Laboratory of Energy, Environmental, and Economic Systems Analysis

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Outline of research

The current focus of our lab is to develop cost-optimal energy supply and demand scenarios and cost-optimal scenarios of energy technology deployment in the medium to long term under climate stabilization constraints. We then try to derive policy recommendations from our model simulation results that are useful to decision makers in the field of energy and environment.

Research theme

- **Model analysis of Kyushu's cost-optimal power generation mix**

  With the aid of GIS, we are currently developing power-generation best-mix models (PGBM) for Kyushu treating variable renewables in detail. Using this PGBM–Kyushu model, we are trying to derive cost-optimal scenarios of the deployment of electricity generation technologies and their cost-optimal operation patterns in Kyushu over the period to 2050 under constraints on CO_2 emissions from Kyushu's electric power generation sector.

- **Long-term global energy system model analysis**

  Using technology-rich global energy system models, we have developed cost-optimal energy supply and demand scenarios and cost-optimal scenarios of energy technology deployment over the period to 2100 for each of 70 world regions under climate stabilization constraints. These models have also been used to assess the cost-competitiveness of new, clean energy technologies. We will develop so-called "hybrid models" by linking top-down economic models to bottom-up energy system models to derive the cost-optimal growth path of both economic and energy systems.

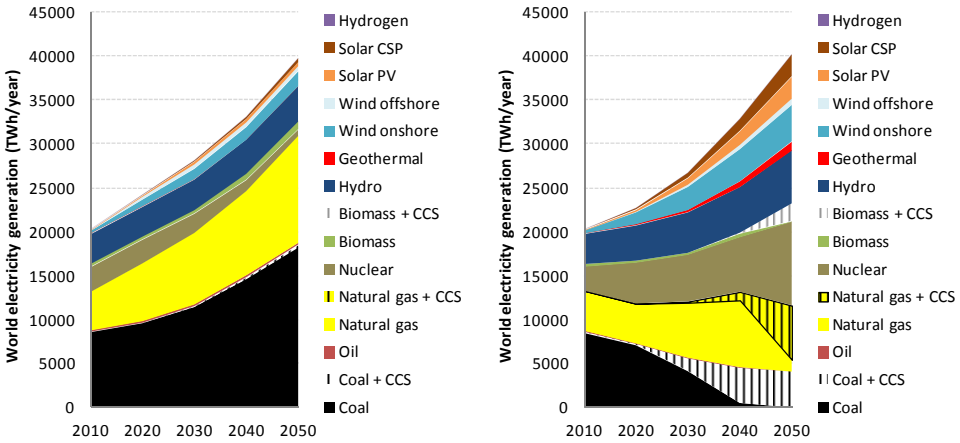

Figure: Global electricity generation in the business-as-usual case (*left*) and the climate stabilization case (*right*).