ENVIRONMENTAL IMPACTS OF BIOMASS-TO-ENERGY CONVERSION TECHNOLOGIES: GRATE BOILERS AND FLUIDIZED BED BOILERS
INTRODUCTION

Electricity production from biomass has the potential to make a significant contribution to the power mix in Portugal with less environmental impact than non-renewable resources.
OBJECTIVES

This study assesses some of the environmental impacts of producing energy from eucalypt residues in Portugal, considering two types of technologies: grate furnaces and fluidized bed furnaces. Moreover, it identifies the operations with the largest environmental impact. This analysis is particularly important given the forest residue market in Portugal and the increasing demand of forest residues for bioenergy.
The functional unit is the production of 1 kWh of electricity to the national grid. The impact assessment methodology implemented to carry out the study was the ILCD (JRC-IES, 2010).
RESULTS

- Marine eutrophication (g N-eq)
- Mineral and fossil depletion (mg Sb-eq)
- Energy conversion
  - Collection, processing and transportation
  - Forest management

- Climate change (g CO$_2$-eq)
- Particulate matter (g PM$_{2.5}$-eq)
- Photochemical ozone formation (g NMVOC-eq)
- Acidification (molc H$^+$-eq)
- Marine eutrophication (g N-eq)
- Mineral and fossil depletion (mg Sb-eq)

Legend:
- Energy conversion
- Collection, processing and transportation
- Forest management
How could my work be used in policy?

The technologies used in Portugal for residual forest biomass combustion are:

- 13 plants with fluidized bed;
- 8 plants with grate furnaces.

According to the National Strategy for Energy, 15 new thermal power plants will be constructed by 2020 (installed capacity of 100 MW)

Why do not they just implement fluidized beds?
How could my work be used in industry?

Currently, the Portuguese emission standard of NO$_x$ for biomass combustion is 600 mg/Nm$^3$.

- But will be reduced in 2019 to a maximum of 300 mg/Nm$^3$.

Why do not they just change for fluidized beds?
How could my work be used to users?

Finding ways to provide more environmental friendly electricity is becoming increasingly necessary to mitigate climate change.
CONCLUSION

• The study shows that the fluidized bed technology presented a smaller impact than the moving grate technology.
• The study shows the need of a transition to a low-carbon technology in the energy industry.
• The methodology adopted here can also be applied to other countries as a decision supporting tool.
• To cover other technologies, sharing information in an application is encouraged.
BIBLIOGRAPHY


Thank you!

Any questions?

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