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講演概要 Abstract

The Human Survivability Studies: A Personal View on the Inevitability, Practice, and Prospects  
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We proposed the discipline of Human Survivability Studies (HSS) at the Graduate School of Advanced Integrated Studies in Human Survivability, Kyoto University in 2012, as a trans-disciplinary research field combining natural science, humanities, and social science perspectives, with the aim to solve global issues for the survival of humankind. To develop HSS, most of the faculty members have established trans-disciplinary research groups based on global issues rather than their own fields of disciplines. As of today, we have 11 trans-disciplinary research groups and the "Human Survivability Research Group", which is a meta-study group bringing together the results of all 11 groups.

In my presentation I will discuss the electric power system and renewable energy as classified as an energy issue studied in HSS. It examines the nexus of energy, environment, and economic growth, which is a characteristic of this man-made system. Specifically, quantitative evaluation studies were conducted on the following issues using data science and computational methods: (1) Assumed large-scale integration of renewable energy sources; wind power and solar photo-voltaic power (2) Estimated the most economical capacity of each power generation facility (3) Confirmed the stability of the system operation for the best-mix power system (4) Studied the use of not only storage batteries but also pumped storage power generation and Vehicle-To-Grid of electric vehicles (5) Examined the economic feasibility of hydrogen generation using a new type of nuclear power generation technology with high safety (6) Examined ways to promote the introduction of renewable energy in developing countries through a combination of carbon pricing and foreign direct investment (7) Examined an electricity usage right trading system that uses renewable energy as the main energy source, a system to monitor the lives of the elderly. Finally, we discuss the "new system" to replace GDP growth by increasing social fairness and wellbeing. As a successful case study in HSS, we will propose and implement specific technologies, systems, and policies to realize such a sustainable society.