

**Planning in a bio-based economy landscape development. Cascading from different directions***Wim van der Knaap**Wageningen University, Netherlands*[Wim.vanderknaap@wur.nl](mailto:Wim.vanderknaap@wur.nl)

The contours of a bio-based society are emerging, using biomass as basic material. This new approach is being developed because we're running out of fossil fuels and we want to reduce CO2 emissions, while the demand for energy and related products only grows. In this paper we will focus on biomass produced in nature areas, roadside verges, urban green, etc., which is treated as waste material the last decades, and not on regular biomass from current agricultural production processes. This 'left-over' biomass was not treated as product the last decades, but rather as a cost factor. However, it can be applied in a first development phase as renewable energy source, and in a next phase it can even be especially applied for bio-based products. The landscape is on the one hand the supplier for the required biomass, but it should also facilitate and absorb the impact of this development. There are many questions related to a bio-based economy landscape development. Will there be a growing pressure on available space? Is there a balance point between material/fuel and food production? Does it require new spatial layouts, logistics and maintenance approaches, either creating new landscapes or reconstructing fossil-based landscapes? Should you incorporate and realize renewable and recycling production processes and cascading opportunities (e.g. distance and costs minimization)? How is the transition process taking place in landscape and society? Is society ready to more efficiently apply energy and bio-based materials? Does the co-evolution process within spatial planning contribute to this new and complex development? The main aim of this paper is to create a planning approach to deal with developments for a more bio-based oriented landscape. To make a step in this direction, nineteen Dutch initiatives around the use of 'left-over' biomass were studied. The Multi-Level-Perspective offers a suitable framework to analyse the bio-based transition process. Several aspects should get attention, such as landscape, product developments (cascading impact), maintenance, cooperation, layer/level, power positions, law and regulations, bottom-up planning processes, awareness in society, learning processes. To enlarge and absorb this current niche of a bio-based approach in society and landscape the learning-curve approach seems to be useful, from instrumental via conceptual towards social learning. This also fits nicely in the co-evolution process of planning. All these developments have a sort of cascading in common, either be it the biomass application, the absorption in landscape and society, the planning process or the learning process. Keywords: Biomass Application; Bio-Based Economy Landscape; Transition processes

- Langeveld, H., Sanders, J., Meeusen, M., 2012. *The biobased economy; biofuels, materials and chemicals in the post-oil era*. Earthscan, London - Kemp, R., Bosch, S. van den, 2006. *Transitie-experimenten. Praktijkexperimenten met de potentie om bij te dragen aan transitie*. Kenniscentrum voor Duurzame Systeeminnovaties en Transitie. Delft. - Groningen, E. van, Knaap, W. van der, Spijker, J., Stobbelaar, D.J., 2013. *Biomassa uit Natuur en Landschap*. Kenniscentrum Agrofood en Ondernemen. CAH Dronten