Low carbon society in contrast to a society with mass consumption of energy and resources

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Conventionally, “wealthy” life has been coupled with massive consumption of energy and material resources. There was strong correlation between economic growth and increase in CO_2 emission in the era of Japanese rapid economic growth. A certain level of de-coupling between GDP and CO_2 emissions was observed after the first oil-crisis. This was mainly thanks to the well-known effort of energy efficiency improvement in energy-intensive industries. However, GDP and CO_2 emissions were re-coupled since late 1980's. This seems to be driven, at least partly, by consumption pattern of households.

According to our analysis employing an environmentally extended economic Input-Output analysis, contribution of household consumption to total emissions has been increasing. Household consumption contributes to CO_2 emissions not only directly by consuming energy commodities such as gasoline, kerosene, town gas and electricity but also indirectly by purchasing other goods and services. Labeling of carbon footprint of foods and daily necessaries will be informative for consumers to be aware of their link to LCS.

Private cars are one of the typical emitters of CO_2 from household consumption. Both total ownership and average size of Japanese private cars became larger since late 1980's and this had significantly contributed to the increasing emission in 1990's. Thanks to energy efficiency improvements, such as by hybrid cars, emissions from cars began to decrease recently. From the behavioral point of view, the distinction between mobility and accessibility seems to be essential, as the latter is more desire-based. Although modal shift to more efficient transport mode is often encouraged as a behavioral change, this is not effective without well-organized public transit and infrastructural changes to more compact city.

Purchasing behaviors of energy-consuming consumer durables such as cars, air conditioners, refrigerators, TV's and other electric equipment also have significant impact. Replacement to up-to-date efficient models is often encouraged, but we have to keep in mind that shorter lifetime of durables lead to excessive consumption of material resources and indirect energy consumption and CO_2 emissions. Payback time in terms of cost, energy, and CO_2 should be carefully examined for typical consumer durables. Reliable information with regard to cost payback time and CO_2 payback time of expensive mitigating technologies such as photovoltaic should be disseminated to consumers to guide their investment decision.

Undoubtedly, the improvement in energy efficiency is necessary to drastically reduce CO_2 emissions from households. However, the question is if technological change is sufficient. In our experiences, gains by efficiency improvements have been often offset by so-called re-bound effect. In Japan, the necessity to make transition from a society characterized by mass-production, mass-consumption and mass disposal to a “sound material cycle society (SMCS)” has been recognized to tackle with increasing solid wastes. 3Rs (reduce, reuse, recycle) policy to minimize solid waste disposal and natural resource consumption has been advocated and is being disseminated internationally through G8, OECD, etc. Behavioral changes towards LCS should be encouraged in a win-win manner with those towards SMCS.