

Economic consequences of climate-induced changes in the energy demand for heating and cooling

Chan Park, Tomoko Hasegawa, Shinichiro Fujimori, Kiyoshi Takahashi, Yasuaki Hijioka, Toshihiko Masui
 Korea Research Institute for Human Settlements & NIES, Japan
 E-mail: parkchan@krihs.re.kr, hasegawa.tomoko@nies.go.jp



Abstract

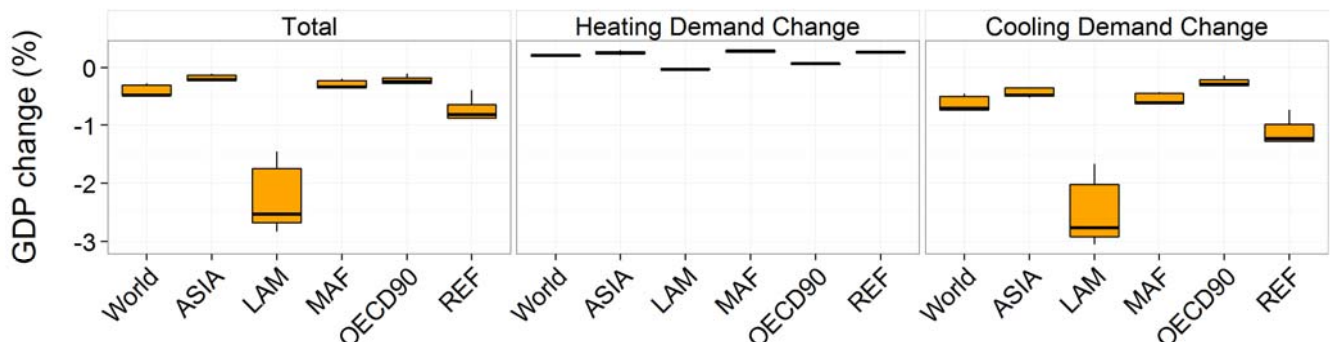
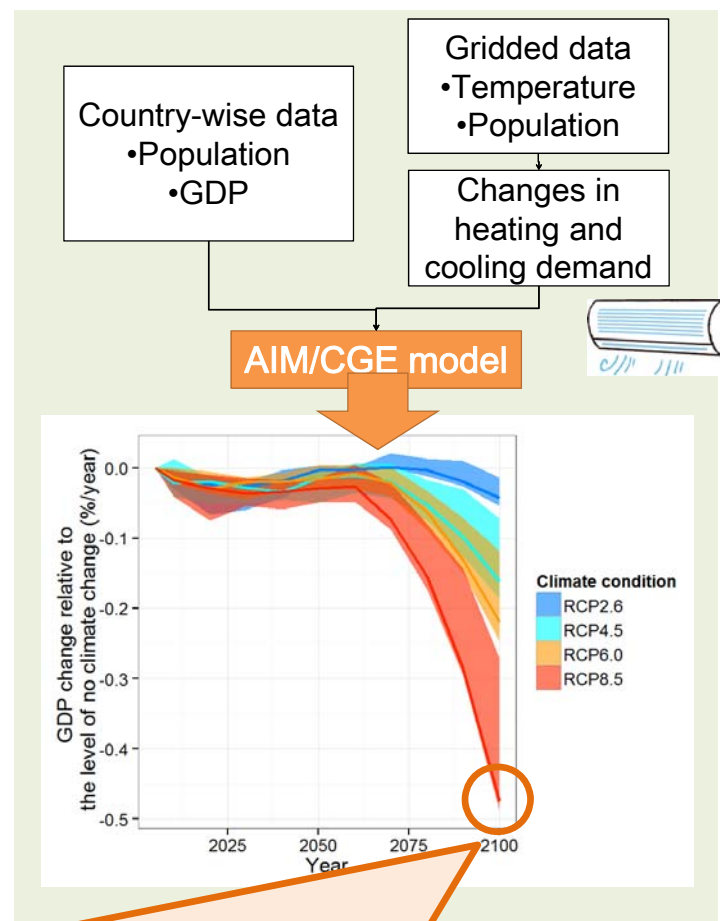
The energy demand for heating and cooling is likely to be sensitive to climate change. We projected the economic impacts of changes in the energy demand for heating and cooling under multiple climate conditions with taking detailed information regarding air-conditioning technologies and their costs into account.

Conclusions

- (i) The economic impact of climate change due to changes in the energy demand for heating and cooling represents a -0.47% change in global GDP from the level of no climate change in 2100 for the highest temperature increase scenario (RCP8.5), and a -0.05% change for the lowest temperature increase scenario (RCP2.6).
- (ii) The magnitude of the economic impact was strongly dependent on future income growth because more air conditioners were used with income growth. This illustrates the importance of incorporating future income growth in low-income countries into climate policies related to energy systems in buildings. For example, establishment of regulations and financial support scheme for thermal insulation for building in currently low-income countries could work effectively on lowering future increase in emissions in the countries.

Methods

- AIM/CGE model coupled with an end-use technology model, explicitly representing
- i) stock changes in air-conditioning technologies, and
 - ii) investment costs for the technologies, which influence the macro-economy.



GDP changes due to changes in the demand for energy services for heating and cooling (RCP8.5, 2100). "Total" considers the changes in both HDD and CDD, while the other two cases only consider changes in either HDD or CDD, respectively.