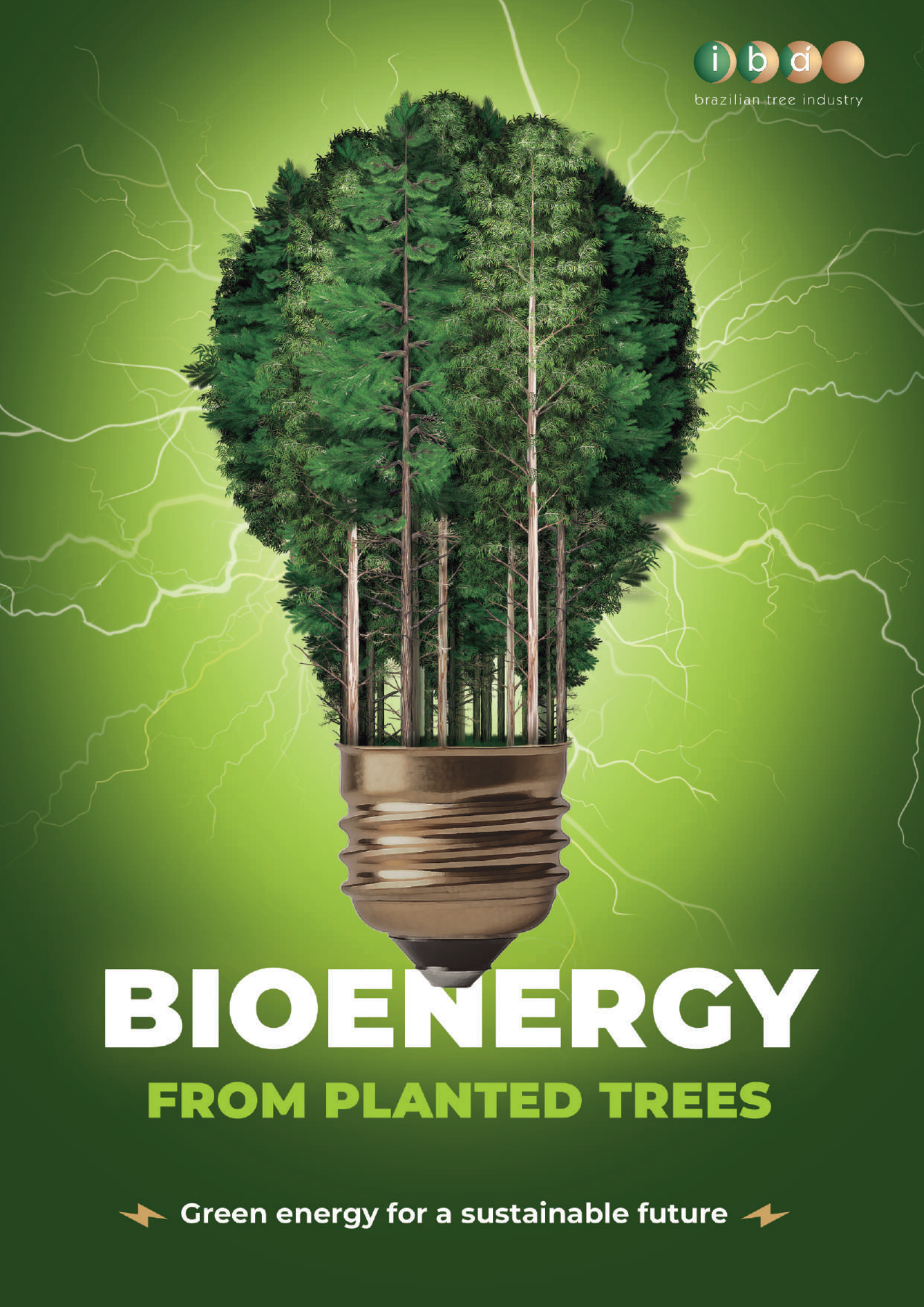
brazilian tree industry



BIOENERGY

FROM PLANTED TREES

Green energy for a sustainable future

BIOENERGY FROM PLANTED TREES

As the world strives to decarbonize its energy sources in order to mitigate climate change, Brazil stands out globally for its diversified energy matrix and use of renewable sources.

The energy matrix represents the group of energy sources used to power factories, homes, and transport. This includes the production and use of different types of energy like thermal and mechanical energy, and may come from renewable or non-renewable sources. In Brazil, 50% of the energy matrix consists of renewable sources, a significant advantage over the global average, which is just 14.3% (BEN EPE, 2025).

Renewable sources from planted trees, like charcoal, black liquor and firewood, are mainly used to power factories and already account for roughly 12.09% of national consumption.

DISTRIBUTION OF BRAZIL'S ENERGY MATRIX

50% RENEWABLE

16.7%
SUGARCANE BIOMASS

11.6%
HYDROELECTRIC

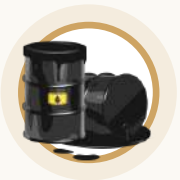
12.1%
FOREST-BASED ENERGY PRODUCTS*

4.5%
OTHER RENEWABLES

2.9%
WIND

2.2%
SOLAR

50% NON-RENEWABLE



34%
OIL & DERIVATIVES

9.6%
NATURAL GAS

4.5%
COAL

1.3%
URANIUM

0.6%
OTHER NON-RENEWABLES

*The following are considered forest-based products: firewood, charcoal, black liquor, and gas from charcoal.
Source: Empresa de Pesquisa Energética (Energy Research Company, EPE)

Considering electricity alone, renewable sources in Brazil accounted for 88.2% of power generated in 2024. Forest-based energy products made up 2.69% of this total, enough to supply all households in the state of Rio de Janeiro for a full year.

The electricity generated by energy products from the forest-based sector is enough to power all households in the state of Rio de Janeiro for 1 year, with extra left over.

FOREST-BASED ENERGY PRODUCTS

For years, the planted tree industry has been using land intelligently, respecting nature and caring for people. It has 10.5 million hectares of trees cultivated for industrial purposes and another 7 million hectares set aside for conservation.

With a wide range of forest-based bioproducts like books, furniture, flooring and fabrics, the sector offers sustainable solutions for people's everyday lives, along with a diverse portfolio of energy products, as shown below.

Biomass from planted trees

A raw material for energy production in the sector. Bioenergy from plantations stands out for its competitive advantage, since availability is not affected by climatic seasonality or production cycles.

Firewood

Wood cut into logs for use in fireplaces, wood-burning stoves, and some industrial processes.

Wood Chips

Chipped wood used in factories to co-generate thermal energy and electricity.

Pellets and Briquettes

Compressed pieces of forest residues or ground wood chips. Used in factories for co-generation of thermal energy and electricity.

Syngas

This gas rich in hydrogen and carbon monoxide can be obtained from wood gasification. It is used by forest-based industry in lime kilns and as a source to produce hydrogen.

Flue gas

Produced when wood is converted into charcoal. It is used to dry wood during charcoal production and also to generate electricity.

Charcoal

The main product from carbonizing wood. Used by the steel industry, for barbecues, and in pizzarias. The source of derivatives like activated charcoal and biochar.

Black liquor

This co-product of cooking chipped wood to produce cellulose is mainly composed of lignin. Used in the pulp industry to co-generate thermal energy and electricity.

Forest residues

Stumps, roots, bark, branches, trimmings and sawdust that result from wood processing. Used in factories for co-generation of thermal energy and electricity.

Torrefied wood

Intermediate product between dry wood and charcoal. It is combined with other fuel sources to co-generate thermal energy and electricity.

Biofuels

These fuels currently in the research and development stage are produced from biomass, such as 2G ethanol and e-fuels (methanol, green diesel).

Low-carbon hydrogen (green H_2)

This fuel is used as a raw material in the production of other fuels. It is still in the research and development phase, and can be produced via two routes:

1: wood is used as fuel to generate renewable electricity used in water electrolysis to separate out hydrogen gas.

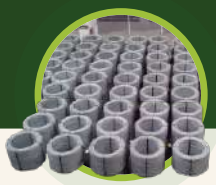
2: biomass is transformed into syngas (synthesis gas), through gasification, which is later refined and purified to separate out the hydrogen gas.

ENERGY SOURCES IN THE PLANTED TREE INDUSTRY

The energy matrix is an example of sustainability and a reason to be proud for manufacturers of flooring, panels, pulp, paper and charcoal, as well as timber management organizations (TIMOs) that together comprise the planted tree industry.

90% of the energy consumed by the various segments in this sector comes from clean and renewable sources that are on the right side of the climate equation.

90%
OF THE ENERGY CONSUMED IS RENEWABLE



Steel, pig iron, and ferroalloys

Brazil is the world leader in charcoal production, which helps to decarbonize the steel and metallurgy sectors. Charcoal is used to generate heat in the production of pig iron and ferroalloys, and plays an essential role in low-carbon steel production and metallurgy in Brazil.

Pulp and paper

The pulp and paper sector generates most of the energy it consumes from forest products, principally black liquor. Some more modern mills are even self-sufficient in electricity, and export any excess power to the national grid.

Flooring and panels

Flooring and panel manufacturers are pursuing a sustainable and circular approach through growing investments in forest residues and biomass to decarbonize their operations.

The construction of a viaduct with green steel from charcoal can save the emission of 4 tons of CO_2eq.*

* compared to CA50 steel rebar produced using coal-based coke

THE POTENTIAL OF FOREST-BASED ENERGY SOURCES FOR DECARBONIZING BRAZIL

Products from the planted tree sector used for energy generation have become key to decarbonizing other industrial sectors by replacing fossil fuels. Some good examples are:

Biofuels in land and air transport

Charcoal in mining and steel manufacturing

Biomass to fire boilers in cement, plastics, food, and beer production

TRANSFORMING POTENTIAL INTO OPPORTUNITIES

The government plays an important role in advancing the use of forest-based energy products as part of the country's energy transition, through:

Incentives to use forest-based energy products as a solution for decarbonizing various industries

Recognizing the climate benefits of using forest-based energy products

Boosting the share of forest-based energy products in the national energy grid

Considering forest-based energy products as renewable sources in Brazil's sustainability taxonomy

ibá brazilian tree industry

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