

Nº 176952

Biomass residues from sustainable forest management in Brazil

**Ana Paula de Souza Silva
S.T. Coelho**

*Pôsters apresentado no EUROPEAN BIOMASS CONFERENCE AND EXHIBITION, on line,
28., 2020.*

A série "Comunicação Técnica" compreende trabalhos elaborados por técnicos do IPT, apresentados em eventos, publicados em revistas especializadas ou quando seu conteúdo apresentar relevância pública.

1. INTRODUCTION

The search for renewable energy sources and fuels to substitute fossil fuels is constant in the world and, in the Paris Agreement, the countries compromised to reduce their greenhouse gas emissions.

Brazil has pledged to reduce emissions by 37% below 2005 levels by 2025, and to this end, it has promised to increase its share to 45% of renewable energy in the energy mix with a significant share of sustainable bioenergy (MMA,2016) .

Brazil has competitive advantages over other countries for forest plantations and species such as eucalyptus and pine set records of productivity, and can be cut in 7, 6, 5 years or even shorter depending on the silvicultural management applied.

In addition to the potential of planted forest biomass, there is the potential of residues generated in the forest industry that can also be used for power generation and biofuel production, being an important input of the world bioeconomy.



Figure 1. a) Planted eucalyptus forest.
Source: Google Images



Figure 1. b) Planted pine forest;
Source: Google Images

2. OBJECTIVES

This study aims to show to present opportunities in different links of the forest chain for energy generation highlighting the waste, showing the importance of this renewable and sustainable source for the country.

3. METHODOLOGY

This paper presents a literature review of studies on forest biomass and the power generation potential of this source in Brazil.

- Databases available in governmental portal of periodicals;
- Digital libraries of theses and dissertations from national and international universities;
- Bibliographic databases of main national and international institutions of research and higher education.
- Research on secondary data from government databases.

4. RESULTS

- Brazil has a strong forest vocation with almost 500 million hectares of native and planted forests, which corresponds to about 59% of territory, considered the second largest forested area in the world, behind Russia (SFB, 2019).
- Native forests occupy more than 488 million hectares and planted forests occupy almost 10 million hectares, mostly with eucalyptus and pine species to attend various industrial demands, including energy.

Table 01: Estimated forest areas in Brazil in 2018

Type of forest	Total area (ha)	Forest area (%)	Brazil area (%)
Natural forest	488,066,946	97.60	57.31
Planted forest	9,839,686	1,97	1.16
Total	497,906,632	100	58.47

Source : <http://www.florestal.gov.br/documentos/publicacoes/4262-brazilian-forests-at-a-glance-2019/file>

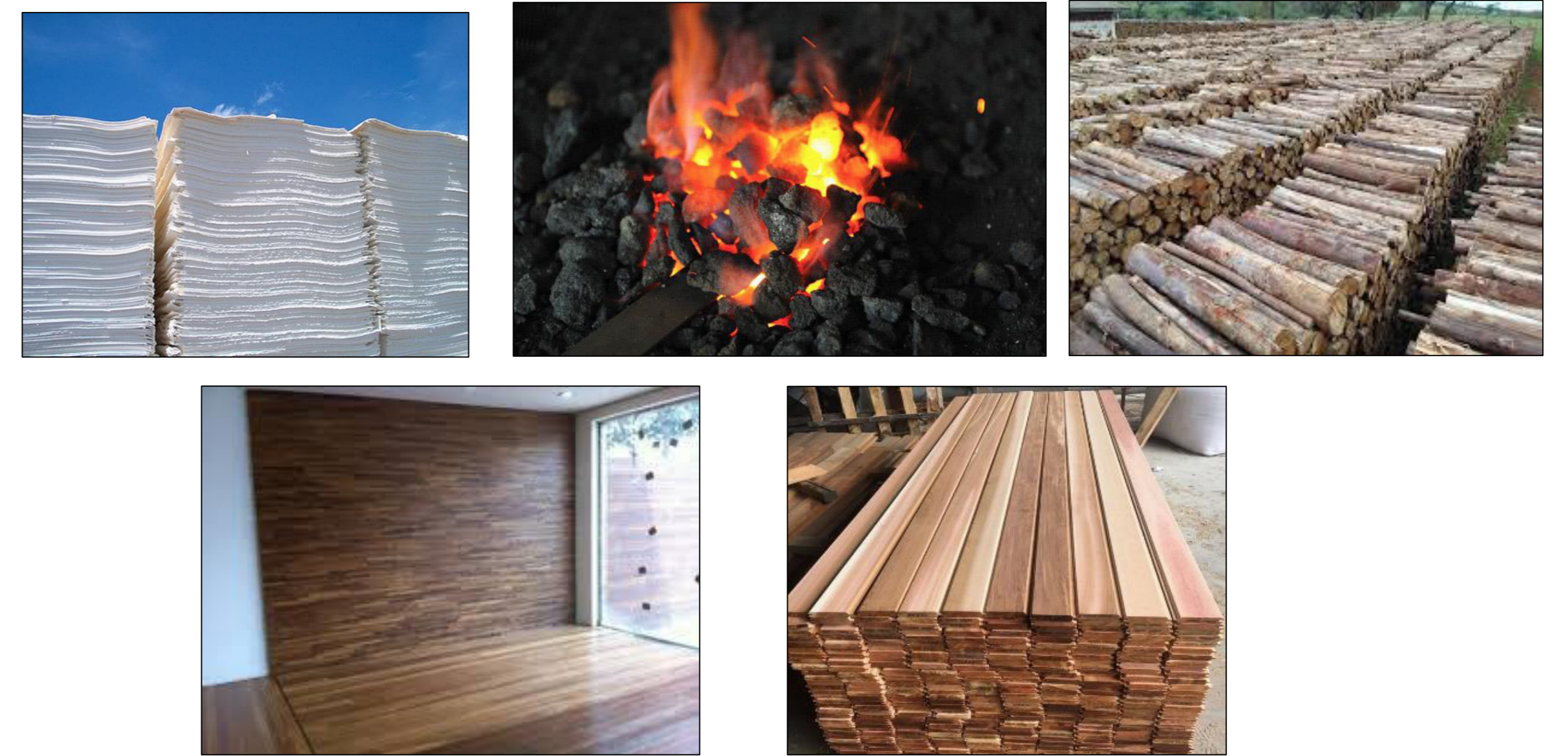
Table 02 : Forest plantations in Brazil in 2018

Plantation	Area (ha)	%
Eucalyptus	7,401,334	75.2
Pine	2,030,419	20.6
Other species	407,933	4.2
Total	9,839,686	100

Source : <http://www.florestal.gov.br/documentos/publicacoes/4262-brazilian-forests-at-a-glance-2019/file>

Main uses of planted forests:

- Paper and pulp industry;
- Charcoal;
- Firewood;
- Energy;
- Wood panels and laminate floors;
- Solid wood products and others



Source: Google Images

Forest biomass in the energy matrix:

- Forest biomass appears as a source of firewood and charcoal in the energy matrix, accounting for 8.4% of internal energy supply in 2018 (BEN, 2019), according to the Energy Balance;
- It also appears as the lixivium source, used for the use and cogeneration of electricity in pulp and paper industries with a 6.9% stake.

Power generation in Brazil

- Brazil has 8970 enterprises power generation with Power Granted 174,584,502,32 kW;
- The biomass power generation in Brazil is concentrated in 573 operation projects that account for 8.78% of total generation;
- **Power generation from forest-based biomass** corresponds to 106 projects in operation (about 18.49% of power generation from different types of biomass and 1.18 % of the total generation).

Power generation from forest-based biomass

Table 3 – Type of forest-based fuel

Fuel	Number of enterprises	Power Granted (kW)
Biogas - forest	01	5,000,00
Charcoal	08	48,197,00
Blast Furnace Gas	12	127,705,05
Firewood	07	82,215,00
Black Liquor	18	2,538,634,00
Forest residues	60	520,010,00
Total	106	3,321,761,05

5. FINAL CONSIDERATIONS

- Brazil has competitive advantages over other countries for forest plantations and species such as eucalyptus and pine set records of productivity ;
- In forest-based chains, such as the pulp and paper industry, charcoal and other uses, it is possible to generate energy from the waste generated ;
- Brazil has many degraded areas where forests dedicated to energy generation could be planted ;
- The planting of forests for energy can promote the development of economically disadvantaged regions, through the generation of jobs and income, in addition to promoting carbon sequestration during the growth of the forest.

6. ACKNOWLEDGMENTS

We gratefully acknowledge support of the RCGI – Research Centre for Gas Innovation, hosted by the University of São Paulo (USP) and sponsored by FAPESP – São Paulo Research Foundation (2014/50279-4) and Shell Brasil, and the strategic importance of the support given by ANP (Brazil's National Oil, Natural Gas and Biofuels Agency) through the R&D levy regulation.