

The Energy Landscape Integrated Analysis method combines energy analysis of agroecosystems (energy flows and capacity to store energy within them) with land cover / land use change. It represents the energy imprint over a landscape. First applied in a historical context to Vallès County (Barcelona) it is here extended to 6 more cases in Europe and North America, each with 3 data points: mid XIXth century, 1950s and the present. The evolution of land use heterogeneity vs. polarization -measured using an adaptation of the Shannon index- is the landscape variable. Two energy variables derived from the agroecosystem's energy balances determine the level of energy complexity -how much of the energy flows are reinvested in the system, thus creating energy loops- and the information carried by these flows -how these energy loops are balanced with energy flows entering and exiting the system- and their temporal evolution. Finally, it studies the existence of any relationship between the three indicators. The paper contributes to enhancing our understanding of the complex relationships between energy flows and their imprint on the landscape patterns; it integrates two important disciplines such as material-energy flow analysis (social metabolism studies, ecological economics) and quantitative landscape ecology (land cover land use change, biodiversity and conservation) and contributes to the land sharing-land sparing debate. From a degrowth perspective, the historical quantitative approach contributes to determine the energy impact of different agriculture systems (organic vs. industrial) and their nexus with landscape ecology and land use change.