Impact of changes in socio-economic activity and consumption behavior on realization of decarbonized society in Japan

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[Abstract]

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In this research, we developed a socio-economic scenario towards the solution of the social issues facing Japan based on the concepts of “Society 5.0” and “Regional circular and ecological sphere”, to analyze the changes in society and consumption behavior, and to assess the impacts due to the achievement of a decarbonized society in 2050. In sub-theme 1, in order to solve social issues related to the elderly people and to rural areas while aiming for a decarbonized society, the analysis was carried out focusing on the following 3 points: changes in lifestyle and consumption behavior, changes in society through ICT (information and communication technology) services, and actions in local communities. In sub-theme 2, two socio-economic scenarios targeting the whole of Japan were developed, based on the results of the analyzes in sub-theme 1. Based on the socio-economic factors (population and economic activity indicators) and the level of regional self-reliance, the pathway for achieving a decarbonized society was clarified quantitatively.

As a result, in order to realize a decarbonized society in Japan, energy conservation, electrification, and low-carbon energy are necessary. The final energy consumption in 2050 is about half of the 2018 level, and the electrification rate increases from 30% in 2018 to 50% in 2050. Also, it was shown that the power generation mix in 2050 becomes 100% decarbonized by combining renewable energy, nuclear power, and thermal power generation with decarbonization measures (CCUS, ammonia). In addition, the realization of a decarbonized society will lead to a significant increase in the energy self-sufficiency rate (from 11% in 2018 to 65% in 2050) and a significant reduction in energy imports (19 trillion yen in 2018 to 6 trillion yen in 2050) through a drastic reduction in fossil fuel consumption. In the analysis, we estimated the impact of social changes accompanying the progress of digitalization and the formation of a circular society. It was found that these changes will lead to a reduction in the amount of total investment, and to a lower dependence on innovative technologies with constraints and high uncertainty of social implementation for building a decarbonized society. In summary, it was shown that social transformation increases the feasibility of a decarbonized society.

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