

## EcoDesign of Low Carbon Society Based on Regional Partnership Between Urban and Rural Areas

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### [Abstract]

**Key Words** Low Carbon Society, Urban-Rural Partnership, Scenario, Regional Circulation, Natural Resources

The purpose of this study is to indicate paths toward regional sustainability by conceptualizing systematic “urban-rural partnership.” The urban-rural partnership in this study aims to create regional systems that facilitate the circulation of renewable natural resources, such as agricultural and biomass resources, across sector boundaries, in order to reduce the use of fossil fuels as well as to generate a variety of benefits like pollution prevention, regional revitalization, and ecosystem maintenance.

By planning and investigating various pilot models in Japan and China, this study proposed three models; namely, technological innovation and development of low carbon industry in rural areas (sector conjunction model) (subtheme 2), circulation of energy and resources through urban rural coalition (spatial conjunction model) (subtheme 3), and political proposal for deploying technology and knowledge in Japan to low carbon pilot projects in China (international co-benefit model) (subtheme 4).

In subtheme 2, we evaluated *Eucommia* plantation in Henan province, China in terms of carbon reduction potential, soil and water protection effects, and contribution of the enterprise to socio-economic development. In subtheme 3, we determined the per-unit productivity and consumption for the agricultural livestock, and forestry product of Hokkaido. Based on these data, we evaluated the food and energy self-sufficiency and low carbonization potential of the whole Hokkaido when the mutual complementarity of rural and urban areas expanded. In subtheme 4, we proposed the method for optimal utilization of distributed energy resources based on regional urban-rural partnerships in Huzhou in Zhejiang province, China. By making use of interdependent relationship between the urban and rural areas, the proposed urban-rural energy systems were examined from both economic and environmental viewpoints.

Furthermore, in subtheme 1, in order to integrate the regional data obtained by the pilot

models in each subtheme, we developed a common framework of regional circulation and two analytical tools that evaluated the potentiality and availability of the partnerships; stock and flow accounting analysis and causal models of regional partnership clusters by using lifecycle simulation. By using a scenario planning methodology, we concluded this research in the form of policy recommendation that suggested future directions of the regional urban-rural partnerships. By clarifying the synergy effects of these three suggested pilot models, we suggested how urban-rural partnership would be multi-beneficial for sustainable society and would contribute to environmental policies toward construction of the low carbon society in Japan and Asian countries.