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TECHNOLOGICAL OPTIONS FOR SAWMILL WASTE AS ENERGY SOURCE TO INCREASE ENERGY ACCESS IN AMAZONIA

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Introduction

The Brazilian Amazon is one of the primary regions in the world to produce tropical wood, and the extraction and industrial processing of wood are among its key economic activities.

In 2018, more than 10 million cubic meters of wood logs were extracted, primarily undergoing primary processing (splitting) in sawmills to produce different products, such as slats, boards, planks, rafters, beams, and planks.

The low technological level and yield of sawn wood results in the generation of over 50% of the sawn volume as waste, amounting to approximately 5 million cubic meters of waste, including sawdust, shavings and wood shavings

Wood-processing waste has the potential for energy use and can be a viable alternative to fossil fuels, thereby increasing the percentage of renewable energy sources in the energy matrix of the Legal Amazon.

The Brazilian National Eletric System comprises two main componentes: a national interconnected system isolated system. The first suplies electricity for 92% of the country with renawables and the second serve around 3 million consumers in remote areas, mainly in North of Brazil and tha Legal Amazon, relying primarily on diesel for power

Objective

The present work presents on an assessment of the energy-use technologies that are best suited for sawmills situated in municipalities within the isolated systems of the Legal Amazon. The underlying premise is to ensure forest certification and to guarantee adherence to environmental, social, and economic principles throughout their operational processes.

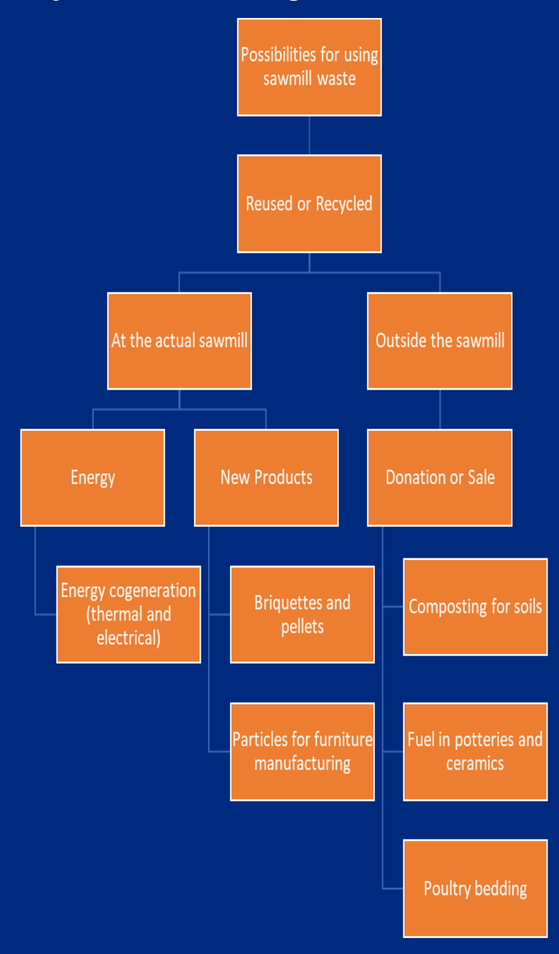
Methodology

- Identifying sawmills that process certified-origin wood;
- Assessing technologies and/or applications through literature review;
- Calculating the estimate of electric power generation potential from lumber mill residues in certified sawmills across municipalities within the Brazilian isolated systems.

Results

- Drawing on information sourced from the Forest Stewardship Council (FSC) [1], 24 sawmills situated in 7 municipalities within isolated systems in the Legal Amazon were identified, along with data on their wood production and waste generation;
- Possibilities for using sawmill waste: donation or sale of sawmill waste; manufacture of small objects; manufacturing of new products (briquettes and pellets), energy cogeneration; other technologies: gasification and pyrolysis, among other possibilities, as shown in Figure 1.

Figure 1. Main ways to use waste generated in sawmills



Fonte: [2]

- Estimation of the potential for generating electrical energy from waste (sawdust, shavings and wood shavings) in certified sawmills in isolated systems in the Amazon using the methodology based on [3] : 133.930 MWh/ano;
- The gasification technology that was tested in the GASEIFAMAZ Project in the Amazon region in the period from 2002 to 2005 [4] presented technical feasibility for 20 kW systems from forest residues to generate energy in isolated communities, requiring attention in the pre- biomass treatment and gas cleaning.

Conclusions

Sustainable Forest Management Plans together with forest certification programs are important instruments for adding value to the Brazilian bioeconomy, indicating that it is possible to extract wood in a rational and sustainable way.

Brazil has great potential for energy use of forestry and wood residues that are generated in different links of the production chains, however, it lacks technological solutions adapted for different production scales.

Wood residues generated from the primary processing of wood in the territory of the Legal Amazon could contribute to the supply of electrical energy necessary for the demand of isolated systems, replacing fuels of fossil origin with renewable ones, also contributing to achieving the goals of the Objectives of Sustainable Development, especially number 7, which deals with access to energy in an affordable and renewable way..

It should be noted that there is a range of possible technologies for energy use of forestry and wood residues, however technologies such as gasification, fast pyrolysis, combustion, compaction, among others, are at different levels of technological maturity and many are not viable on small scales, being It is necessary to assess the economic viability of each option..

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