

# Laboratory of Environmental System

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Environmental loads as greenhouse gas (GHG) emissions associated with economic activities can be regarded as attributable to satisfaction with final human “consumption.” From this perspective, there have been discussions on environmental management in the nations with “consumption-based accounting” by which the consumer is responsible for the loads from the production of energy, goods, and services related to their final consumption. For example, it has been described that applying consumption-based accounting to GHG emissions, the so-called “carbon footprint,” has many political advantages. Furthermore, this accounting approach is beginning to be applied to other various environmental loads such as water and material resources consumption (“environmental footprints”) in pursuit of wider sustainability.

The main topic of this laboratory is to address consumption-based environmental loads (i.e. carbon footprint), and to present political solutions to mitigate both climate change and resources depletion from the perspective of ecological economics and industrial ecology. The analytical tools in which the laboratory is interested are life cycle assessment (LCA), environmentally extended input-output analysis (EEIOA), and material flow analysis (MFA). The laboratory currently focuses on identification of impact of changes in our lifestyles (consumption patterns) and/or societies on the environment, key factors for green consuming (i.e. education for sustainable development), and future environmental footprints using a scenario approach (the figure presented below is an example from the previous works).

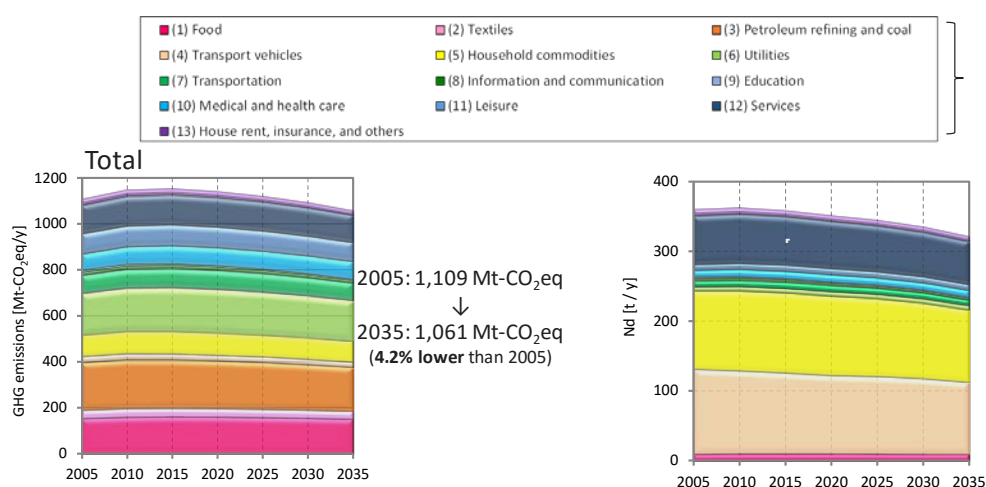


Figure. Estimations of the household carbon footprint (Shigetomi et al., *ES&T*, 2014) and neodymium footprint (Shigetomi et al., *Ecol. Econ.*, 2015) of Japan from 2005 to 2035 with respect to an aging society with a lower birthrate.