

Systemic analysis of production scenarios for bioethanol produced from ligno-cellulosic biomass

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Defining alternatives for non-renewable energy sources constitutes a priority to the development of our societies. One of these alternatives is biofuels production starting from energy crops, agricultural wastes, forest products or wastes. In this context, a "second generation" biofuels production, aiming at utilizing the whole plant, including ligno-cellulosic (hemicelluloses, cellulose, lignin) fractions (Ogier et al., 1999) that are not used for human food, would allow the reduction of the drawbacks of bioethanol production (Schoeling, 2007). However, numerous technical, economical, ethical and environmental questions are still pending. One of the aims of the BioEtha2 project, directed by the Walloon Agricultural Research Centre, is to define the position of bioethanol produced from ligno-cellulosic biomass among the different renewable energy alternatives that could be developed in Wallonia towards 2020. With this aim, and in order to answer the numerous questions in this field, the project aims at using tools and methods coming from the concept of "forecasting scenarios" (Sebillotte, 2002; Slegten et al., 2007; For-learn, 2008). This concept, based on a contemporary reality, aims to explore different possible scenarios for the future development of alternative sources of energy production. The principle is to evaluate, explore, possible futures of the studied problematic, through the establishment of possible evolution trajectories. We contribute to this prospective through a systemic approach (Vanloqueren, 2007) that allows lightening the existing interactions within the system "ligno-cellulosic biomass chain" without isolating it from its environment. We explain and sketch the two contexts needed to identify primary stakes. The global context includes inter-dependant and auto-regulating fields such as society, politics, technology and economy. These four fields influence each part of the "chain" with specific tools. However, the interest and possible action fields lay within the intermediary context representing the "resources" such as agriculture, forestry, "driving" elements such as mobility, mediation elements such as territories and environment and concurrent elements such as non-cellulosic biomass, the energy mix and the non-energy valorization.

Keywords. Bioethanol, ligno-cellulosic biomass, prospective, systemic, scenario.

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