Energy structure and energy security under climate mitigation scenarios in East Asia

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Climate change and energy

Decrease in energy import under climate mitigation policies (= increase in self-sufficiency of energy)?

http://ourworld.unu.edu/jp/scale-of-the-climate-and-energy-challenge

Purpose

- Impact of climate change mitigation on energy structure and energy security in East Asian Countries (Japan, China, and Korea)

Change in energy structure in the future?

Improvement of energy security in the future?

Method

- Model：CGE (Global recursive dynamic)
- Scenario：Representative Concentration Pathways（RCP）

- Energy structure: Primary energy
- Energy security：Herfindahl Index (diversity), Energy import

- Periods：2001-2050

Herfindahl Index

- Evaluating dependence (diversity) of each element (energy type) in a group (primary energy)

$$H = \sum_i x_i^2$$

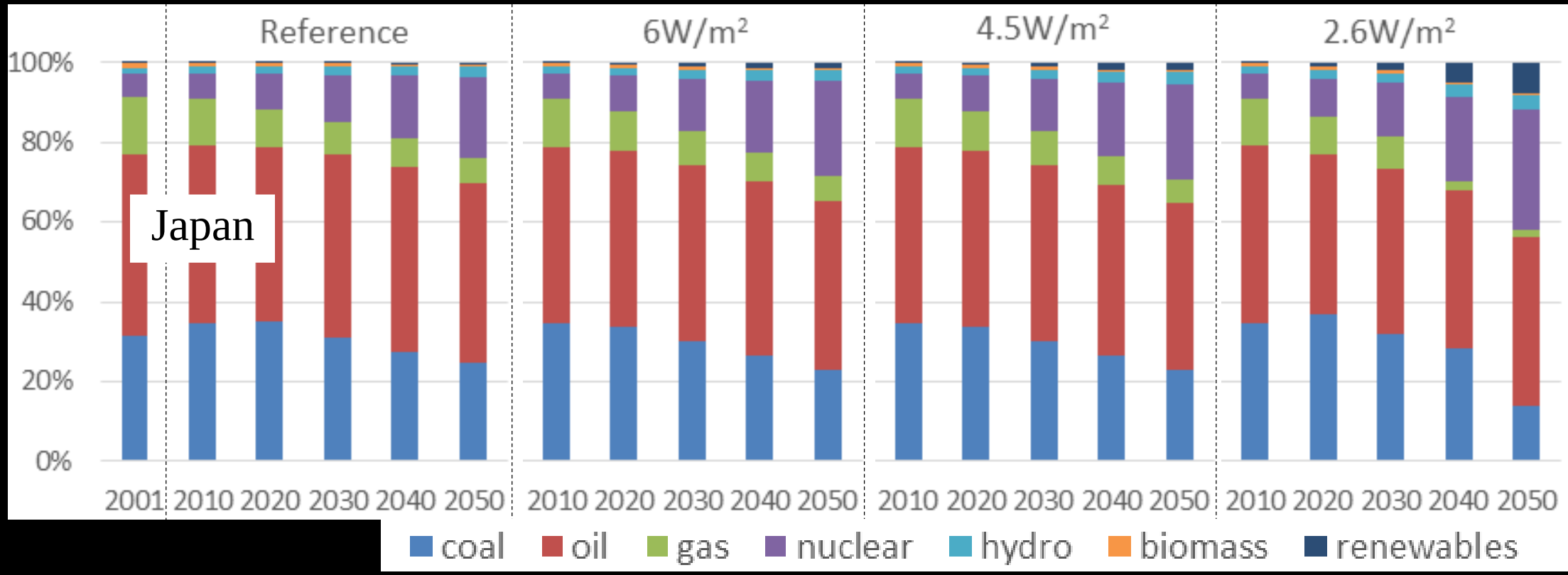
H : HI ; x_i : Share in energy demand of primary energy type

(dependence on a specific element is high if the index is close to 1)

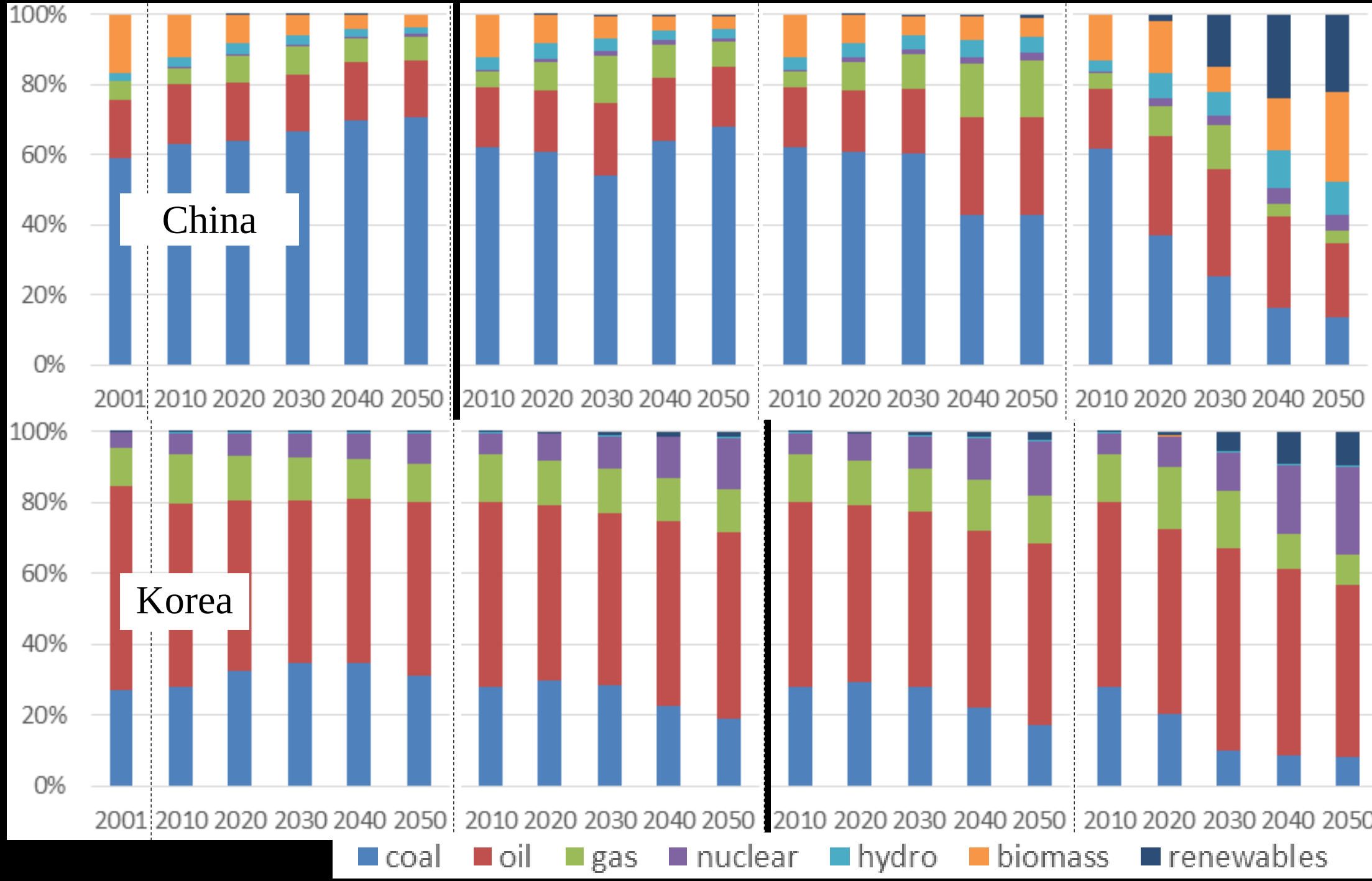
Total primary energy (EJ)

	2001	2050			
		Reference	6W/m^2	4.5W/m^2	2.6W/m^2
Japan	19.9	12.1	11.7	11.6	9.3
China	53.5	275.6	261.0	149.8	73.5
Korea	9.1	13.3	12.1	11.5	7.2

Primary energy structure



Cont.


China
Korea
100%
80%
60%
40%
20%
0%
2001 2010 2020 2030 2040 2050
2010 2020 2030 2040 2050
2010 2020 2030 2040 2050
2010 2020 2030 2040 2050
coal
oil
gas
nuclear
hydro
biomass
renewables

Herfindahl Index