

Development of a map of the spatial distribution of global electricity demand

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Keywords: Electricity demand, Global map, Population density, Downscaling.

This study introduces the development of a map with spatial distribution of electricity demand at global scale. The capability of the energy system to deliver low carbon energy to demand centers is constrained by the remoteness of energy resources and the technologies to transport and deliver them in a safe and cost-efficient manner. In carbon constrained world that depends on large amounts of dispersed energy resources, such as solar, wind and biomass, the spatial mismatch between energy supply and demand becomes an important aspect of energy systems. The location of global energy demand is represented in integrated assessment models (IAMs) at country scale based on national statistics. However, information at a higher spatial detail is missing, which constrains the analysis of suitability of location of energy supply with respect to energy demand, as well as sub-national disparities in energy demand, in particular between urban and rural areas. Based primary on gridded data of the spatial distribution of world population, electricity demand in the residential sector is represented for urban and rural areas in grid cell scale. The level of electricity consumption per capita is disaggregated according to population densities and living conditions (i.e. urban/rural). Other factors influencing residential electricity demand, such as climate and income, are to be considered in a future study. The analysis will be extended to other final energy sources and other sectors.

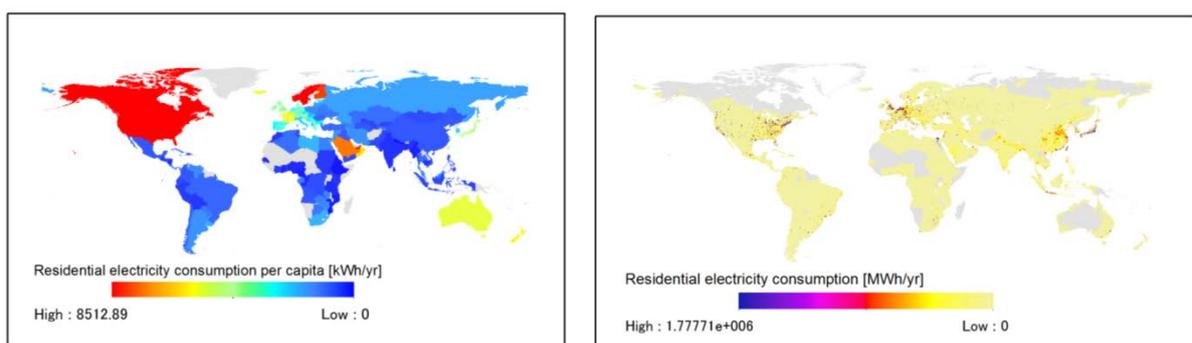


Figure 1 Electricity consumption in the residential sector: per capita consumption by country (left) and annual consumption by grid cell (right).

Acknowledgement

This study is supported the Ministry of Environment of Japan through the 2-1402 project ("Research on Evaluation of Mitigation Strategies to achieve Long-term Reduction Targets of Greenhouse Gases in Japan and the World") and by JICA and JST through the SATREPS project ("Development of Low Carbon Scenarios for Asian Regions").