



# RENEWABLE ENERGY

## State of São Paulo Investment Guide

## UNIQUE COMBINATION OF COMPETITIVE ADVANTAGES

The State of São Paulo gathers competitive advantages that make the region the best destination for investments in renewable energy. Business opportunities include projects throughout the whole industry chain, from equipment production to clean energy generation. Add to this excellence in infrastructure conditions, highly skilled workforce and incentives for technological development.

Want some more? Those interested in learning more about the State's potential may rely on free advice from Investe São Paulo – the investment promotion agency of the State of São Paulo.

# INVESTESÃO PAULO

## STRATEGIC SUPPORT FOR YOUR INVESTMENT

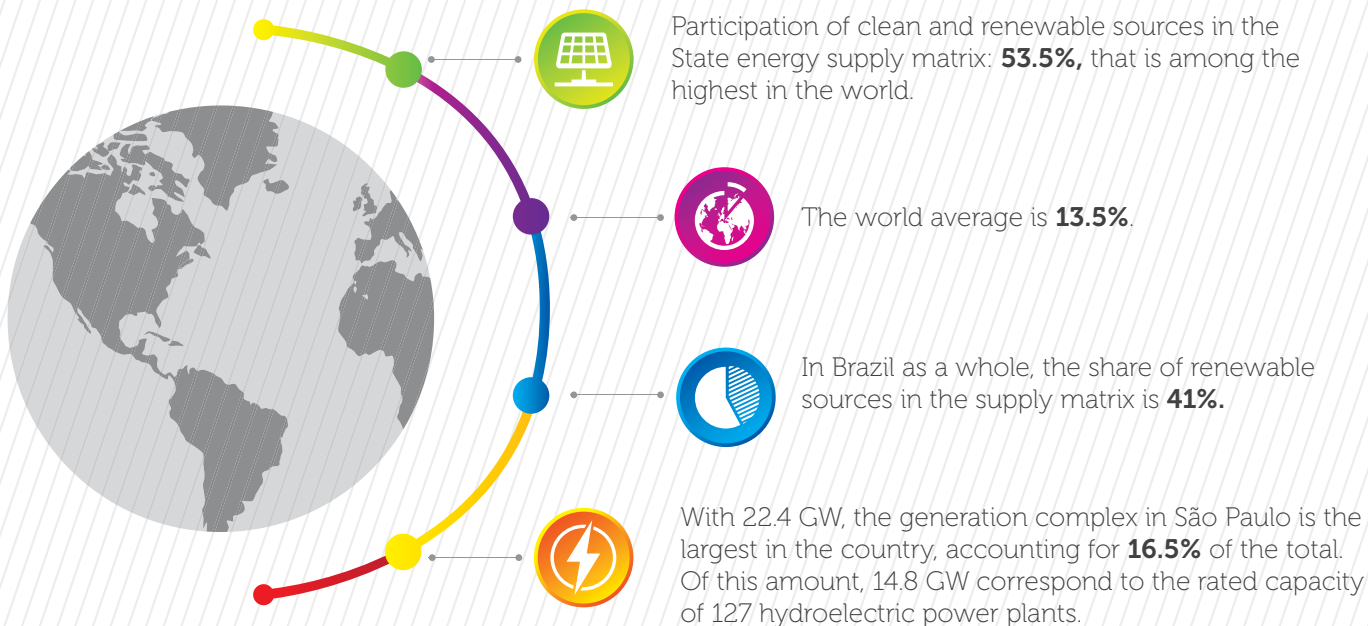
Investe São Paulo is the gateway for companies seeking to invest in the state. The Agency provides, free of charge, strategic information to assist investors in identifying the best locations for new businesses or expansions, while exchanging intelligence with similar organizations and funding agencies. Always attentive to opportunities that may contribute to the development of the State, the agency also works to promote the State's image in Brazil and abroad as one of the world's best destinations for investment.

[www.investe.sp.gov.br](http://www.investe.sp.gov.br)

# ABOUT THE STATE OF SÃO PAULO

## LEADERSHIP IN RENEWABLE ENERGY

The State of São Paulo combines Latin America's leadership in economic and social development with state-of-the-art technology for clean and renewable energy. The share of these sources in the state energy supply matrix is among the highest in the world.



## **STRONG AND DIVERSIFIED ECONOMY**

Accounting for about 28.8% of the Brazilian GDP (approximately US\$ 488 billion in 2014\*), São Paulo has a modern and highly diversified services and industrial framework. The country's greatest logistics infrastructure lies within this development, consisting of the best Brazilian highways, waterways, railways and pipeline systems.

The State is also the most competitive in the production of equipment and capital goods for the entire power chain. It's worth mentioning the presence of traditional industrial players, such as Dedini and TGM – both producing equipment for ethanol plants – and GE Wind, Siemens and Wobben Windpower – wind turbine manufacturers. The industry chain also evolves along innumerable suppliers - São Paulo will produce from the turbine to its tower, from the screw to the high-voltage tower.

## **CUTTING-EDGE HUMAN CAPITAL AND TECHNOLOGY PLATFORM**

Investing in human resources qualification is fundamental for São Paulo's technological development. The State accounts for about 25% of higher education institutions in Brazil, many of which are internationally renowned, which contributes to the creation of an environment that stimulates technological research and development.

- 30% of the country's researchers work in the State. They work in 590 higher education institutions which account for 46% of Brazilian scientific articles published abroad.
- Three of the best Latin American universities are in São Paulo: USP, Unesp and Unicamp.
- The network of research and development state institutions includes 19 research institutes, such as Instituto de Pesquisas Tecnológicas do Estado de São Paulo (IPT) and Instituto Tecnológico de Aeronáutica (ITA), among others.
- With annual disbursements of US\$ 338,12 million\*, Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) is one of the main funding agencies for scientific and technological research in the country. In its project portfolio, the Bioenergy Research Program (BIOEN) deserves special attention, as it stimulates innovative research to increase sugarcane productivity and generate knowledge to ensure Brazil's leading position in bioenergy research and production.

\* Conversion rate: US\$ 1.00 = R\$ 3.25328 – average from 01/01/2015 to 10/11/2015 according to BCB

## BUSINESS OPPORTUNITIES

The development of renewable energy supplies has guided the actions of the State government to increasing the quality, quantity and diversification of the energy matrix, giving priority to more environmental-friendly energy sources. These actions will be critical to enable the State to meet its goal of increasing the share of renewable energy within the power matrix from the current 53.5% to 69% by 2020.

Ethanol and bioelectricity are among the main drivers of this expansion, which also includes solar and wind power and the entire supply chain for such segments.

## INVESTMENTS

### SÃO PAULO, THE RIGHT DESTINATION FOR INVESTMENT

Its competitive advantages maintain São Paulo as one of the main development and investment hubs in the country. Automakers Mercedes-Benz and Honda will soon inaugurate new production lines in the State, while the Korean Hyundai Rotem is preparing to produce high-tech trains in Araraquara. Within the renewable energy industry, BYD is building, in Campinas, its production plant to manufacture electric buses and photovoltaic panels, which will also include research and development in the area. Also noteworthy are the investments of the petrochemical company Mexichem, which, in Brazil, produces pipes and fittings; of the German SAS Protensão, a world leader in the industry of anchors and special actions; and Sky, which prepares a new broadcast center in Jaguariúna.

### A CLEANER AND MORE DIVERSIFIED ENERGY MIX: SOCIAL, ENVIRONMENTAL AND ECONOMIC BENEFITS

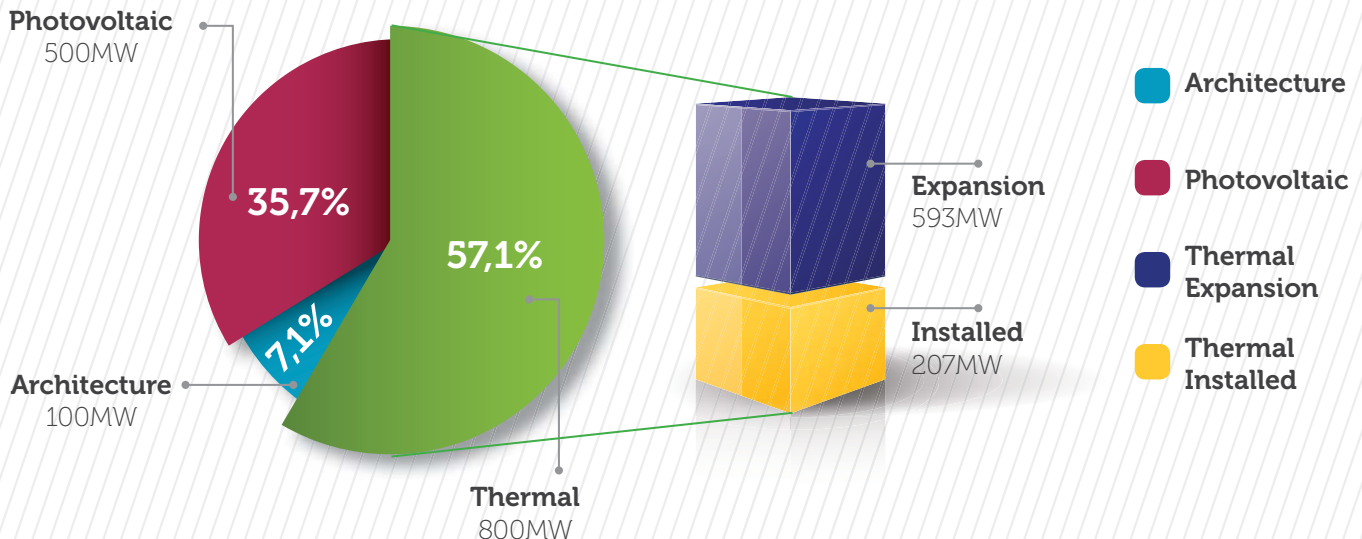
- Increased amount of energy generated from renewable, sustainable and decentralized sources.
- Reduced greenhouse gas emissions and amount of local pollutants.
- Higher level of energy full-sufficiency in comparison to other states.
- Promotion of the State's technological and industrial development.
- Job creation.
- New equipment constantly supplying businesses within the sector and in power generation projects.
- Promotion of regional development.

# SOLAR ENERGY

## PLENTY OF HOT WATER, ELECTRICITY AND ENERGY SAVING

São Paulo should have, by 2020, with solar energy utilization equivalent to 1000 MW, five times the rated capacity of ten years ago. This expansion should be ensured primarily through water heating projects that resort to solar energy.

### Prospect of the solar power expansion in the State - 2020



Source: Investe SP / Undersecretariat of Renewable Energies of the Secretariat of Energy in the State of São Paulo.

The installation of solar heating systems in public housings built in the State has been one of the main ways to put such expanded use of solar energy into practice. Large-scale competitiveness and applicability challenges related to this source have also been faced by the State Government, which has encouraged research in the area and offered credit lines, such as those provided by Inter-American Development Bank (IDB).



## **SOLAR THERMAL ENERGY:**

The process in which the sun's energy is converted into heat for use in water heating systems shall use the equivalent to 800 MW in the State up to 2020. Used in homes, hotels and industrial processes, among others, the technology provides an expressive reduction in energy consumption, savings in electricity bills and reduction of environmental impacts.

## **PHOTOVOLTAIC ENERGY:**

These systems were being used mainly to serve communities isolated from the power grid and in infrastructure projects, such as telephony and highways. This situation began to change in 2014 when, in a federal auction, nine projects were undertaken, amounting to 270 MWp.

## WIND

### QUALITY AND DIVERSIFICATION IN THE STATE ENERGY MATRIX

The State of São Paulo shares on the most promising prospects regarding wind energy in the Country. The supply is a critical part of the government's strategy for expanding the quality and diversifying the local energy matrix.



### WIND POTENTIAL IN THE STATE OF SÃO PAULO

Wind speed	Area (km <sup>2</sup> )	Unstable power (MW)	Annual energy (GWh)	Capacity factor (%)
V ≥ 6	7,420	30,891	71,918	26.6
V ≥ 6.5	1,134	4,734	13,000	31.3
V ≥ 7	138	564	1,753	35.5
V ≥ 7.5	5	21	74	40

*Source: Wind Atlas of the State of São Paulo, 2012*

In addition to business opportunities related to use of the wind potential, the State of São Paulo holds the most complete parts and components supply chain for wind power generators.

São Paulo gathers all the fundamental links of the aero generator production chain. There are two assemblers, Wobben and GE, one blade factory Tecsis and three tower factories, Engebasa, Icec and Elicabrás. Furthermore, the State also concentrates the production of large cast and machined parts, holding the largest number of subcomponents and inputs suppliers to the sector.





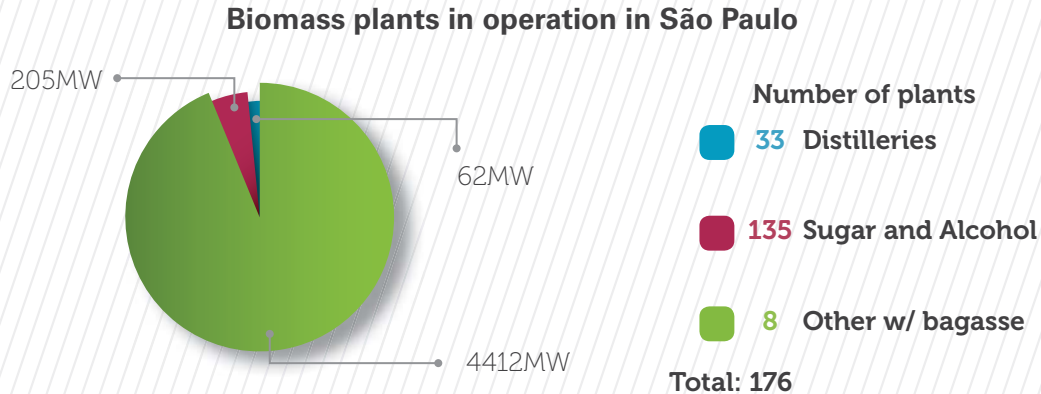
## BIOMASS

### LEADERSHIP IN BIOFUELS AND BIOELECTRICITY

By processing 367.4 million tons of sugarcane in the 2013/2014 harvest, São Paulo accounted for the production of 13.9 billion liters in the period, which is half of the Brazilian production. This performance can be attributed not only to the infrastructure conditions and other potentials of the area, but also to the technological advances that allowed systematically increases to the sector's productivity, both with regard to ethanol and sugar as to the generation of bioelectricity from sugarcane bagasse.

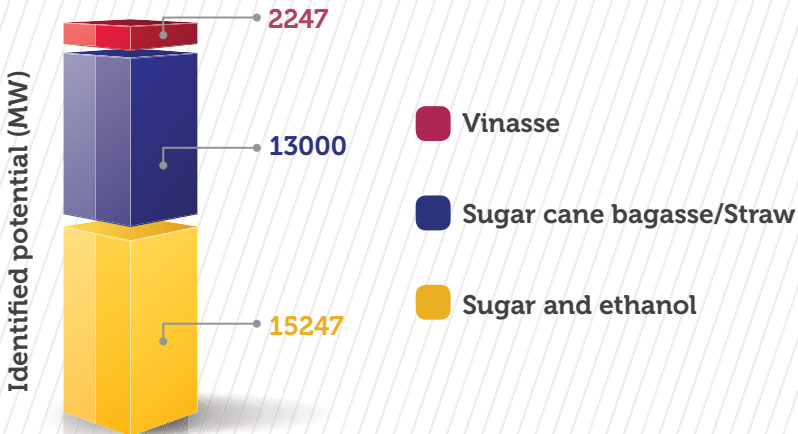
Nevertheless, São Paulo will not stop here: the introduction of species with improved regional adaptation and investment in cellulosic or second-generation ethanol - from sugarcane biomass - will ensure new productivity leaps in the coming years. The prospect is to produce 22.6 billion liters in the 2020/2021 harvest.

The share of bioelectricity in the State's energy budget is also increasing. This is an excellent choice to supplement the prevailing hydroelectric model used in the country, as it is available precisely during the dry season in the hydroelectric reservoirs. Currently, the rated capacity in this type of plant is 4.679 MW, as detailed in the following chart.



Source: Investe SP / Undersecretariat of Renewable Energies of the Secretariat of Energy in the State of São Paulo.

### Cogeneration potential in São Paulo - 2020



The consolidation of a new production structure for São Paulo's sugar and ethanol industry, based on the implementation of improved sustainable practices, should continue to allow environmental and energy gains in the future.

Source: Investe SP / Undersecretariat of Renewable Energies of the Secretariat of Energy in the State of São Paulo.

## HOW CAN INVESTE SP HELP?

### SÃO PAULO IS OPEN FOR YOUR RENEWABLE ENERGY BUSINESS

#### **Tax incentives for investors:**

In order to stimulate the use of its renewable energy potential, São Paulo offers a number of incentives, including the deferral, exemption, reduction of the calculation basis and even full ICMS (Value-added tax) credit of various products and services related to projects in the area.

#### **Feasible mini and micro region:**

São Paulo went ahead to enable the self-production of energy by small consumers: it is one of the few places in Brazil where ICMS only falls upon the difference between the power purchased from the grid and that returned to the electrical system. Agência Nacional de Energia Elétrica (Aneel) estimates that Brazil may have, by 2024, about 700,000 homes with solar energy systems if all Brazilian states joint the tax exemption.

#### **Strategic support for your business:**

Investe São Paulo is available to investors in order to identify the best way to combine the State's potential with projects that further contribute to its sustainable development.



