



**PTI**

Itaipu Technology  
Park

# GLOBAL COMPACT

# SUSTAINABLE DEVELOPMENT GOALS

2019



**Brazil**



**PTI**

Itaipu Technology  
Park



# INTRODUCTION

Itaipu Technology Park - Brazil (PTI-BR), in alignment with Itaipu Binacional and as a signatory to the Global Compact, has adopted actions that meet the Sustainable Development Goals (SDGs) since 2003, the year of its creation. The PTI's mission is "to promote sustainable territorial development through education, science, technology, innovation, culture and entrepreneurship". The actions include the area of influence of the Itaipu Hydroelectric Power Plant, Western Paraná, composed of 54 municipalities.

In recent years, the reality of Western Paraná has changed dramatically. Until 1960, the region was sparsely populated, when the first migrants began to arrive, attracted by land offerings, logging and development of industry and commerce, which mainly stimulated migrants from Rio Grande do Sul and Santa Catarina (South of Brazil). This scenario led to an abrupt population increase: from 135,000 people in the 1960s to over 760,000 in 1970. Another factor that stimulated migration was the construction of the Itaipu Hydroelectric Power Plant. It is estimated that in the 1980s alone, more than 140,000 people migrated to the region, mainly to Foz do Iguaçu, motivated by the construction.

Currently, Western Paraná has a dynamic associated with agribusiness. The region has the largest number of cooperative agribusinesses in the State: 17 agricultural cooperatives positioned among the 1000 largest companies in Brazil. Of these, eight are in the Western region (IPARDES, 2003; EXAME, 2017). This is due to the creation of a Science, Technology and Innovation (CT&I) environment and higher education profile focused on agroindustrial activities, which generates a policy of encouraging research, adequacy of institutional arrangements and close relationship between science and the needs of the productive sector (IPARDES, 2003). In addition to its agricultural vocation, we highlight the furniture industry, tourism and the Itaipu Hydroelectric Power Plant, which attract suppliers and service providers to the region.

Such demographic changes demanded a change in the profile of the region, which, in a little over 20 years, added activities of the tertiary sector to agriculture and cattle raising. Thus, PTI was created to implement an appropriate environment for technological development, which directly impacted the Human Development Index (IDH)<sup>1</sup> of the region, which in 1991 was 0.46, in 2000 - 0.62, and currently 0.717, the largest in Paraná, according to the Paraná Institute of Economic and Social Development (IPARDES, 2003).



<sup>1</sup> The Human Development Index (IDH) measures the level of human development and uses three pillars – health, education and income – which are measured as follows: a long and healthy life (health): life expectancy at birth. Access to knowledge (education): average years of schooling (adults) and expected years of schooling (children). A decent standard of living (income): measured by Gross National Income (RNB) based on Purchasing Power Parity (PPC) per inhabitant. Available at: <http://www.br.undp.org/content/brazil/pt/home/idh0/conceitos/o-que-e-o-idh.html>. Access on: Aug 1, 2019.

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# LIST OF ACRONYMS

<b>ABDI</b>	Brazilian Agency for Industrial Development
<b>ANA</b>	National Water Agency
<b>BNDES</b>	National Bank for Economic and Social Development
<b>Ceasb</b>	Center for Advanced Studies in Dam Safety
<b>CT&amp;I</b>	Science, Technology and Innovation
<b>EB</b>	Brazilian Army
<b>Eletrobrás</b>	Brazilian Power Plants - Centrais Elétricas Brasileiras S.A.
<b>HLPF</b>	High-Level Political Forum on Sustainable Development Goals
<b>IDEB</b>	Basic Education Development Index
<b>IDH</b>	Human Development Index
<b>IfaS</b>	Applied Institute of Materials Management and Flow
<b>INPE</b>	National Institute for Space Research
<b>IPARDES</b>	Paraná Institute of Economic and Social Development
<b>IPEA</b>	Institute of Applied Economic Research
<b>IQP</b>	Planting Quality Index
<b>Lasse</b>	Laboratory of Automation and Simulation of Electrical Systems
<b>MCTIC</b>	Ministry of Science, Technology, Innovations and Communications
<b>NIT</b>	Territorial Intelligence Center
<b>ONU</b>	United Nations
<b>Plansab</b>	National Basic Sanitation Plan
<b>PPC</b>	Purchasing Power Parity
<b>PTI-BR</b>	Itaipu Technology Park - Brazil
<b>PTI</b>	Itaipu Technology Park
<b>RNB</b>	Gross National Income
<b>RPMF</b>	Disturbance and Phase Measurement Recorder
<b>RTDS</b>	Real Time Digital Simulator
<b>SDG</b>	Sustainable Development Goals
<b>Sebrae</b>	Brazilian Micro and Small Business Support Service
<b>Sesi-PR</b>	Industry Social Service
<b>UAB</b>	Open University of Brazil
<b>Unila</b>	Federal University for Latin American Integration
<b>Unioeste</b>	Western Paraná State University
<b>UNWTO</b>	United Nations World Tourism Organization
<b>WTO</b>	World Tourism Organization

## WORD FROM THE SUPERINTENDENT DIRECTOR OF ITAIPU TECHNOLOGY PARK - BRAZIL

Ladies and gentlemen,

It is with great pleasure that Itaipu Technology Park presents its report on the Sustainable Development Goals (SDGs) which, according to the Institute of Applied Economic Research (IPEA, 2018), represent the central axis of Agenda 2030, which guides the actions in the three dimensions of sustainable development: economic, social and environmental. These dimensions indicate the paths to be followed and the measures to be taken to achieve the United Nations (ONU) objectives in monitoring climate change and its effects on the planet and people. This monitoring is carried out annually at the High-Level Political Forum on Sustainable Development Goals (HLPF).

In this sense, the Itaipu Technology Park, which has made a commitment to the Global Compact, cannot be absent from the SDGs, considering that its actions have a strong focus on regional environmental issues, a topic of interest to our maintainer, Itaipu Binacional, whose raw material is water, which depends on several factors to maintain its quality and quantity.

In addition to water conservation, the purpose of our maintainer, Itaipu Technology Park is focused on fulfilling extended mission, boosting economic, tourism, technological and sustainable development and serving as Itaipu's arm to transform the region through research and development of sustainable technologies.

In this sense, the programs and projects of Itaipu Technology Park are oriented towards compliance with the SDGs, as shown throughout this report. I emphasize also that the programs and projects of the Park are directly related to 13 out of the 17 SDGs.

Finally, I wish you all a good reading of this report and I invite you to visit Itaipu Technology Park, located in Foz do Iguaçu, in the triple border region among Brazil, Argentina and Paraguay, an abundant region in nature – land of the Iguazu Falls, one of the seven natural wonders of the world – and energy sources that needs to be conserved for future generations as well.

### **General Eduardo Castanheira Garrido Alves**

*Superintendent Director of Itaipu Technology Park - Brasil.*





# WORD FROM THE BRAZILIAN GENERAL DIRECTOR OF ITAIPU BINACIONAL

Ladies and gentlemen,

I am pleased to present the Itaipu Technology Park (PTI) Sustainable Development Goals (SDGs) report. PTI is in charge of fulfilling the extended mission of the world leader in clean and renewable energy production, Itaipu Binacional, which has produced more than 2.6 billion megawatts-hour (MWh) since the start of its operation in 1984. Its 20 generating units and 14,000 MW of installed capacity provide 15% of the energy consumed in Brazil and 90% of the energy consumed in Paraguay.

Power generation at Itaipu depends directly on the monitoring of rivers and climate in the Paraná Basin, with water pouring from six Brazilian states and the Federal District and, upon meeting the Iguaçú River, forms the La Plata River, which flows into the ocean after passing through Paraguay, Argentina and Uruguay.

Itaipu's reservoir is the main asset to produce energy for Brazil and Paraguay. But its multiple uses also include agriculture, tourism, leisure and municipal supply.

Therefore, Itaipu Binacional and its Technology Park focus on the conservation of this important watershed with actions ranging from protection of springs and recovery of microbasins, conservation of biodiversity and the promotion of environmental education, to the sustainability of productive activities, especially food production, which is the flagship of the region's economy.

Itaipu and PTI have extensive experience in managing water resources, promoting their multiple uses and long-term water security, and thus contribute to the sustainable development of the territory, in line with the SDGs and the 2030 Agenda, of the United Nations (ONU). This Agenda demands awareness raising in people, adaptation to global goals, implementation of governance and definition of national indicators, according to the Institute of Applied Economic Research (IPEA, 2018).

PTI plays an important role in the region as a research, diagnostic, project execution and knowledge dissemination arm and has programs and projects directly related to 13 out of the 17 SDGs.

Finally, I wish you a good reading of this report and I invite you to visit Itaipu Binacional and PTI, located on the border among Brazil, Argentina and Paraguay, the region of the most beautiful waterfalls in the world, the Iguazu Falls.

**General Joaquim Silva e Luna**

*Brazilian General Director of Itaipu Binacional.*





# 1 NO POVERTY

One of the structuring ways to eradicate poverty is through education, which provides qualified employability, intellectual development and the ability for people to live in synergy with the environment. Itaipu Technology Park has educational and training activities specifically aimed at people in socially vulnerable situations. Among the initiatives, we can mention:

- **Youth Trail:** in a partnership with Polo Iguassu Institute, it trains young people from 16 to 24 years old to work in the tourism area, since Foz do Iguacu is one of the main destinations in Brazil. In four years, more than 500 people have graduated from segments such as food and beverage, lodging, tourism and service, as well as commercial activities.
- **College entrance examination training:** in 3 years, more than 100 young vulnerable people got a place in public universities. It is an important achievement for these people to have access to qualified jobs. The partner in this action is the Western Paraná State University (Unioeste) in Foz do Iguacu.
- **Vira Vida:** together with the Industry Social Service (Sesi-PR), the project promotes the improvement of self-esteem, improvement of family and community life, regularization and improvement of formal education, removal of conflict and danger situations and training for employability. In this action alone, since 2014, of the 285 young people, 199 were sent to the formal job market.
- **Professional Workshops:** training activities are offered for the development of professional and artistic potentials and skills. The workshops are offered in organizations that serve associations, reference centers in social assistance and women in situations of violence. In 2018 alone, more than 600 workshops were held.

Figure 1: No Poverty - Youth Trail.



Figure caption: One of the fronts for poverty eradication is vocational training for young people in an unfavorable economic situation or in social vulnerability. Source: PTI gallery archive.





## 2 ZERO HUNGER

PTI's main action to promote sustainable agriculture is through technology. A web platform called "No-Tillage System" was developed to calculate the Planting Quality Index (IQP) of rural properties based on a register and on soil management quality parameters. The no-tillage system<sup>2</sup> is an ally for the pursuit of sustainable development and improved productivity in agriculture. The system can even be used by small producers.

Figure 2: Zero Hunger - Technician in field.



Figure caption: PTI technician monitors productivity rates of agricultural properties in the region. Source: Kiko Sierich.

All environmental management actions in the watershed are important to conserve the quality of water resources and production systems. Achieving this goal requires promoting sustainable agricultural practices through support for family farming, equitable access to land, technology and the market. PTI also supports collectives of low-income family producers, such as *quilombola*<sup>3</sup> communities and small producers. An example of that is the support to the Coofamel Cooperative, from the municipality of Santa Helena, in strengthening its management in the honey production chain. In addition to the implementation of a honey processing unit, the number of registered producers increased, and the cooperative obtained federal certification to market honey outside Paraná and in specific markets,

<sup>2</sup> The use of no-tillage on straw in place of conventional methods has increased significantly in recent years. In it, the straw and other plant debris from other crops are kept on the soil surface, ensuring cover and protection against harmful processes such as erosion.

<sup>3</sup> Quilombolas are the current inhabitants of black communities made up of descendants of enslaved africans, who mainly live off subsistence agriculture on donated, purchased or for long-occupied land. Available at: [http://basilio.fundaj.gov.br/pesquisaescolar/index.php?option=com\\_content&view=article&id=857:quilombolas&catid=51:letra-q](http://basilio.fundaj.gov.br/pesquisaescolar/index.php?option=com_content&view=article&id=857:quilombolas&catid=51:letra-q). Access on: Aug 27, 2019.

such as hotels and supermarkets, which added more value to the product. There was also the implementation of a Family Farming Commercialization Center, in the municipality of São Miguel do Iguaçu. This action is developed through a partnership among the PTI, Itaipu, the National Bank for Economic and Social Development (BNDES) and the Brazilian Micro and Small Business Support Service (Sebrae). In this case, cooperatives and associations have, as a requirement, to be formed mostly (at least 70% of members) by persons with family income equal to or less than 3 monthly minimum wages (approximately US\$730.00/month - US dollar exchange rate at R\$3.90). The selected projects received funds for the purchase of machinery, equipment, vehicles, specialized technical services, works and technical support.

*Figure 3: Zero Hunger - Coofamel.*



*Figure caption: PTI supports collectives of low-income family producers. Source: Kiko Sierich.*





## 3 GOOD HEALTH AND WELL-BEING

Foz do Iguaçu is a Brazilian city that borders two other countries: Paraguay and Argentina. This geographical feature reinforces the need for articulated and integrated actions in the health field among the three countries in the triple-border. In addition to Itaipu Binacional and Itaipu Technology Park, the working group that deals with the theme is composed of representatives of universities, state departments, councils, the Ministry of Health, foundations and governmental and non-governmental organizations.

At monthly meetings, relevant topics are addressed to ensure the implementation of public health policies and to verify demands that are often specific to the border region. An example of that was the identification of the need for a Tropical Medicine Center, where a molecular biology laboratory is in place today and able to investigate the full cycle of tropical diseases transmitted by animals and insects. In the case of the *Aedes Aegypti* mosquito, for example, a transmitter of diseases such as dengue, zika and chikungunya fever, from a mosquito sample, the laboratory has the ability to identify, within one hour, whether the insect from a certain region of the city is infected. This rapid diagnosis allows the city to immediately trigger preventive actions in the affected area, eliminating the mosquito before disease transmission and possible infestation, which directly impacts the decision-making of government managers. The work was funded by the Itaipu Hydroelectric Power Plant and research and diagnostics impact public health throughout the region.

Figure 4: Good Health and Well-being - Itaipu Health Working Group.



Figure caption: Planned and integrated actions among Brazil, Paraguay and Argentina are strategic to prevent epidemics. Source: Kiko Sierich.



## 4 QUALITY EDUCATION

Education has a transversal role to all SDGs and impacts on sustainable development both directly and indirectly. In addition to actions related to employability education and the transformation of human activities where there is social vulnerability, one of the main areas of activity of the PTI is in higher education, with articulation to attract universities and courses (undergraduate, specializations, masters and doctorates), mainly focusing on regional demands. PTI environment also favors student exchange: the labs are shared between students from the Western Paraná State University (Unioeste) and the Federal University for Latin American Integration (Unila), which allows research to be done together. In addition to Unioeste and Unila, PTI also operates a hub of the Open University of Brazil (UAB), with undergraduate and graduate courses. From 2006 to 2018, in the three universities, almost 3500 students graduated.

PTI also helped attract two masters' degree courses to the Western region: one in Computer Sciences and one in Technology, Management and Sustainability, as well as six doctorate courses: Numerical Methods, Law, Nursing and Public Health, Regional Development and Agribusiness, Electrical Engineering and International Relations.

The focus on qualification also happens with teachers. In the state of Paraná, the teaching of astronomy is mandatory in the school curriculum and teachers are trained at PTI. In basic education, in partnership with the city of Foz do Iguaçu, the use of new information and communication technologies is stimulated in pedagogical practice with the continuing education of teachers to improve the quality of teaching. In four years, 20 thousand people were served and the Foz do Iguaçu Basic Education Development Index (IDEB) scored averages above the State and National averages. In elementary school, for example, the indicators for 2017 are: Foz do Iguaçu (7.2), State of Paraná (6.3) and Brazil (5.5). Still in support of basic education, PTI offers scientific activities to promote investigative practices and encourage scientific initiation from the ground up.

*Figure 5: Quality Education - Enedina Alves Marques laboratory researchers.*



*Figure caption: PTI provides actions related to employability education and the transformation of human activities. Source: Kiko Sierich.*



Since 2006, PTI has been granting scholarships through partners to encourage and foster research, technological and educational development for people across the region. From 2006 to 2018, 1,793 scholarships were awarded in the various modalities.

PTI's educational actions follow citizens throughout their entire education: scientific initiation with children, support for the insertion of young people in public universities and referral of those who are in social vulnerability, whether for educational training or the labor market, in addition to offering continuing education, with undergraduate, specialization, master's and doctorate programs (academic and professional) and scholarships. With all these actions, the goals of SDGs 4 that are met are: 4.1, 4.3, 4.4, 4.5, 4.7, 4.a and 4.b.

*Figure 6: Quality Education - Science Station.*



*Figure caption: Education is one of the PTI's focal points to promote sustainable development. Source: Kiko Sierich.*



## 6 CLEAN WATER AND SANITATION

Water quality is a central theme for the PTI's maintainer, the Itaipu Hydroelectric Power Plant, in addition to initiatives related to water security, through Itaipu Technology Park, actions are developed that impact other levels of preservation of water resources beyond the environmental issue, such as the economic and social spheres.

An example is support for the National Plan for Basic Sanitation (Plansab), which provides for universal water and sewage services throughout southern Brazil by 2030. With this, PTI and Itaipu provide technical support to municipalities and consortia in the western region of Paraná through partial financial support and the elaboration of basic sanitation plans, which resulted in Municipal Basic Sanitation Policies.

Still in the environmental sphere, participatory monitoring of the water quality of the rivers of the region and the quality of surface waters and soils in relation to pesticides is carried out.

In parallel to ongoing actions, such as those described above, projects such as "Water: Knowledge for Management" are being developed through an agreement with the National Water Agency (ANA) which, from 2011 to 2016, trained more than 20,000 Brazilians and more than a thousand foreigners from all Latin American countries, as well as Spain, Germany, Portugal, Cape Verde and Mozambique on water resources management. Thirty online and semi-face-to-face courses were offered to various audiences, from teenagers to technicians. Of these, nine training courses were offered in the Spanish language.

PTI also implemented the Territorial Intelligence Center (NIT) that creates and applies solutions that improve and assist the management and decision-making process, focusing on water resources preservation and sustainable development, considering and analyzing the various existing interactions in the territory.

For this, NIT works with the development of web systems that allow spatial visualization and correlation of data in the territory, with studies and methodologies for environmental analysis and management, and with knowledge building to apply geoprocessing and geotechnology techniques and tools for territorial analysis.

*Figure 7: Clean Water and Sanitation.*



*Figure caption: PTI provides technical support to meet the National Plan for Basic Sanitation, which provides for universal water and sewage services for the entire southern region of Brazil by 2030. Source: Kiko Sierich.*





## 7 AFFORDABLE AND CLEAN ENERGY

The Itaipu Hydroelectric Power Plant is the largest generator of clean and renewable energy in the world. To ensure the continuity of energy security, it invests in hydroelectric operation and in new energy sources through research carried out in its technology park.

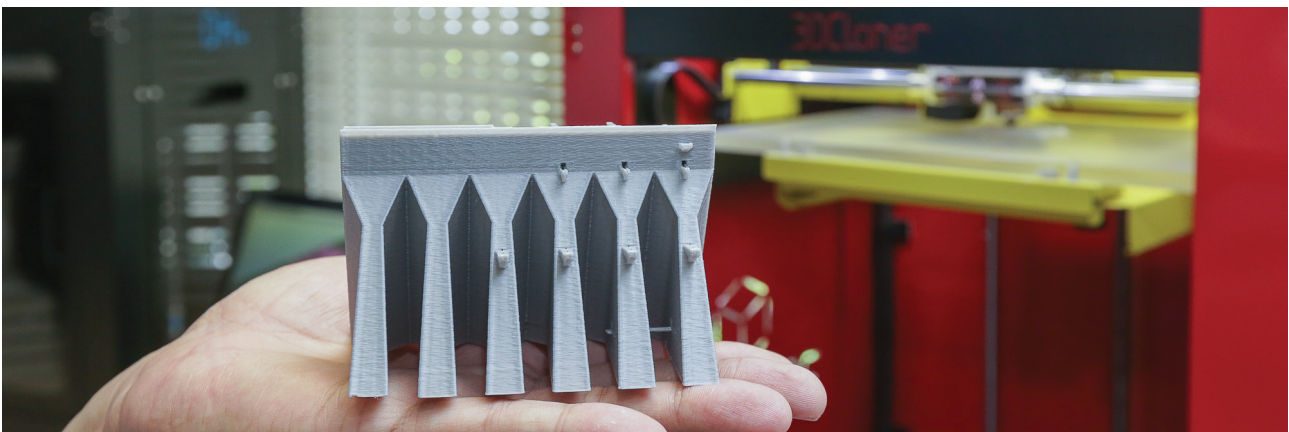
Regarding studies focused on meeting the demands of hydroelectric power generation, one of the laboratories, Laboratory of Automation and Simulation of Electrical Systems (Lasse), makes deliveries related to automation and simulation of electrical systems. A number of customized solutions have already been applied to the power plant, such as the Disturbance and Phase Measurement Recorder (RPMF), the Real-Time Digital Simulator (RTDS) and other solutions that assist in the quality of power transmission and loss reduction. The safety of the hydroelectric dam's civil structure is also the focus of studies carried out by PTI. Researchers are involved in 3D modeling of parts, geological studies and component wear and tear, among others. All so that the life of the dam is extended and the Itaipu Power Plant can remain with excellent levels of power generation.

*Figure 8: Affordable and Clean Energy - Lasse.*



*Figure caption: Laboratory of Automation and Simulation of Electrical Systems. Source: Kiko Sierich.*

*Figure 9: Affordable and Clean Energy - Ceasb.*



*Figure caption: Center for Advanced Studies in Dam Safety. Source: Kiko Sierich.*

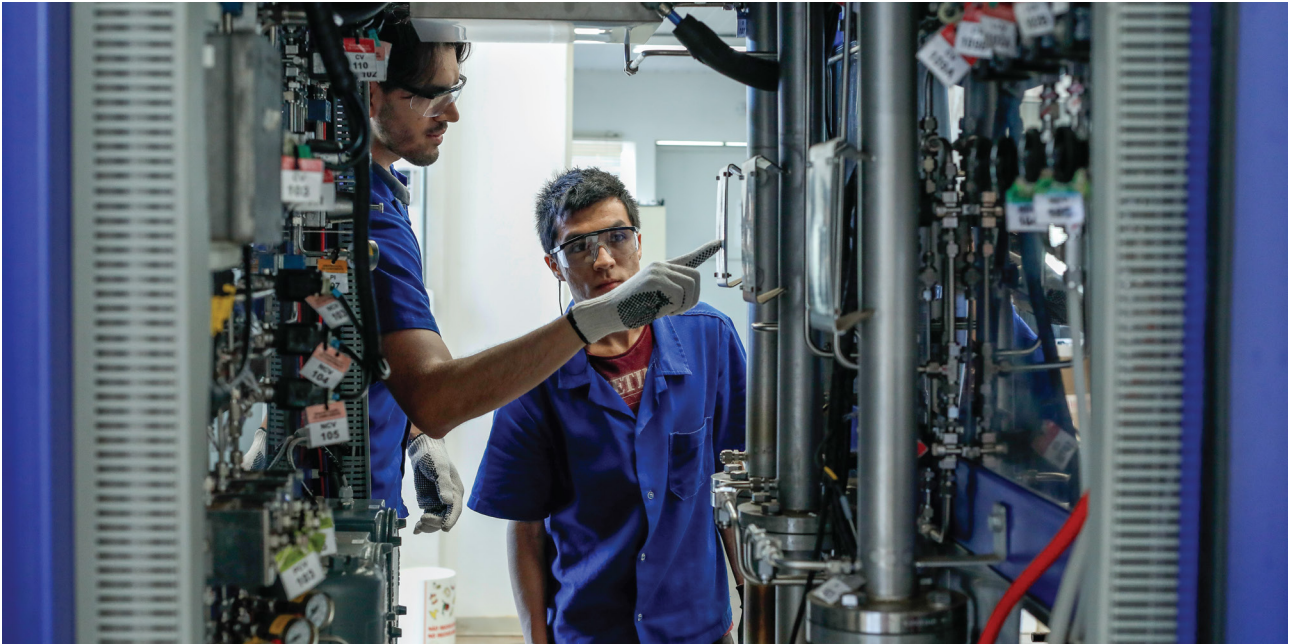


The geographical characteristics of the region where PTI is installed (Western Paraná State - Brazil) shaped investments in new sources of power generation, such as hydrogen and biogas. Western Paraná is one of the world's largest producers of animal protein, especially pork. The environmental liabilities generated on rural properties have been reused to generate biogas and biomethane. Many properties are near the Itaipu Power Plant reservoir. Before, most of the waste was deposited in this lake.

Water characteristics also favor hydrogen production and storage. Research carried out at PTI involves the use of gas in fuel cells or combustion in a mixture with other fuels such as biomethane.

In terms of energy storage, the focus of research is to produce Nickel-Sodium batteries. These metals are abundantly present in Brazil, are recyclable and not very pollutant and can be used in the storage of renewable energy.

*Figure 10: Affordable and Clean Energy - Hydrogen.*



*Figure caption: One of the newest sources of power generation. Source: Kiko Sierich.*

*Figure 11: Affordable and Clean Energy - Biomethane.*



*Figure caption: Research related to water and energy security is the PTI's focus. Source: Kiko Sierich.*





## 8 DECENT WORK AND ECONOMIC GROWTH

According to the goals relevant to SDGs 8, it is essential to stimulate decent employment generation, entrepreneurship, creativity, innovation and formalization. In addition, special attention is given to implementing policies to promote sustainable tourism that generates jobs and promotes local culture and products. In this regard, PTI has actions of great impact.

Foz do Iguaçu is internationally known for its Iguazu Falls and for being part of the Triple Border, with Paraguay and Argentina. Every year, more than five million tourists visit the city, which is the 3rd most visited international destination in Brazil. One of the main discussions related to tourism is to make visitors stay in the city longer. With this, in the early 2000s, the Itaipu Plant became part of the city's tourist attractions. The visitors get to know the plant and the characteristics related to energy production. PTI manages the tours. Each year, the plant receives about 1 million visitors. All proceeds from the sale of tickets go to the research projects of the technological park. More than 150 direct jobs and 150 indirect jobs are generated and there are positive impacts on the city's supply and service chain. In 2016, the sustainable tourism model was awarded by the World Tourism Organization (WTO) through the UNWTO Awards. PTI won the "Innovation in Research and Technology" category of the Tourism Excellence and Innovation Award.

*Figure 12: Decent Work and Economic Growth - Tourists.*



*Figure caption: All proceeds from ticket sales to visit the plant are invested in research carried out by the PTI. Source: Kiko Sierich.*

Decent work and economic growth are also met through a business incubator maintained by the PTI, which encourages decent employment generation, business formalization, entrepreneurship,

creativity and innovation, purposes related to goal 8.3. The profile of incubated companies is generally technology-based, linked to food and biotechnology, renewable energy, electromechanical and information technology.

*Figure 13: Decent Work and Economic Growth - Incubated company.*



*Figure caption: Technology-based companies meet the demands of Western Paraná. Source: Mahuan Abdala.*





## 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

There is a worldwide movement for government managers to invest in smart and sustainable cities to reduce basic infrastructure costs, improve management, digital inclusion in public services and resource optimization. These needs must have technology to work well, sustainably and at costs many times lower than conventional.

PTI and the Brazilian Agency for Industrial Development (ABDI) are partners to disseminate concepts on Smart Cities to Brazilian municipalities and, together with the incubator located at PTI, intend to stimulate the development of 4.0 industries in the region.

The application of renewable energy, for example, requires industrial components for its use, such as a public transport network, the application of smart traffic lights, the integration of means of transportation and the investment in shared alternatives for travel in big cities.

Faced with this scenario, PTI is a technology-based innovation ecosystem focused on real problems promoting competitive biddings to provide an appropriate and tutored environment for civil and academic society to turn ideas into high impact business. PTI has 17 companies in its portfolio in the areas of Technology, Agribusiness, Construction and Sustainability and Management.

*Figure 14: Industry, Innovation and Infrastructure - Electric vehicle fuel totem.*



*Figure caption: Smart, Sustainable Cities Demand 4.0 Industry Investments. Source: Kiko Sierich.*





## 10 REDUCED INEQUALITIES

PTI works to reduce inequalities through structuring actions, such as education, support for the creation of companies, stimulating entrepreneurship and offering professional training to people in social vulnerability.

Regarding mobility and migration, PTI hosts the Federal University for Latin American Integration (Unila), a bilingual institution (portuguese and spanish) that today has students from over 20 countries, as well as indigenous people, refugees and humanitarian visa holders. Some undergraduate and graduate courses work at PTI, which supports the university through physical structure, such as classrooms and laboratories.

PTI promotes a program called Science Station, which is a space to popularize, disseminate and strengthen scientific culture upon investigative practices for science education. In its laboratories, elementary and high school students participate in practical activities and the teachers get to know ways of teaching that arouse interest for active and investigative methodologies, in order to attract children and young people to the world of science and innovation. By then, more than 12,000 children have been impacted by the program.

In addition, there is the Youth Trail program, which aims to train 180 in-need and at-risk young people aged 16-24 each year, preparing them for the job market in the tourism, trade and related areas. The training lasts approximately 8 months and uses methodology that works on the technical-professional, social and individual transformation and, at the end of the training, provides professional experiences for young people.

*Figure 15: Reduced Inequalities - Students.*



*Figure caption: One of the main features of the technology parks is diversity. Source: Kiko Sierich.*





## 11 SUSTAINABLE CITIES AND COMMUNITIES

In this regard, PTI operates with specific and long-term actions. Some deliveries have already been made to support the government management of municipalities in Western Paraná, such as Foz do Iguaçu, when the Park drew up the city's urban mobility plan.

Another action is the work of supporting the municipalities of the region in the elaboration of the basic sanitation plans, in contribution to the National Basic Sanitation Plan, that foresees to universalize the water and sewage services for the Southern region of Brazil by 2030.

The elaboration of practical responses for urban environments, combined with the development of skills of the planning and urban planning teams of the cities, expanded the approach horizon not only to Foz do Iguaçu, but also to the cities that make up the trinational region, to think of the region as a metropolis and, therefore, the importance of planning combined and sustainable actions for cities geographically linked by rivers. The initiative is developed in a partnership with the French universities - Université Paris-Est Marne-la-Vallée, École Nationale Supérieure d'Architecture de Nantes and UniLa-Salle - and UniAmérica, from Foz do Iguaçu. This same partnership with universities, while developing the technical and transversal skills of planning, urbanism and sustainability professionals from municipalities and institutions in the Region, produced feasible project proposals in response to the urban sustainability challenges of five different cities in Western Paraná: Foz do Iguaçu, meeting the challenge of urban attractiveness; Toledo, in relation to the new urban citizenships; Assis Chateaubriand, regarding urban mobility and immobility; Cascavel, as regards solid waste and; Guaíra, regarding urban risks.

In order to stimulate access to safe and sustainable transport systems, PTI has its own software and hardware developed for monitoring and sharing of electric vehicles. For now, the functionality has been used in fleet of Itaipu Hydroelectric Power Plant, but it can be extended to cities.

*Figure 16: Sustainable Cities and Communities - Foz do Iguaçu.*



*Figure caption: Technology applied to planning is a determining factor for cities to be sustainable. Source: Kiko Sierich.*



## 12 RESPONSIBLE CONSUMPTION AND PRODUCTION

In this SDG, PTI acts from end to end: ensuring sustainable production and consumption standards involves education and culture-building actions, issues that are disseminated by PTI to children and teenagers through a space called “Ecovillage”, where there is a minicity focused on pedagogical activities that make the link between the content of the school curriculum with the life of a city, on issues related to sustainability, such as sanitation, selective waste collection, renewable energy, mobility and multiple uses of water, among others.

In PTI’s corporate culture, conscious consumption actions are also strengthened. More than 10 years ago the use of plastic cups by employees was banned. Upon being hired, the employee receives the utensils for personal use. In addition, an annual award encourages employees to come up with ideas for promoting the SDGs, the so-called “Sustainable Innovators PTI”.

With regard to production, agriculture-related initiatives have already been cited in this report, such as encouraging no-tillage techniques, supporting organic food producers and small family farming groups. The replacement of fossil fuels is also the focus of the PTI’s actions, which has research related to the use of biomethane and hydrogen and energy storage through nickel-sodium batteries.

Figure 17: Responsible Consumption and Production - Ecovillage.



Figure caption: A minicity was built so that, in a playful way, topics such as sanitation, selective waste collection, renewable energy, mobility and multiple uses of water, among others, are addressed. Source: Kiko Sierich.





# 13 CLIMATE ACTION

In a cross-sectional way, applications provided by a smart and sustainable city reduce greenhouse gas emissions, such as the integration of means of transportation and investment in shared alternatives for travel in large cities.

Waste disposal also impacts this goal. Therefore, initiatives supported by PTI, such as the correct disposal of the environmental liabilities of the swine farms impact on climate mitigation.

With regard to food waste, PTI participates in the production of biogas and biomethane, collecting more than 640 kg daily of waste from restaurants, destined for the waste treatment plant to produce biomethane, which is used in over 80 vehicles of Itaipu Binacional.

Also, as already mentioned, PTI acts in fronts related to sustainable agriculture, in support of the development of the system of monitoring and application of no-tillage, to small producers linked to family agriculture and production of organic food, made through georeferencing, of the Territorial Intelligence Center, installed in PTI.

Figure 18: Climate Action - Shared bikes.



Figure caption: Alternative ways to get around. Source: Kiko Sierich.

Figure 19: Climate Action - Biomethane vehicles.



Figure caption: In a cross-sectional way, the applications provided by a smart and sustainable city lead to the reduction of gas emissions that cause damage to the environment and cause climate imbalance. Source: Kiko Sierich.



## **17 PARTNERSHIPS FOR THE GOALS**

An organization whose purpose is innovation, like a technology park, should encourage, in its composition and performance, the integration among government, academia, industry, investors and society, in the approach of the so-called 'quintuple innovation helix'. According to the actions presented in this report, PTI, over its 15 years, has established a wide relationship network and constantly seeks to promote public and private partnerships. Local partnerships include universities, federal institutes, the government of all municipalities that make up the area of influence of the Itaipu Hydroelectric Power Plant and the trade associations of these municipalities. In the government sphere, the Ministry of Science, Technology, Innovation and Communications (MCTIC); Brazilian Agency for Industrial Development; Brazilian Army (EB); Brazilian Power Plants (Eletrobrás) and National Institute for Space Research (INPE), among others. Internationally, in addition to universities, there are cooperation initiatives with research institutes such as the Applied Institute for Materials Management and Flow (IfaS) and government agencies. Partner companies include Renault, Nissan and Pratti-Donaduzzi (the largest manufacturer of generic drugs in Brazil), the Iguazu Falls concessionaire and cooperatives in the western region of Paraná.

In addition, one of the initiatives that illustrates PTI's relational capital is a regional innovation system, an online platform that establishes a network for the participation of companies, associations, technicians, teachers and educational and research institutions in the region. The goal is to connect these territorial agents to identify potentialities and generate joint solutions that result in innovation, scientific and technological development. With that, it is possible to map the activities, expertise and opportunities that exist in the territory. This type of initiative is fundamental to stimulate cooperation between the productive, public, research and society sectors, with a view to enhancing innovation.



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