Achieving sustainability in animal production is a multi-dimensional challenge. Any new system for growing poultry has to meet very different requirements, ranging from animal welfare and economics, to citizen preferences, landscape and local and global environment. We present the results of a design project in poultry production (‘Tasteful Broilers’), aimed at the development of integral sustainable designs for poultry husbandry. An interactive and structured design process was followed (Groot Koerkamp and Bos, 2008), in which the needs of a set of key actors is the starting point, and functions rather than solutions are the primary unit of analysis. In this way, the participants in the project were able to synthesize a wide range of seemingly conflicting requirements. The two resulting concept-designs make plausible that very high levels of animal welfare can be paired to a low environmental footprint, while addressing important societal demands. Economical feasibility was attained by recombination of functions, and by rethinking the product and (parts of) the chain. Key innovations are amongst others: separated functional areas, frequent removal of manure and litter cleansing, space and energy reuse by keeping multiple ages at the same time, dust reduction by use of natural ventilation and plants, and the substitution of soy by grass(products). Additionally, new products are presented that may facilitate the economical valorisation of poultry meat from these systems in the market, by integrating instrinsical and extrinsical attributes. Finally, we will report how the interactive design process contributed to appropriation by private actors and how public-private R&D may proceed after the project’s finish.