

Bioeconomic modeling of household waste recovery

Nadia Raissi¹, Noha ElKattabi², and Othman Cherkaoui-Dekkaki³

¹Université Mohammed V de Rabat

²Université Mohammed V de Rabat Faculté des Sciences

³Université Mohammed V Agdal Faculté des Sciences

August 18, 2020

Abstract

The ecological consciousness has driven developed societies to explore alternatives to the growing need for energy and the consequent increase in waste production. The adjustment towards the waste recovery and their transformation into energy, by various processes, is then necessary. However, so far the domain has not benefited much from a mathematical modeling approach. The main contribution of this work consists of building a bio-economic model describing the problem of a potential investor who aims to maximize his net profit generated by selling the produced energy from the household waste transformation. We first study the evolution of a waste stock, the energy quantity produced and the capital dedicated to the transformation process in a giving landfill and recovery center. Then we insert decision variables to this dynamic which are both the investment and the part of waste to be treated. This leads to an optimal control problem which we solve by the deductive method. The resulted solution is then illustrated by some numerical simulations. This investment policy would be to support the decision-makers to go toward investment in this activity.

Hosted file

MMA-august15.pdf available at <https://authorea.com/users/351814/articles/476292-bioeconomic-modeling-of-household-waste-recovery>

Hosted file

MMA-august15.tex available at <https://authorea.com/users/351814/articles/476292-bioeconomic-modeling-of-household-waste-recovery>







