

## **Policy drivers in the woody biomass market between Emilia Romagna and Missouri.**

### **Joint research between the University of Bologna and the University of Missouri-Columbia, College of Agriculture, Food and Natural Resources.**

My name is Edoardo Desiderio, I'm a 24 years old Italian Master Student at the University of Bologna, currently graduated in Economics and Management, curriculum Food System Management. My Master Thesis reports a research I have conducted on policy drivers in the woody biomass market in Emilia Romagna and Missouri, for my graduation thesis in Rural Development, Bioenergy Economics and Policy. The awareness of the damages created to the environment by the excessive reliance on non-renewable energy source, and consequently to mankind, is urging countries to shape their energetic policies towards a major use of renewable sources. As well as other European countries, Italy in particular is driven by the European 2020 strategy, which sets a target of 20% final energy consumption from renewable energy (Commission 2009). In this legislative context, the aim of this paper is the investigation of the potential use of woody biomasses as renewable energy sources in the Italian region of Emilia Romagna, compared to the American Missouri on the different levels of the supply chain. The interest for this analysis was raised by the concern of assessing the use of an energy sources which is now rarely considered and the scarce literature about the topic. The first approach will be the definition of the policy framework above all, then a market analysis will be led in the way Emilia Romagna is supplied in wood pellets from the Unites States, questioning if the imports are efficient and sustainable, and finally, a comparison between the two supplies chain in what concerns the localized impact of economic activity. The results are expected to prove an increasing implementation of woody biomasses use in the Italian region, proposing eventual integration with the American system.

Woody biomasses have and will have in the future, a predominant role as a renewable energy sources, it is of extreme importance to understand every potential use at a regional level. As for the methods used, a literature review will be led to assess the state of the art about this technology, comparing, analyzing and discussing several points of view of earlier researches. Furthermore, a survey will be sent to associations and key figures in the wood energy sector. The main purpose of the survey is to gather the opinion of citizens directly involved in this technology. The survey, which will be submitted in Missouri as well as in Emilia Romagna, is composed of six brief sections which ask mostly about the woody biomass utilization, opportunities, challenges, related public policies and power plant data collection, which will allow the study to understand how people involved in the sector, who therefore deal with bioenergies from a work or study point of view, perceive this technology. The questionnaire gives a value added to the thesis since it will allow to start from an energy policy framework to the opinion of those who have a clear picture of the different steps. Once the data will be collected, a file with the coding of the answers for each interviewee will be created. A factor analysis will be run on the sections of the questionnaire that hold questions with answers from 1 to 5. Once the factors are extracted, the latter will be input for a cluster analysis. Once the clusters have been obtained, ttest, chi-square or ANOVA will help to understand the relationship between external variables and the clusters obtained, would represent the synthesis of the conception that the respondents have of the problem investigated. Several regression models where the independents are represented by elements such as age, degree of study of the respondents, opportunities and challenges of the technology, and the dependent variable represented by the

investigated question, that's to say what influences the most the adoption of this technology in this field. Thanks to the submission of a survey to professional workers in the woody biomass field, it was possible to individuate what respondents believed to be the pillars of a bioenergy policies should be. The comparative analyses between Emilia Romagna and Missouri pointed out the differences between the two subjects, the former characterized by a strong use of woody biomasses as wood pellets for residential heating; the latter characterized by the preference for wood chips for industrial heating processes, often mixed with charcoal in energy plants. The geography and legislative context of the two subjects has shaped their needs and action plans, goal-oriented to boosting this technology as a tool to reduce the dependence on non-renewable energies. From a policy perspective, Emilia Romagna is tied to European Union goals, and woody biomasses are the perfect candidate to make the members countries achieve EU2020 goals. Missouri on the other hand doesn't have to follow goals but has been influenced too from last decade increasing wood trade between South-eastern United States towards Europe, its main client. Finally, the supply chain shares common stages for both regions, although the American one is much more developed due to social-historic reason than the Italian one. The survey pointed out that workers in the woody biomass field strongly sustain woody biomasses as a renewable source of energy, and both for American and Italian people, woody biomass could increase the ability of rural communities to become more independent, generating at the same time locally produced energy.

Challenges are still behind the corner for this technology although being considered primitive yet hides a complex cross-field approach because of the vastness of elements in its essence. Biomasses are the only renewable energy sources that generate energy from living organism. Their utilization must for this reason consider several aspects, from the environment in which they are harvested to the final user consumption. Dealing with so many aspects this technology can get tricky, but at the same time once managed in a proper way, benefits spread all over the sectors. The factorial analysis was helpful to merge opportunities and challenges data results. Its main findings consist in the individualization of several components, found as drivers found to be significative for policy writing. Several drivers were synthetized from the opportunities and challenges proposed. The first part, the one that is believed to represent respondent's belief as the main important in policy writing is the "*job opportunity component*". It appears that, in the opinion of the ones that are directly involved in this field, from the harvest processes to the final consumer steps, a job-creating-component should be the pillar of a solid woody bioenergy policy. This driver considers elements that stand respectively for generate added income for landowners, generate additional work opportunities for harvesters and loggers, generate additional work opportunities for consulting foresters and technicians, generate locally-produced energy, reduce greenhouse gas emissions, create jobs in the energy industry. It is clear how a solid policy should consider the possibility of expanding jobs in each step of the energy process, from the harvesting to the final consumer use. The second driver found to be the most influential for policy writing was the environmental one, which includes elements such as potential negative impacts on soil physical/ chemical conditions due to biomass removal, potential negative impacts on watersheds due to biomass removal and potential negative impacts on wildlife habitat due to biomass removal. All this element highlight workers concerns for the surroundings environment, rather than genuine issues for people health. Other drivers shift then the attention to forest health and concerning of the continuous supply of raw materials to the supply chain. In conclusion, this research may represent a starting point for a further study in the policy drivers and how they are different in the bioenergy policy field. It is clear how institutions are shifting their efforts in finding alternative source of energy. Woody bioenergy seems to be the key to solve the riddle of a cleaner and environmentally friendly energetic future.