

A.2. A HIGHLY DYNAMIC, SELF-ORGANIZED, BIO-ECONOMY; IT'S BECOMING A SERIOUS GAME

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The notion that we have only one planet 'earth' with renewable and recyclable resources, a vulnerable interface with the troposphere and maximized solar energy is becoming more and more apparent while challenging its limits. A viable planet is a highly (or the most) complex system of which key parts are actually passing the boundary between the orderly state and the chaotic regime, revealed by exponentially changing patterns (like for greenhouse gases, loss of biodiversity, public deficits, depletion of fossil fuels, ...) instead of showing sinusoidal curves. Even though the boundary layer ('melting zone') between the orderly and chaotic state has a certain bandwidth due to numerous external and internal conditions, allowing complex systems being dynamic and self-organized, the bandwidth is not unlimited.

Within this boundary layer, all living creatures have to respectfully play their games, challenge the rules in time but accept the upper and lower limits, being revolutionary more creative, etc. Today, incremental innovations showing 10% improvements may motivate us, however, this is often far from sufficient. If we currently use 6 planets for our daily living conditions, we need to radically change numerous activities with at least a factor of 10 as soon as possible.

Here, we face a 21st century paradox in the bio-based economy: the efficiency thinking or economy of scale concepts drives us towards in general upscaling and homogenization of production processes (food, biomaterials, biomolecules, ...), however, the environmental and social factors force us towards biodiversity, product differentiation, respecting cultural identities, etc.

Some preliminary suggestions are here presented, that may counteract the paradox, in the area of targeted, down-sized, technologies, alternative resources and new business concepts.