

Biomass Residual Energy Potential in Peru

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ABSTRACT

The objective of this research is to determine the energy potential of biomass residues of agriculture, agro-industry and the forest industry in Peru. The result of this work has been BIOMAP PERU or Biomass Energy Atlas of Peru that presents the biomass energy supply at provincial and departmental level in the country. Its development involved the selection of biomass residues with more energy potential, the analysis of national statistics of agricultural and forestry production from 2003 to 2011 year; waste field sampling and the physical chemical characterization of the residues. A mathematical model was applied to determine the energy potential of each biomass residue. The information was processed by product and geographical location. The result is presented as tables and maps.

The research work shows that Peru generates over 10'247,000 TM of waste material that represent 2'991,711 TEP that can be used as energy. These biomass waste are mainly integrated by crop residues from sugarcane (21%), corn stems, leaves and cobs (35%), bagasse (17%), rice husk (4%), rice straw (14%), asparagus straw (2%), cotton straw (6%), chip and sawdust (1%). The departments with more energy potential are La Libertad (26%), Lambayeque (16.7%), Lima (13%), San Martin (7.1%) and Piura (11.7%).

1. INTRODUCTION

In Peru, agricultural and forestry residues are resources that are not currently commercially exploited despite their energy potential. Also they are not counted as commercial primary energy source in the National Energy Balance. To promote the development of bioenergy in Peru it must be improved the knowledge of issues related to supply of biomass residues, their composition and technologies currently available for biomass energy use. BIOMAP PERU shows the energy supply at departmental and provincial levels of the most representative local residues species of agricultural sector and forest industry. It is a tool to analyze the technical, socio-economic and environmental aspects of the use of biomass resources as energy sources in the perspective of sustainability. In addition, BIOMAP PERU can be used to identify priority areas of action to develop and formulate strategies for the management of biomass resources for bio-energy production.

2. METODOLOGY

The process to develop BIOMAP PERU had six stages: selection of the sources of biomass residues, collection of information of biomass residual supply, selection of waste biomass with more energy potential, sampling and characterization of biomass residues, determination of the energy potential of biomass residues and processing the information and mapping.

The selection of waste biomass material with more energy potential was performed by CAFRE-PUCP methodology that evaluates each residue by a set of criteria, giving a score to each one according to their support for energy use. A score from zero to four was assigned to each criterion depending of its level of compatibility with the possibility of implementation and use of the energy generated from the biomass residue. The residues that obtained the highest score are presented in BIOMAP-PERU. Rice husks, rice straw, asparagus straw, cotton straw, crop residues of sugar cane (leaves and buds), bagasse and corn leaves were selected.

In the case of wood industry the residues of importance were the sawdust and shavings.

3. RESULTS

As a result of this research work has been developed the Peruvian supply of residual biomass by country departments and provinces. Figure 1, show the result of the work.

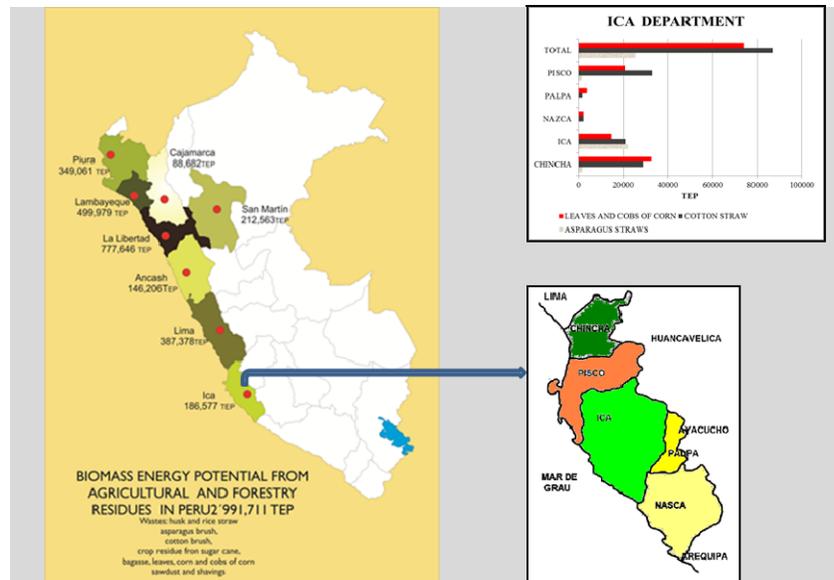


Figure 1: Biomap Perú

4. CONCLUSIONS

1) Agricultural and forestry residues in Peru are resources not commercially exploited at present despite its high energy potential. To use this primary energy source is required to improve local knowledge in the field of supply of biomass residues, composition and technologies currently available for biomass energy use.

2) In Peru the agriculture, agribusiness and timber industry generates over 10'247,000 TM of biomass residues that represent 2'991,711 TEP of energy. The biomass residues are mainly integrated by crop residues of sugarcane (20 %), corn stems, leaves and cobs (35%), bagasse (17 %), rice husk (4 %), rice straw (14 %), asparagus straw (2 %), cotton straw (6 %), chips and sawdust (1 %).

3) The departments with the higher biomass residues energy potential are: La Libertad (26%), Lambayeque (16.7 %), Lima (13 %), San Martin (7.1 %), Piura (11.7 %) and Ica (6.23 %).

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