is headed in the right direction to become more innovative yet with real challenges to overcome.

Two significant IPT innovation projects began in 2010, based on BNDES’ Funtec program resources: new pyrometallurgical production routes solar grade silicon and the study of alternatives for recuperation of areas contaminated by organochlorine chemicals. These projects are marked by multidisciplinarity, an IPT icon in the search for innovation and of a new scale of research projects in the R$ 10 million range.

The R&D project which resulted in more revenues in 2010 aimed to develop software for online integration of information generated by smart equipment systems applied along highways (call box, traffic sensors, variable message panels, and meteorological stations, among others) installed on privatized highways. In addition, the system integrates maps of events taking place in these roads with actions taken by the contractor. Furthermore, the system allow the triggering of alarms and alerts regarding road conditions and the ITS (Intelligent Transportation System) equipment for the São Paulo State Transportation Delegation Public Services Regulatory Agency (Artesp). This system with allow Artesp to better control and monitor, in real time, operation of highways by contractors enabling quicker action by the Agency.

The effort to increase IPT’s internationalization was marked by the initiation of two projects in cooperation with foreign institutions in the context of the European Union’s main instrument for research funding, the FP7...
Innovation, culture and green chemistry

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(Framework Programme 7): the “MyFire” project, which brings together institutions from seven countries to encourage the use of experimental test procedures of new applications that are being developed for the internet of the future, and the “Viajeo” project, which aims to develop and demonstrate efficient tools for using traffic and transportation information in real time and involves institutions from eight countries.

IPT’s biomass gasification project was restructured in 2010 to comply with the budget restrictions requested by BNDES. Throughout this process, which included visits to pilot plants in Sweden (Värnamo) and Germany (Siemens and Choren), a new route for gasification was adopted based on the process known as entrained flow, which in one hand has the potential success of being the more economically viable route and on the other hand comes with the challenge of building a reactor based on innovative technology, never before done in Brazil. A new proposal was made based on creative and articulate action on the national level. In other words, its success depends not only on IPT but also on the action of the greatest minds in the country in this field: researchers involved in the National Fuel Network at the Science and Technology Ministry (MCT). As the costs of the project are in the range of R$80 million in five years, it was necessary to combine resources from BNDES, FINEP, the Secretariat of Economic Development, Science, and Technology of the State of São Paulo and four national companies: Cosan, Brasken, Oxiteno and Petrobras. The project implementation will directly involve four research institutions: CTC (Sugarcane Technology Center), CTBE (Center for Bioethanol Technology), Esalq (the University of São Paulo’s Luiz de Queiroz Agriculture School), and IPT, in addition to those who take part in the science projects to be negotiated.

This is an engineering challenge that aims to design, build, and operate a biomass gasification pilot plant. The product of this gasification will be a biogas which could be used to generate electricity, produce biofuels and biopolymers – the so-called green chemistry.

The synthesis gas produced from sugar cane bagasse, straw, and wood splinters can be used to generate electric power, produce biofuels and biopolymers: power efficiency and green chemistry.
International Development and Training Program (PDCE)

IPT’s International Development and Training Program (PDCE) was launched in 2008 and is funded by the IPT Foundation (FIPT). PDCE’s goal is to send the Institute’s researchers and technicians abroad for improvement in their fields of work and research interest. Until 2010, 25 researchers from different areas developed research and scientific projects during periods from four to eight months in ten different countries, bringing back to the State of São Paulo the most advanced technological knowledge in the world.

FIPT provides financial support for the cost of training, courses and internships, based on the references of CNPq and Capes, and with the travel expenses for researchers and their dependents, including lodging assistance, health insurance and arrival assistance in order to offer more quality of life, security and commitment for the accomplishment of the researcher’s tasks. The employment agreement is preserved, guaranteeing the researcher’s monthly salary and other benefits established by law.
The PDCE participant contributes even more to improve IPT’s installed and applied capabilities in order to improve the continued quality of processes, products and projects as well as with the acquisition of new abilities not yet available. The international contacts established also promote the international insertion of the Institute and the technical cooperation with foreign cutting-edge institutions around the globe.

To participate in the program, the candidate needs to demonstrate interest and indicate the research to be produced to the director responsible for the technological center of origin. Once this step is completed, the approved project is forwarded to the Chief Operations Officer. If viable, the proposal is sent to the Human Resources Coordination (CRH) and to the International Relations Sector at the Corporate Relations Management (GRC), which will conclude the details of the trip – visas, air tickets, and contacts with the host institution abroad, among others.

Until 2010, PDCE participants were sent to the following institutions:

- Germany: Fraunhofer Institutes (ICT, IZFP), Werth, Martin-Luther-Universität, Physikalish-Technische Bundesanstalt (PTB), GeoForschungsZentrum (GFZ)
- Spain: Biological Investigations Center (CIB)
- USA: National Institute of Standards and Technology (NIST), Michigan Technological University, University of Colorado/Boulder, U.S. Geological Survey (USGS)
- Finland: VTT Technical Research Centre of Finland
- Indonesia: World Agroforestry Center (ICRAF)
- Italy: Centro di Ricerca Interuniversitario di Aerodinamica delle Costruzioni e Ingegneria del Vento (CRIACIV)
- Japan: Railway Technical Research Institute (RTRI)
- Norway: Norwegian University of Science and Technology (NTNU)
- Portugal: National Civil Engineering Laboratory (LNEC), Minho University
- United Kingdom: Imperial College London, London College of Fashion, Brunel University, University of East Anglia
In May 2010, IPT received the visit from Dominique Strauss-Kahn, former Managing Director of the International Monetary Fund (IMF). Strauss-Kahn visited the IPT’s Center for Naval and Ocean Engineering (C-Naval), which months before received R$9.5 million in investments for new facilities.

During his speech, Strauss-Kahn spoke about the importance of technology innovation for economic development and competitiveness. The former IMF Managing Director was received by then Governor of the State of São Paulo, Alberto Goldman, who emphasized state investments in science and technology. During the visit, IPT’s advances in the biotechnology and bioenergy areas were also highlighted. The IMF visit was an opportunity for the Institute to present its work to the international community.
The Governor of the State of São Paulo

While visiting IPT on December 16th, 2010, the then Governor of the State of São Paulo, Alberto Goldman, inaugurated new facilities like the construction of the bionanomanufacturing building and the Oil Flow Metrology Laboratory, and announced an investment of R$ 50 million in IPT in 2011, in continuation to the Institute’s modernization program.

This was the third opportunity in which the Governor visited IPT in 2010. In May he visited the IPT campus to inaugurate the new electromagnetic compatibility chamber, used in research to avoid interference between electronics like TVs, radios, cell phones, computers, and electronic medical systems, among others.

Biomass Gasification Pilot Plant

The former State of São Paulo Secretary of Development, Luciano de Almeida, announced in December 2010 the approval of the first phase of the Biomass Gasification Development Center project (CDGB), at the Piracicaba (SP) Technology Park, which shall receive R$ 80 million in investments through a partnership between IPT, FINEP and BNDES.

The center will house an 80-thousand square meter area and a pilot plant for the development of technology for sugarcane bagasse gasification; an example of the technology race that plays out in other countries for consolidating this process, only with different raw materials like corn stalk and coal. Gasification is currently important because its technology is seen as a greenhouse gas emission reduction tool and also because it is a technology that will increase productivity in sugar cane plantation areas.
Agreement with GE Global Research Center

General Electric (GE) Global Research and IPT established a partnership in November 2010 in order to share high tech expertise and joint research in key areas for scientific and industrial development in Brazil.

The announcement was made during the official inauguration ceremony for choosing Rio de Janeiro to host the fifth GE Global Research Center in the world, which will be placed in the Bom Jesus da Coluna/Fundão island.

The agreement between IPT and GE aims at intensifying the high-tech knowledge from both institutions by leveraging the incentive for innovation and the development of sustainable technology. The agreement expects to identify the application of processes or experiences that can be used in the improvement of solutions in the areas of bionano technology, bioenergy, oil and gas, and R&D support.

International visitors

In 2010, the IPT campus was visited by authorities and representatives from government, private and research organizations from several countries, generating opportunities of international cooperation, mutual institutional knowledge and exchange of strategic information in R&D. Below, a list of some foreign institutions that interacted with IPT in that year:

**Austria:** A delegation from Upper-Austria visited IPT in April to learn about the Institute’s innovative technologies. Comprised of 42 representatives of the government, companies, research institutes, universities and media from this Austrian state, the delegation was headed by the Secretary of Education, Science, Research, Women, and Youth, Doris Hummer. The Secretary emphasized the interest in creating and strengthening ties with Brazil in science and technology.

**China** – In November, a mission from the Chinese province of Yunnan visited IPT to identify cooperation and
investment projects in metallurgy and biotechnology. In December, it was Hubbei province’s time to learn about IPT’s activities in information technology and communications.

Germany: A delegation of 14 representatives from German educational institutions – University of Münster and the Technical Universities of Aachen, Munich, and Berlin – visited IPT in March in order to identify cooperative programs. In October, a delegation from the Brazil-Germany Engineers Association (VDI) met IPT’s activities in energy and engineering and, in November 2010, the Institute also received Sabine Kunst, President of Potsdam University and President of the German Academic Exchange Program (DAAD), a nonprofit organization with 231 higher learning institutions as members. Main discussion included the industrial demands for IPT’s R&D, the differences in the partnerships with Brazilian and foreign universities and patent ownership on projects developed between IPT and companies.

South Korea – IPT and the Korea Institute of Industrial Technology (KITECH), from South Korea, signed an agreement in September for technical cooperation to enable the two institutions to exchange experiences and information on green plastics, biomass gasification, and solar grade silicon. For the partnership’s benefit, the two entities have similar operational profiles in technological services and R&D projects. Another similarity is the work of both institutions with technologies in the final process of maturity, preparing them for insertion in the market and also the support to the development of small and medium enterprises.

Spain – In September, IPT was visited by representatives from eight of the 14 centers that make up the network known as Red de Institutos Tecnológicos de la Comunitat Valenciana (Redit), which signed a protocol of intentions with the Institute. In the same month, IPT’s biotechnology projects were presented to representatives of the Manresa Technological Center. In November, a delegation from the association known as Asociación de Empresas Gallegas Adicadas a Internet e as Novas Tecnoloxías (Eganet) was introduced to the work of IPT’s Center for Information Technology, Automation, and Mobility (Ciam), in search of capabilities exchanging.

Sweden – In March, representatives of Vinnova and Growth Analysis, two Swedish government agencies related to innovation, competition and economic development, learned about IPT’s S&T actions in the context of strengthening Brazil-Sweden ties in these areas. In the same context, IPT also received in November the Director General of investment promotion agency Invest Sweden, Per Erik Sandlund, along with members of the Swedish-Brazilian Commerce Chamber and the Swedish company Stora Enso. The Swedish agencies identified opportunities for business and bilateral cooperation in the areas of clean technology, renewable energy, material science, and metallurgy opportunities at IPT.

Other international highlights include the relationships IPT started or strengthened with representatives of government, companies and research institutions from Cape Verde (program “Support to Housing Development in Cape Verde”), Canada (provinces of Alberta and Quebec), The Netherlands (workshops on biopolymers innovation), Ireland (Higher Education Authority, Dublin Institute of Technology, Athlone Institute of Technology, University College Dublin, National University of Ireland) and Venezuela (Ministerio del Poder Popular para Ciencia, Tecnologia e Industrias Intermedias and Fundación Instituto de Ingeniería).
Acknowledgement

The projects developed by IPT are recognized for their standard of excellence and reliability. Many of the Institute’s initiatives have repercussions in governmental and private organizations. See below the main honors received in 2010:

- Researchers Eduardo Soares de Macedo, Fabício Araújo Mirandola and Katia Canil, from the Environmental Risks Laboratory (Lara) received on February 24th the Recognition Diploma from the São Paulo Chamber of Commerce and the São Paulo Municipal Civil Defense Council, in recognition for the service they provided to the community.

- On April 20th, at the Palácio dos Bandeirantes a “Ceremony honoring the 34th Anniversary of Civil Defense” was held. On this occasion, the organization honored people and institutions with medals from Civil Defense and the Military. For technological support to Civil Defense in natural disasters occurring that year in São Paulo, like the flood in the city of São Luiz do Paraitinga, IPT was awarded with a medal from the Military, received by its CEO João Fernando Gomes de Oliveira.

- From January to July, 2010, researcher Thiago de Carvalho Cobu from the Flow Measurement Laboratory (LV) participated in the PDCE and received training from the National Institute for Standards and Technology (NIST) in the USA. During this period, Cobu conducted research together with other researchers at NIST on modeling of gas flow in laminar type meters using process gases. The article was presented at the most important event in the area of flow measurement, the 15th International Flow Measurement Conference – Flomeko 2010, held in October in Taipei (Taiwan), and was the voted best by participants at the conference. The award is publication in the Journal of International Metrology in 2011.

- On October 19th, the São Paulo state government awarded the Military Medal to researchers Claudio Luiz Ridente Gomes, Fabiana Chechinato Silva, Fabício Araújo Mirandola and Luiz Antonio Gomes, all from the Environmental Risks Laboratory (Lara), for their technological support of Civil Defense during the flooding that took place in the state of Alagoas in June.

- In a ceremony held on November 17th, researcher Douglas Messina received the Procel 2010 Award, in the city of Rio de Janeiro. The award was given in recognition of the Building Installations and Sanitation Laboratory (LIP) for the actions developed in the area of energy efficiency and in the realization of tests for granting the PROCEL seal on solar and electric water heating equipment.
Acknowledgement

In November 2010, researcher João Guilherme Rocha Poço and technician David Augusto de Freitas, from the Chemical Processes and Particle Technology Laboratory (LPP) at CTPP, received the Inventor 2010 Award. The recognition was given by Petrobras for the glycerin derivatives project which resulted in securing a catalyst and process patent for the company.

In November 11th the Electrical and Optical Equipment Laboratory (LEO) received the Procel Electricity Efficient City Award for their partnership in the implementation of public lighting resource administration in the city of Gaurulhos (SP). The mayor was awarded in the category of Municipal Energy Management as well as the other partner involved in the projects, the electric provider EDP Bandeirante. The actions contemplated covered programs implemented simultaneously in the public lighting system, traffic lights, social project housing additions, public municipal buildings, and the public water system.

The CEO of IPT, João Fernando Gomes de Oliveira, was the winner of the FCW Science and Culture Award sponsored by the Conrado Wessel Foundation (FCW), in the Applied Science category. This is the major award in Brazil for this field. The FCW Science Award recognizes each year renowned profiles with qualities of innovative talent, leadership, social programs, hard work, integrity and ethics. Oliveira has been carrying on and intense work in the modernization of IPT, which began in 2008 with over 400 pieces of equipment acquired, and many infrastructure, management and human resources improvement projects.

The CEO of IPT, João Fernando Gomes de Oliveira, was promoted by decree of President Luiz Inácio Lula da Silva, published in the Official Diary of the Union on December 28th, 2010, from “Honorable” (title received in 2007) to the rank of “Grand Cross”, the highest award of the National Order of Scientific Merit for his contributions to Science and Technology. Following another decree on the same date, also published in the Official Diary, IPT Advisory Board member Carlos Tadeu da Costa Fraga, executive manager of Cenpes/Petrobras, was given the title “Honorable” in the National Personality category of the National Order of Scientific Merit. The Order was instituted in 1993 to recognize national and foreign personalities for relevant contributions to Science and Technology. The Decree, nº 4.115, on 6 February of 2002, discusses the Order and established its two classes: “Grand Cross” and “Honorable”. The decree allows 200 places for Grand Cross and 500 for Honorable.
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Financial statements
Message to shareholders

In 2010, IPT consolidated a cycle of three years of investments with the application of R$ 120 million from the State of São Paulo Government and partners in a more modern structure to face challenges in the country's development. The new technology base promotes a transformation in the Institute's role, which increasingly inserts itself in the society as a creator of innovation, enabling the application of technological knowledge in businesses.

IPT's new laboratory capabilities aim at producing solutions focused on sustainable development, covering bionanotechnology, renewable energy, highly efficient energy materials and infrastructure projects with lower environmental impact. New laboratories such as bionanomanufacturing, naval, corrosion, light structures and oil flow metrology, among others, now provide support in order for the Institute to develop research and services of greater added value.

The mobilization surrounding IPT modernization involves human resources, procedures and equipment. The human aspect is essential to this transformation. In 2010, 80 new employees were hired through a civil service selection process in 2008 — considering the 140 in 2009; the Institute has 220 new employees. And in 2011 it will hold a new selection process to qualify another 250 professionals.

Another important aspect of research valorization is the International Development and Training Program (PDCE) which, in 2010, sent 13 more researchers to complete training programs in IPT partner institutes abroad, such as Fraunhofer in Germany, Imperial College in the United Kingdom, the U.S. Geological Survey, and VTT in Finland. These researchers join 13 others that participated in the Program in 2009 and 2008, forming a group of 25 people trained abroad until 2010.

Last year, IPT served 3.5 thousand companies, the larger part of them small and medium organizations. In terms of institutional production results in 2010, 26,794 technical documents were issued including calibration and compliance certificates, reference material certificates, technical advice, technical references, and technological service reports, among others. The Institute filed six invention patents in Brazil and one abroad. The scientific production of the staff resulted in 194 national and international published papers, along with journal and event papers. IPT's income increased 10% compared to 2009, with special focus on R&D projects and with the generation of intellectual property.

In 2011, IPT began operation of the investments made over the last three years. This year will also mark the advance of the modernization project which relies mainly on State of São Paulo Government resources (R$50 million), FINEP and BNDES.

The modernization project is an unprecedented milestone in IPT’s history.

March 2011

BOARD OF DIRECTORS
Instituto de Pesquisas Tecnológicas do Estado de São Paulo S.A. - IPT

IPT balance sheets from december 31st 2010 and 2009 (in thousands of reais)

<table>
<thead>
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<th>ASSET</th>
<th>N.E.</th>
<th>2010</th>
<th>2009</th>
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<td>Cash and cash equivalents</td>
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<td>Financial investments and attached credits</td>
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<td>Advances to employees and third parties</td>
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<tr>
<td>Prepaid tax to be recovered</td>
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<td>Services in progress</td>
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<td>Prepaid expenses</td>
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<td>Reserve Deposits</td>
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<td>Other amounts to be received</td>
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<td>Long term feasible</td>
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<td>Fixed assets</td>
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<td>Intangible</td>
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<td><strong>TOTAL ASSETS</strong></td>
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The accompanying notes are integral parts of these financial statements.
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<td>Suppliers</td>
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<td>Salaries to pay and expenses to recover</td>
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<td>Taxes and contributions</td>
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<td>Income tax and social contribution</td>
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<td>Advances from clients</td>
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<td>Payables – vacations and payroll</td>
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<td>Tax installments</td>
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<td>Government grants – fostering agencies</td>
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<td>Other obligations</td>
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<td>Total passive recurring</td>
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<td>NON RECURRING</td>
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<td>Tax installments</td>
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<td>Other liabilities</td>
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<td>Provision for tax, workers and civilian liabilities</td>
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<td>Total passive recurring</td>
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<td>LIQUID ASSETS</td>
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<td>Equity</td>
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<td>Capital reserves</td>
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<td>Revenue reserves</td>
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<td>Resource for capital increase</td>
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<td>Accumulated losses</td>
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<td>(116.700)</td>
<td>(118.098)</td>
</tr>
<tr>
<td>Total Liquid Assets</td>
<td></td>
<td>106.735</td>
<td>61.450</td>
</tr>
<tr>
<td>TOTAL LIABILITIES AND LIQUID ASSETS</td>
<td></td>
<td>214.136</td>
<td>151.556</td>
</tr>
</tbody>
</table>

The accompanying notes are integral parts of these financial statements.
Instituto de Pesquisas Tecnológicas do Estado de São Paulo S.A. - IPT

IPT results for the year ending December 31st of 2010 and 2009
(in thousands of reais)

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009 (Reclassified)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income from products and services</td>
<td>81,194</td>
<td>74,888</td>
</tr>
<tr>
<td>Economic grants</td>
<td>57,110</td>
<td>45,561</td>
</tr>
<tr>
<td>GROSS OPERATIONAL INCOME</td>
<td>138,304</td>
<td>120,449</td>
</tr>
<tr>
<td>Taxes levied on sales and services</td>
<td>(11,449)</td>
<td>(10,625)</td>
</tr>
<tr>
<td>Returns and allowances</td>
<td>(580)</td>
<td>(415)</td>
</tr>
<tr>
<td>NET OPERATIONAL INCOME</td>
<td>126,275</td>
<td>109,410</td>
</tr>
<tr>
<td>Cost of services rendered and products sold</td>
<td>(87,418)</td>
<td>(80,498)</td>
</tr>
<tr>
<td>GROSS PROFIT</td>
<td>38,857</td>
<td>28,912</td>
</tr>
<tr>
<td>(EXPENSES) OPERATING INCOME</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General and administrative</td>
<td>(25,481)</td>
<td>(22,276)</td>
</tr>
<tr>
<td>Honorary Board of Directors and Audit Committee</td>
<td>(720)</td>
<td>(734)</td>
</tr>
<tr>
<td>Third party services</td>
<td>(7,264)</td>
<td>(9,639)</td>
</tr>
<tr>
<td>Depreciation and amortization</td>
<td>(1,126)</td>
<td>(740)</td>
</tr>
<tr>
<td>Miscellaneous provisions</td>
<td>(4,116)</td>
<td>(2,728)</td>
</tr>
<tr>
<td>Others (expenses) and other operational income, NET</td>
<td>111</td>
<td>(31)</td>
</tr>
<tr>
<td></td>
<td>(38,596)</td>
<td>(36,148)</td>
</tr>
<tr>
<td>OPERATIONAL RESULTS BEFORE INCOME AND FINANCE EXPENSES</td>
<td>261</td>
<td>(7,236)</td>
</tr>
<tr>
<td>Finance income</td>
<td>4,282</td>
<td>1,865</td>
</tr>
<tr>
<td>Finance expenses</td>
<td>(2,383)</td>
<td>(2,632)</td>
</tr>
<tr>
<td>RESULTS BEFORE INCOME TAX AND SOCIAL CONTRIBUTION</td>
<td>2,160</td>
<td>(8,003)</td>
</tr>
<tr>
<td>Income tax and social contribution</td>
<td>(660)</td>
<td>-</td>
</tr>
<tr>
<td>FINANCIAL RESULTS</td>
<td>1,500</td>
<td>(8,003)</td>
</tr>
</tbody>
</table>

The accompanying notes are integral parts of these financial statements
Instituto de Pesquisas Tecnológicas do Estado de São Paulo S.A. - IPT

IPT statement of changes in liquid assets for the year ending 31 December 2010 and of 2009
(in thousands of reais)

<table>
<thead>
<tr>
<th></th>
<th>Social Capital</th>
<th>Capital Reserves</th>
<th>Profit Reserves</th>
<th>Resources for Capital Increase</th>
<th>Accumulated Losses</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>BALANCE ON DECEMBER 31st OF 2008</td>
<td>134.742</td>
<td>27.766</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(103.956)</td>
</tr>
<tr>
<td>Prior year adjustments</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(6.139)</td>
</tr>
<tr>
<td>Resources for capital increase</td>
<td>-</td>
<td>17.040</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Operational losses</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(8.003)</td>
</tr>
<tr>
<td>BALANCE ON DECEMBER 31st OF 2009</td>
<td>134.742</td>
<td>44.806</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(118.098)</td>
</tr>
<tr>
<td>Capital increase</td>
<td>35.424</td>
<td>(35.424)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Resources for capital increase</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>43.784</td>
<td>-</td>
<td>43.784</td>
</tr>
<tr>
<td>Operational profit</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.500</td>
<td>1.500</td>
</tr>
<tr>
<td>Legal reserve appropriation</td>
<td>-</td>
<td>-</td>
<td>75</td>
<td>-</td>
<td>(75)</td>
<td>-</td>
</tr>
<tr>
<td>Tax incentive appropriation</td>
<td>-</td>
<td>-</td>
<td>27</td>
<td>-</td>
<td>(27)</td>
<td>-</td>
</tr>
<tr>
<td>BALANCE ON DECEMBER 31st OF 2010</td>
<td>170.166</td>
<td>9.382</td>
<td>75</td>
<td>27</td>
<td>43.784</td>
<td>(116.700)</td>
</tr>
</tbody>
</table>

The accompanying notes are integral parts of these financial statements.
### IPT cash flow statement for the year ending December 31 of 2010 and 2009
(in thousands of reais)

<table>
<thead>
<tr>
<th>2010</th>
<th>2009 (Reclassified)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Results before income tax and social contribution</strong></td>
<td>2.160</td>
</tr>
<tr>
<td><strong>Adjustments to reconcile profit before income tax and social contribution with net cash generated by operational activities</strong></td>
<td></td>
</tr>
<tr>
<td>Depreciation and amortization</td>
<td>6.242</td>
</tr>
<tr>
<td>Previous year adjustments</td>
<td>-</td>
</tr>
<tr>
<td>Provisions for losses on fixed assets</td>
<td>144</td>
</tr>
<tr>
<td>Residual lowered value of fixed assets</td>
<td>252</td>
</tr>
<tr>
<td><strong>Increase (decrease) in operational assets</strong></td>
<td></td>
</tr>
<tr>
<td>Related financial investments</td>
<td>(11.684)</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>(543)</td>
</tr>
<tr>
<td>Advances for employees and third parties</td>
<td>1.424</td>
</tr>
<tr>
<td>Prepaid taxes to be recovered</td>
<td>(287)</td>
</tr>
<tr>
<td>Stock</td>
<td>(22)</td>
</tr>
<tr>
<td>Services in progress</td>
<td>(19)</td>
</tr>
<tr>
<td>Prepaid expenses</td>
<td>(8)</td>
</tr>
<tr>
<td>Reserve deposits</td>
<td>(35)</td>
</tr>
<tr>
<td>Other amounts to be received</td>
<td>130</td>
</tr>
<tr>
<td><strong>Increase (decrease) in passive operations</strong></td>
<td></td>
</tr>
<tr>
<td>Suppliers</td>
<td>5.057</td>
</tr>
<tr>
<td>Payroll and expenses to be recovered</td>
<td>408</td>
</tr>
<tr>
<td>Taxes and contributions to collect</td>
<td>(1.625)</td>
</tr>
<tr>
<td>Advances from clients</td>
<td>499</td>
</tr>
<tr>
<td>Accounts payable – Vacation and charges</td>
<td>468</td>
</tr>
<tr>
<td>Tax installments</td>
<td>985</td>
</tr>
<tr>
<td>Government grants and fostering agencies</td>
<td>12.409</td>
</tr>
<tr>
<td>Other obligations</td>
<td>(176)</td>
</tr>
<tr>
<td>Net cash used for operational activities</td>
<td>15.779</td>
</tr>
<tr>
<td><strong>INVESTMENT ACTIVITIES CASH FLOW</strong></td>
<td></td>
</tr>
<tr>
<td>Long term reduction</td>
<td>143</td>
</tr>
<tr>
<td>Fixed asset acquisition</td>
<td>(54.073)</td>
</tr>
<tr>
<td>Donations received</td>
<td>(111)</td>
</tr>
<tr>
<td>Intangible increase</td>
<td>(224)</td>
</tr>
<tr>
<td>Net cash applied to investment activities</td>
<td>(54.265)</td>
</tr>
<tr>
<td><strong>FINANCE ACTIVITY CASH FLOW</strong></td>
<td></td>
</tr>
<tr>
<td>Installments</td>
<td>(1.231)</td>
</tr>
<tr>
<td>Other liabilities</td>
<td>85</td>
</tr>
<tr>
<td>Provision for tax, worker, and civil liabilities</td>
<td>(242)</td>
</tr>
<tr>
<td>Appropriation for capital increase</td>
<td>43.784</td>
</tr>
<tr>
<td>Net cash invested in finance activities</td>
<td>42.396</td>
</tr>
<tr>
<td><strong>INCREASE (DECREASE) IN CASH/CASH EQUIVALENT BALANCE</strong></td>
<td>3.910</td>
</tr>
<tr>
<td><strong>CASH AND CASH EQUIVALENTS</strong></td>
<td></td>
</tr>
<tr>
<td>At beginning of period</td>
<td>8.397</td>
</tr>
<tr>
<td>At the end of period</td>
<td>12.307</td>
</tr>
<tr>
<td><strong>INCREASE (DECREASE) OF CASH AND CASH EQUIVALENT BALANCE</strong></td>
<td>3.910</td>
</tr>
</tbody>
</table>

The accompanying notes are integral parts of these financial statements.
Accompanying notes to financial statements in December 31, 2010 and 2009 (in thousands of reais – R$)

1. Operating context

São Paulo’s Institute of Technical Research - IPT has the purpose of meeting the demands of science and technology in the public and private segments, in their acting field, as well as to contribute for the development of scientific and technological knowledge, being assigned to, among other activities: (a) making research and scientific and technological development projects; (b) give technical support to the development of engineering and industry; (c) to train and develop research teams able to contribute for distribution and solution of industrial technology problems in the State and in the country; (d) to collaborate in specialization programs for technicians graduated by Universidade de São Paulo and other higher education institutions in interest areas of science and technology; (e) to make agreements or contracts with natural or corporate entities, both public and private, Brazilian and foreign; (f) to make services to entities and bodies of public and private segments; (g) to explore, directly or indirectly, the results of research made; (h) to apply for the register of patents; (i) to grant the use of patents and other rights and (j) to edit and publish technical papers, as bulletins, journals and books.

For the development of these goals and to keep its operations, IPT receives budget from São Paulo State Government and governmental funding of fostering agencies.

IPT is an institute linked to the Economic Development, Science and Technology Secretary, and for more than one hundred year its been collaborating with the country’s development process.

2. Summary of main accounting practices

This is the first set of financial statements prepared by the Institute according to CPC PME, issued by the Committee for Accounting Pronouncing (CPC). The main accounting policies used in the preparation of these financial statements are defined below. These policies were consistently applied in the years presented.

2.1. Base for preparation and presentation

Financial statements were prepared and are presented according to CPC for PMEs. They were prepared considering the history of cost as base for value. The preparation of accounting statements in compliance with CPC for PMEs requires the use of certain accounting estimates and also the use of judgment by the Institutes’s management of in the process of applying accounting policies, however, without areas or situations with more complexity demanding higher level of judgment or significant estimates for accounting statements.

2.2. Functional Currency and Presentation Currency

The financial statements are also being presented in thousands of reais, that is the functional currency used by the institute and also its presentation currency.

2.3. Cash and Cash Equivalents

These cover money in cash and bank deposits, stated all along and short term and high liquidity financial applications with meaningless risk of value change stated in the cost added of revenues calculated up to the balance date, having as counterpart the year’s result.

2.4. Financial Applications – Bound Credits

Financial applications of immediate liquidity, of resource received from Fostering Agencies, demonstrated in the cost added of revenues calculated up to the balance date.

2.5. Financial Instruments

The administration classifies its financial assets under the following categories: measured at fair value through the result and loans and receivables.

The classification depends on the purpose for which the financial assets were acquired. The management determinate the classification of its financial assets in the initial acknowledgement. Measured at fair value through the result – These are financial assets kept for active and frequent negotiation. Assets of this category are classified as circulating assets. Gains or losses coming from variations in the fair value of financial assets measured at fair value through the result are presented in the results disclosure in the notation “Financial Revenues” in the period when they occur. Profit from financial applications respective to bound credits are recorded in account for “Government funding – Fostering agencies.”
Loans and receivables – In this category are included loans made and receivables that are financial assets not derivative with fixed or determinable payments, not quoted in an active market. They are included as circulating assets except those with term above 12 months after the balance's date, classified as non circulating assets. The Institute's loans and receivables involve cash and, cash equivalents, accounts receivable and other credits. Derivative financial instruments and hedge activities – During the years 2010 and 2009, the Institute has not operated with derivative financial instruments (hedge operations, swap, contracts for term and others).

2.6. Accounts Receivable

Accounts receivable correspond to transactions made with Brazilian clients and abroad, recorded by the billed value, decreased after ended the administrative resources of collection of Estimate Losses in Doubtful Liquidation Credit.

2.7. Inventory and other circulating assets

Inventory, substantially represented by laboratory materials, chemical and protection products, were valued for their purchase value, deducting, when applicable, as provision to face possible losses in its accomplishment. Other circulating assets are stated at cost or accomplishment value.

2.8. Fixed assets

Fixed assets items are demonstrated at historic cost of purchase or donation, minus the value of depreciation and any non-recoverable loss accumulated. Depreciation is calculated using linear method to allocate its costs and having as base the usual rates demonstrated in bill nº 8, not considering residual value.

2.9. Intangível

It is represented by brands, patents and software licenses purchased that are capitalized based on costs incurred in their purchase and preparation of software for its use. These costs are amortized during their lifecycle estimated in five years.

Brands and patents, as they do not have a defined lifecycle, are being amortized in the period of ten years.

2.10. Provision for losses per impairment in non financial assets

Assets subject to depreciation or amortization are revised annually to check the recoverable value. When there is indication of loss of recoverable value (impairment), the asset's accounting value is tested. When there is loss, it is acknowledged by the amount in which the asset's accounting value surpasses its recoverable value, it means, the greatest between the net sale price and the value in use of an asset.

2.11. Suppliers

Accounts payable to suppliers are duties payable for goods or services that were acquired in the normal course of activities, being acknowledged in the value of corresponding bill or contract. The aforementioned accounts payable are classified as circulating liabilities if the payment is due in the period of up to one year after the balance date. Otherwise, accounts payable are presented in the non circulating liabilities.

2.12. Provision for Tax, Labor and Civil Risks

Updated up to the dates of balances by the likely amount of losses, observing their natures and support in the opinion of lawyers. For demonstration purposes, they are presented net of respective legal deposits. The foundations and the nature of provisions for tax, civil and labor risks are described in the explanatory note nº 14.

2.13. Tax Installments

Updated by monetary variations and interests incurred up to the balances' dates, as foreseen in contract and demonstrated in the explanatory note nº 13.


The income tax and social contribution of the effective year are calculated based on rates of 15%, plus the additional of 10% over the exceeding taxable income of R$ 240 thousand for income tax and 9%, over taxable income for social contribution over net income, and they consider the compensation of tax losses and negative base of social contribution, limited to 30% of actual income, according to explanatory note nº 11.

2.15. Other Circulating Liabilities

Demonstrated by values known or calculable, plus, when applicable, duties and monetary variations incurred.
2.16. Acknowledgement of Revenue

Revenue covers the value billed by services provided, and is acknowledged based on the services made up to the balance's date, to the extent that all costs related to services may be measured in a reliable manner.

Fundings received from São Paulo State Government for costs are acknowledged upon their reception and are appropriated by competence regime.

3. Cash and cash equivalents

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>84</td>
<td>81</td>
</tr>
<tr>
<td>Movement account banks</td>
<td>155</td>
<td>1.202</td>
</tr>
<tr>
<td>Financial applications</td>
<td>12.068</td>
<td>7.114</td>
</tr>
<tr>
<td></td>
<td>12.307</td>
<td>8.397</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Management System for States and Cities – SIAFEM</td>
<td>195</td>
<td>470</td>
</tr>
<tr>
<td>Investment funds with fixed revenues</td>
<td>11.873</td>
<td>6.644</td>
</tr>
<tr>
<td></td>
<td>12.068</td>
<td>7.114</td>
</tr>
</tbody>
</table>

Resources applied in SIAFEM come from reception of clients that operate in this same system and are compensated in approximately 95% of SELIC rate.

The financial applications refer specially to quotas in investment funds with Banco do Brasil with an approximate revenue of 9% per year.

4. Checking accounts and financial applications – bound credits

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bound checking accounts</td>
<td>66</td>
<td>696</td>
</tr>
<tr>
<td>Bound financial applications</td>
<td>23.675</td>
<td>11.361</td>
</tr>
<tr>
<td></td>
<td>23.741</td>
<td>12.057</td>
</tr>
</tbody>
</table>

These refer to checking accounts and applications in investment funds. These resources are made available as Government Funding by Fostering Agencies for financing of specific projects not characterized as provision of services.

The revenues perceived in the year due to these financial applications in the amount of R$ 1,136 in 2010 (R$ 354 in 2009) are incorporated to the resources made available by fostering agencies, classified in the section “Government Fundings – Fostering Agencies”, and remain bound for the accomplishment of respective projects, and therefore do not make IPT’s financial revenue.

5. Accounts Receivable

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts Receivable</td>
<td>8.138</td>
<td>7.467</td>
</tr>
<tr>
<td>Estimated Losses in Credit of Doubtful Liquidation</td>
<td>(310)</td>
<td>(182)</td>
</tr>
<tr>
<td></td>
<td>7.828</td>
<td>7.285</td>
</tr>
</tbody>
</table>

There were no significant movements in estimated losses in credit of doubtful liquidation in the years ended in December 31, 2010 and 2009.

In December 31, 2010 and 2009, the opening of accounts receivable per due dates was as follows:

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>To expirate</td>
<td>5.911</td>
<td>5.738</td>
</tr>
<tr>
<td>Due:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 to 30 days</td>
<td>520</td>
<td>1.231</td>
</tr>
<tr>
<td>31 to 60 days</td>
<td>654</td>
<td>183</td>
</tr>
<tr>
<td>61 to 90 days</td>
<td>342</td>
<td>41</td>
</tr>
<tr>
<td>91 to 180 days</td>
<td>626</td>
<td>9</td>
</tr>
<tr>
<td>More than 180 days</td>
<td>85</td>
<td>134</td>
</tr>
<tr>
<td></td>
<td>2.227</td>
<td>1.598</td>
</tr>
<tr>
<td></td>
<td>8.138</td>
<td>7.336</td>
</tr>
</tbody>
</table>

Though the amount due for more than 90 days sums up to R$ 711, the provisioned estimated losses are R$ 310 because the criteria for its constitution is made only after all the administrative collection resources are exhausted.
6. Anticipated taxes to recover

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>COFINS to compensate</td>
<td>675</td>
<td>819</td>
</tr>
<tr>
<td>PASEP to compensate</td>
<td>157</td>
<td>194</td>
</tr>
<tr>
<td>Social Contribution to compensate</td>
<td>1.198</td>
<td>1.083</td>
</tr>
<tr>
<td>Income Tax to Compen</td>
<td>1.042</td>
<td>669</td>
</tr>
<tr>
<td>IRRF on Financial Applications</td>
<td>76</td>
<td>261</td>
</tr>
<tr>
<td>IRRF to compensate</td>
<td>1.303</td>
<td>1.142</td>
</tr>
<tr>
<td>INSS to compensate</td>
<td>202</td>
<td>198</td>
</tr>
<tr>
<td></td>
<td>4.653</td>
<td>4.366</td>
</tr>
</tbody>
</table>

Balances of taxes and contributions to compensate cover the amounts disbursed as anticipation of taxes and contributions and/or withheld from clients, made according to the tax law in effect. The movement in the year ended in December 31, 2010 is as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>COFINS to compensate</td>
<td>819</td>
<td>979</td>
<td>(1.123)</td>
<td>675</td>
</tr>
<tr>
<td>PASEP to compensate</td>
<td>194</td>
<td>221</td>
<td>(259)</td>
<td>156</td>
</tr>
<tr>
<td>Social Contribution to compensate</td>
<td>1.083</td>
<td>995</td>
<td>(879)</td>
<td>1.199</td>
</tr>
<tr>
<td>Income Tax to Compen</td>
<td>669</td>
<td>2.239</td>
<td>(1.865)</td>
<td>1.043</td>
</tr>
<tr>
<td>IRRF on Financial Applications</td>
<td>261</td>
<td>(185)</td>
<td>-</td>
<td>76</td>
</tr>
<tr>
<td>IRRF to compensate</td>
<td>1.142</td>
<td>252</td>
<td>(92)</td>
<td>1.302</td>
</tr>
<tr>
<td>INSS to compensate</td>
<td>198</td>
<td>4</td>
<td>-</td>
<td>202</td>
</tr>
<tr>
<td></td>
<td>4.366</td>
<td>4.505</td>
<td>(4.218)</td>
<td>4.653</td>
</tr>
</tbody>
</table>

7. Fixed Assets
a. Breakdown of fixed assets

<table>
<thead>
<tr>
<th></th>
<th>Yearly depreciation rate</th>
<th>Cost</th>
<th>Depreciation</th>
<th>Net 2010</th>
<th>Net 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real estate</td>
<td>-</td>
<td>37.283</td>
<td>-</td>
<td>37.283</td>
<td>37.283</td>
</tr>
<tr>
<td>Buildings and improvements</td>
<td>2%</td>
<td>51.452</td>
<td>(23.257)</td>
<td>28.195</td>
<td>29.212</td>
</tr>
<tr>
<td>Machines and equipment</td>
<td>10%</td>
<td>85.525</td>
<td>(48.134)</td>
<td>37.391</td>
<td>26.556</td>
</tr>
<tr>
<td>Facilities</td>
<td>10%</td>
<td>7.165</td>
<td>(6.399)</td>
<td>766</td>
<td>959</td>
</tr>
<tr>
<td>IT Equipment</td>
<td>20%</td>
<td>11.983</td>
<td>(9.218)</td>
<td>2.765</td>
<td>2.067</td>
</tr>
<tr>
<td>Diverse instruments</td>
<td>10%</td>
<td>965</td>
<td>(937)</td>
<td>28</td>
<td>35</td>
</tr>
<tr>
<td>Vehicles</td>
<td>20%</td>
<td>1.729</td>
<td>(1.477)</td>
<td>252</td>
<td>123</td>
</tr>
<tr>
<td>Furniture and utilities</td>
<td>10%</td>
<td>2.958</td>
<td>(2.310)</td>
<td>648</td>
<td>461</td>
</tr>
<tr>
<td>Other fixed assets</td>
<td></td>
<td>437</td>
<td>(437)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Assets in progress</td>
<td></td>
<td>54.302</td>
<td>-</td>
<td>54.302</td>
<td>16.983</td>
</tr>
<tr>
<td></td>
<td>253.799</td>
<td>(92.169)</td>
<td>161.630</td>
<td>113.679</td>
<td></td>
</tr>
<tr>
<td>Reduction to recoverable value</td>
<td>(144)</td>
<td>-</td>
<td>(144)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Total fixed assets</td>
<td></td>
<td>253.655</td>
<td>(92.169)</td>
<td>161.486</td>
<td>113.679</td>
</tr>
</tbody>
</table>
The movement of fixed assets in the year ended in December 31, 2010 is as follows:

<table>
<thead>
<tr>
<th>Real estate</th>
<th>31/12/2009</th>
<th>Additions</th>
<th>Write-offs</th>
<th>Transferences</th>
<th>31/12/2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lands</td>
<td>37.283</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>37.283</td>
</tr>
<tr>
<td>Buildings</td>
<td>51.452</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>51.452</td>
</tr>
<tr>
<td>Machines and equipment</td>
<td>70.839</td>
<td>1.638</td>
<td>(127)</td>
<td>13.175</td>
<td>85.525</td>
</tr>
<tr>
<td>Facilities</td>
<td>7.161</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>7.165</td>
</tr>
<tr>
<td>IT Equipment</td>
<td>10.516</td>
<td>1.225</td>
<td>(3)</td>
<td>245</td>
<td>11.983</td>
</tr>
<tr>
<td>Diverse instruments</td>
<td>964</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>965</td>
</tr>
<tr>
<td>Vehicles</td>
<td>1.539</td>
<td>189</td>
<td>-</td>
<td>1</td>
<td>1.729</td>
</tr>
<tr>
<td>Furniture and utilities</td>
<td>2.701</td>
<td>251</td>
<td>(11)</td>
<td>17</td>
<td>2.958</td>
</tr>
<tr>
<td>Other fixed assets</td>
<td>437</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>437</td>
</tr>
<tr>
<td>Assets in progress</td>
<td>16.983</td>
<td>50.769</td>
<td>(8)</td>
<td>(13.442)</td>
<td>54.302</td>
</tr>
<tr>
<td>Total</td>
<td>199.875</td>
<td>54.073</td>
<td>(149)</td>
<td>-</td>
<td>253.799</td>
</tr>
</tbody>
</table>

The value for assets in progress in the year 2010 refers to machines and equipment that are being imported as part of IPT's revitalizing program, which started with a R$ 43,784 financial income by the São Paulo State's Government for future increase of the share capital.

8 – Intangible Assets

It is made up as follows:

<table>
<thead>
<tr>
<th></th>
<th>Annual amortization</th>
<th>Cost</th>
<th>Amortization</th>
<th>Net 2010</th>
<th>Net 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brands and patents</td>
<td>10%</td>
<td>337</td>
<td>259</td>
<td>78</td>
<td>323</td>
</tr>
<tr>
<td>Software use license</td>
<td>5%</td>
<td>218</td>
<td>11</td>
<td>207</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>555</td>
<td>270</td>
<td>285</td>
<td>323</td>
</tr>
</tbody>
</table>

9 – Taxes and contributions to collect

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISS</td>
<td>550</td>
<td>2.618</td>
</tr>
<tr>
<td>PASEP and COFINS</td>
<td>487</td>
<td>575</td>
</tr>
<tr>
<td>IRR – Third Parties and Employees</td>
<td>1.206</td>
<td>1.013</td>
</tr>
<tr>
<td>COFINS – withholdings</td>
<td>266</td>
<td>50</td>
</tr>
<tr>
<td>PASEP – withholdings</td>
<td>61</td>
<td>14</td>
</tr>
<tr>
<td>Others</td>
<td>110</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>2.680</td>
<td>4.305</td>
</tr>
</tbody>
</table>
10. Income Tax and Social Contribution

Expenses with income tax and social contribution, proper to the year’s result, can be stated as follows:

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income (Loss) before income tax and social contribution</td>
<td>2.160</td>
<td>(8.003)</td>
</tr>
<tr>
<td>Actual rate according to law in effect (32.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income Tax and Social Contribution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary Differences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compensation of tax loss and negative base</td>
<td>(283)</td>
<td>-</td>
</tr>
<tr>
<td>Provisions</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Permanent Differences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Income Tax and Social Contribution</td>
<td>660</td>
<td>-</td>
</tr>
</tbody>
</table>

The tax law in effect in Brazil does not set a term for compensation of tax losses found in previous years, but limits its use to 30% of the income tax due in the year. It also establishes that the provisions temporarily nondeductible should be added in the calculation of actual revenue and for calculation of income tax and social contribution for the year.

In December 31, 2010, IPT has accumulated tax losses and negative base in the amounts of R$ 65,393 and R$ 40,872, respectively, and R$ 68,919 and R$ 41,027 in 2009. The income tax and social contribution deferred over tax losses and other differences temporarily nondeductible were not acknowledged in financial statements due to accumulated losses incurred in the last few years by IPT.

11. Advances from clients

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrobras</td>
<td>2.930</td>
<td>2.336</td>
</tr>
<tr>
<td>Plantarium Com Prod Alim Cosm Farm Manif</td>
<td>178</td>
<td>278</td>
</tr>
<tr>
<td>TCE Ind da Amazonia</td>
<td>153</td>
<td>153</td>
</tr>
<tr>
<td>ArcelorMittal Brasil S/A</td>
<td>89</td>
<td>115</td>
</tr>
<tr>
<td>Others</td>
<td>1.202</td>
<td>1.171</td>
</tr>
<tr>
<td></td>
<td>4.552</td>
<td>4.053</td>
</tr>
</tbody>
</table>

12. Government Fundings – fostering agencies

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNDES</td>
<td>22.056</td>
<td>6.899</td>
</tr>
<tr>
<td>Finep</td>
<td>1,542</td>
<td>4.317</td>
</tr>
<tr>
<td>Fehidro</td>
<td>353</td>
<td>165</td>
</tr>
<tr>
<td>CNPq</td>
<td>126</td>
<td>146</td>
</tr>
<tr>
<td>Others</td>
<td>676</td>
<td>817</td>
</tr>
<tr>
<td></td>
<td>24.753</td>
<td>12.344</td>
</tr>
</tbody>
</table>
13. Tax Installments
The debts that make up the installments balance are demonstrated as follows:

<table>
<thead>
<tr>
<th></th>
<th>INSS Refis</th>
<th>ISS(a)</th>
<th>IPTU(b)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installments plan</td>
<td>-</td>
<td>4.923</td>
<td>7.415</td>
<td>12.338</td>
</tr>
<tr>
<td>Interests</td>
<td>-</td>
<td>1.575</td>
<td>212</td>
<td>1.787</td>
</tr>
<tr>
<td>Reclassification for provision of tax risks</td>
<td>-</td>
<td>(4.370)</td>
<td>-</td>
<td>(4.370)</td>
</tr>
<tr>
<td>Short term transference</td>
<td></td>
<td></td>
<td></td>
<td>4.707</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>36.400</td>
</tr>
</tbody>
</table>

(a) Refers to tax assessment notices made by São Paulo City Hall in December 27 2006, due to the absence of collection of Tax over Services – ISS over invoices not issued, over absence of collection in due term and undercollection of tax during the period of April 2000 to April 2005. It also refers to tax foreclosure for collection of ISS regarding the years 1992, 1994 and 1995.
(b) Refers to tax foreclosure for collection of Urban Building and Estate Income – IPTU regarding the years 1994 to 2004.

14. Provisions for tax, labor and civil risks

IPT is a part in legal suits before several labor, civil and tax courts due to the usual conduct of its business.

The respective provisions for contingencies were constituted considering the evaluation of loss probability by legal advisors and, when needed, legal deposits were made.

The management, based on the opinion of its legal advisors, believes the constituted provisions for contingencies are sufficient to cover possible losses with law suits as presented below:

a) Composition

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tax (a)</td>
<td>4.124</td>
<td>3.364</td>
</tr>
<tr>
<td>Civil</td>
<td>2.281</td>
<td>2.623</td>
</tr>
<tr>
<td>Labor</td>
<td>3.339</td>
<td>3.999</td>
</tr>
<tr>
<td></td>
<td>9.744</td>
<td>9.986</td>
</tr>
</tbody>
</table>

The movement in the year finished in December 31, 2010 is as follows:

<table>
<thead>
<tr>
<th></th>
<th>Tributários</th>
<th>Cíveis (b)</th>
<th>Trabalhistas (b)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constitution</td>
<td>3.418</td>
<td>-</td>
<td>388</td>
<td>3.806</td>
</tr>
<tr>
<td>Transference between provisions accounts</td>
<td>(2.658)</td>
<td>-</td>
<td>(88)</td>
<td>(2.746)</td>
</tr>
<tr>
<td>Payment</td>
<td>-</td>
<td>(342)</td>
<td>(960)</td>
<td>(1.302)</td>
</tr>
</tbody>
</table>

(a) In December 2010, the Institute was notified by São Paulo City Hall’s (PMSP) authorities in the total value of R$ 4,857, for alleged lack of collection of ISS over debit bills issued in the year 2006. The management filed an administrative objection to part of the aforementioned notification and constituted the provision for the non disputing part.
(b) Civil and Labor refer to risks for which the Management, together with its legal advisors, understands as likely to have unfavorable result for IPT.
15. Net equity

(a) Capital Share: The capital share, subscribed and paid in full, is made up of 17,016,632,281 common nominative shares, without nominal value.

(b) Income reserves: The legal reserve was constituted with the destination of 5% of net income in the year and may not exceed 20% of capital share.

(c) Capital Reserves: Resulting from donations and/or funding for investment to be used for capital increase.

d) Resource for Capital Increase: Financial income from São Paulo’s State Government for future capital share increase.

16. Budget allocation

For the year 2011, São Paulo’s State Government approved Budget Allocation in the amount of R$ 103,770, R$ 52,770 for Costs and R$ 51,000 for Investments, as approved in São Paulo State Budget Law, Decree no. 56.644 of January, 3rd, 2011.

17. Insurance coverage

In December 31, 2010, there is insurance coverage for fire, lightning, explosion, implosion and smoke for the Institute’s buildings, with expiration in May 11, 2011, in a value deemed enough by the management to cover possible losses.
Relatório dos auditores independentes sobre as demonstrações contábeis

To the Board of Directors of Instituto de Pesquisas Tecnológicas do Estado de São Paulo S/A. - IPT

São Paulo - SP

We have examined accounting statements of Instituto de Pesquisas Tecnológicas do Estado de São Paulo S/A. – IPT, that include the equity balance in December 31, 2010 and the respective statements of result, the mutations of liquid equity and cash flows for the year finished in that date, as well as the summary of main accounting practices and other explanatory notes.

Responsibility of the management for accounting statements

The entity’s management is responsible for the preparation and proper presentation of these financial statements according to accounting practices used in Brazil and for the internal controls that it has determined as necessary to allow the preparation of financial statements without significant distortion, regardless being caused by fraud or error.

Responsibility of independent auditors

Nossa responsabilidade é a de expressar uma opinião sobre as demonstrações contábeis in accordance with our audit, made according to Brazilian and international audit standards. These standards require the compliance with technical requirements by the auditors and that the audit be planned and made with the purpose of getting a reasonable security that financial statements are free of relevant distortion.

An audit involves the execution of procedures selected for getting evidence on values and disclosures presented in financial statements. The procedures selected depend upon the auditor’s judgment, including evaluation of relevant distortion risks in accounting statements, regardless being caused by fraud or error. In this evaluation of risks, the auditor considers the relevant internal controls for the preparation and adequate presentation of the Entity's financial statements to plan audit procedures that are adequate in the circumstances, but not for purposes of expressing an opinion on these entity’s internal controls’ efficacy. An audit also includes evaluation of fitting of accounting practices used and the reasonableness of accounting estimates made by the management, as well as the evaluation of the presentation of financial statements collectively.

We believe that the audit evidence obtained is sufficient and appropriate to base our opinion.

Opinion

In our opinion, the accounting statements mentioned above present adequately, in all the relevant aspects, the equity and financial position of Instituto de Pesquisas Tecnológicas do Estado de São Paulo S/A. – IPT, the performance of its operations and its cash flows for the year finished in that date, according to accounting practices used in Brazil.

São Paulo, February 21, 2011.

Cokinos & Associados
Auditórios Independentes S/C
CRC-2SP 15.753/O-0

José Luiz de Faria
Accountant
CRC - 1SP166.868/O-8

CVM register n° 7.739
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Geraldo Alckmin

Deputy Governor of the State of São Paulo
Guilherme Afif Domingos

Secretaty of Science, Technology, and Economic Development
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Fábio de Carvalho Groff

Corporate Marketing Advisory
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Eduardo Luiz Machado

Modernization and Infrastructure Management
Wilson Shoji Iyomasa

Budget and Control Management
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Supplies Coordination
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Information Technology Coordination
Newton da Silva Brandão

Technological Information and Collection Deptartment
Rosangela Zanforlin de Almeida

Projects Financial Administration Department
Diraldo Nunes Pereira

Ombudsman
Rafael Palla dos Santos
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