Lessons from results of integrated assessment on carbon tax in Japan

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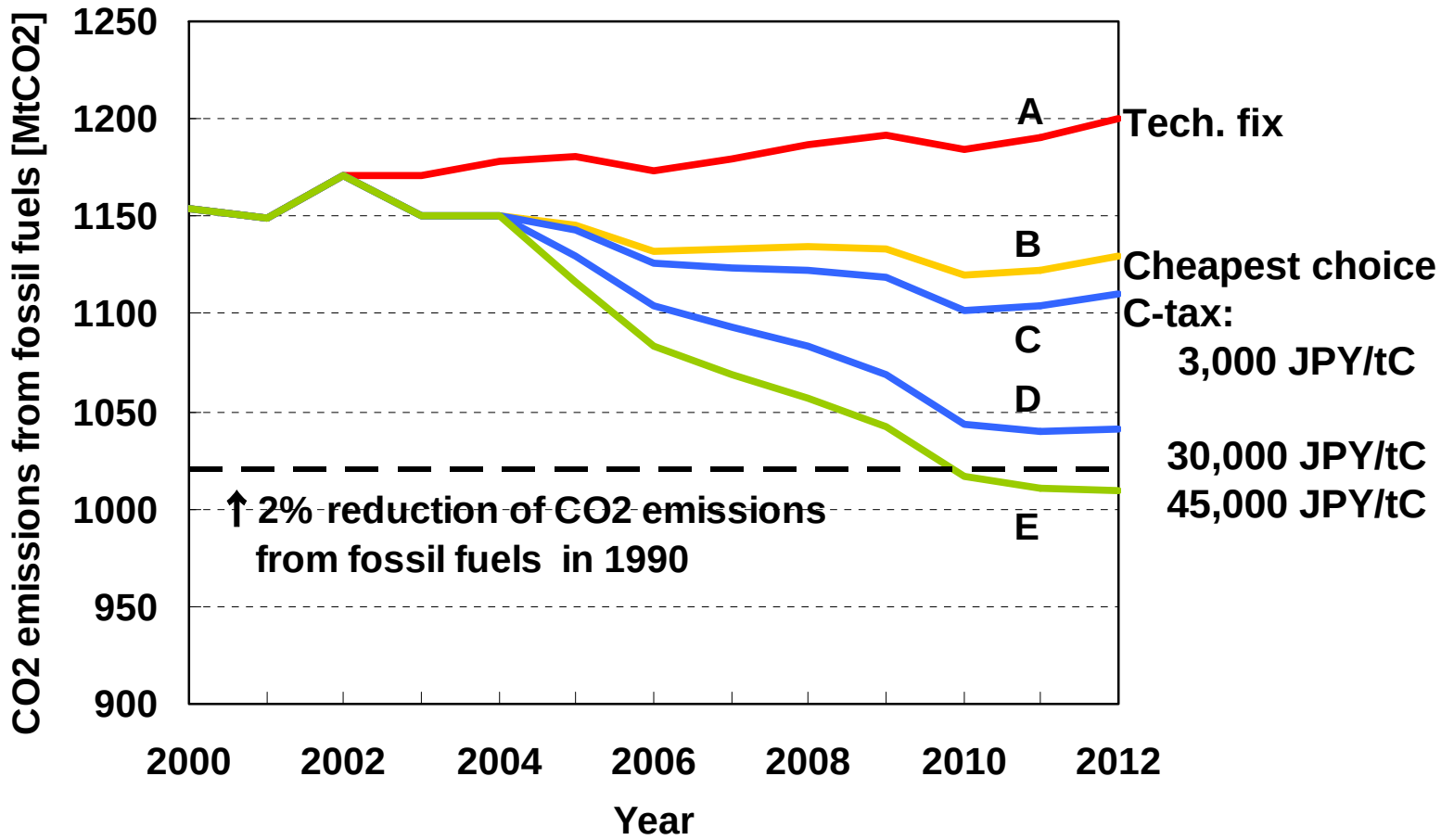
Messages from model analysis

- Based on simulation results in 2003 using AIM (Asia-Pacific Integrated Model)
  - In order to reduce the CO2 emissions in Japan to achieve Kyoto Target, marginal CO2 reduction cost, that is necessary carbon tax rate, is 45,000 JPY/tC.
  - When the tax revenue is utilized to lower the prices of equipment contributing to reduce CO2 emissions, the carbon tax rate is 3,400 JPY/tC.
  - Increase of demand of energy saving equipment bring economic benefit, and as a result, most of economic loss are compensated.
- Carbon tax has both price effect and income effect.
- One year later (in 2004), we updated data and simulated again;
  - The shorter the time period until 1st commitment period is, the more expensive CO2 reduction options must be introduced.
    - marginal cost: 45,000 JPY/tC -> 60,000 JPY/tC
    - tax rate: 3,400 JPY/tC -> 3,600 JPY/tC

Model analysis on CO2 reduction policy

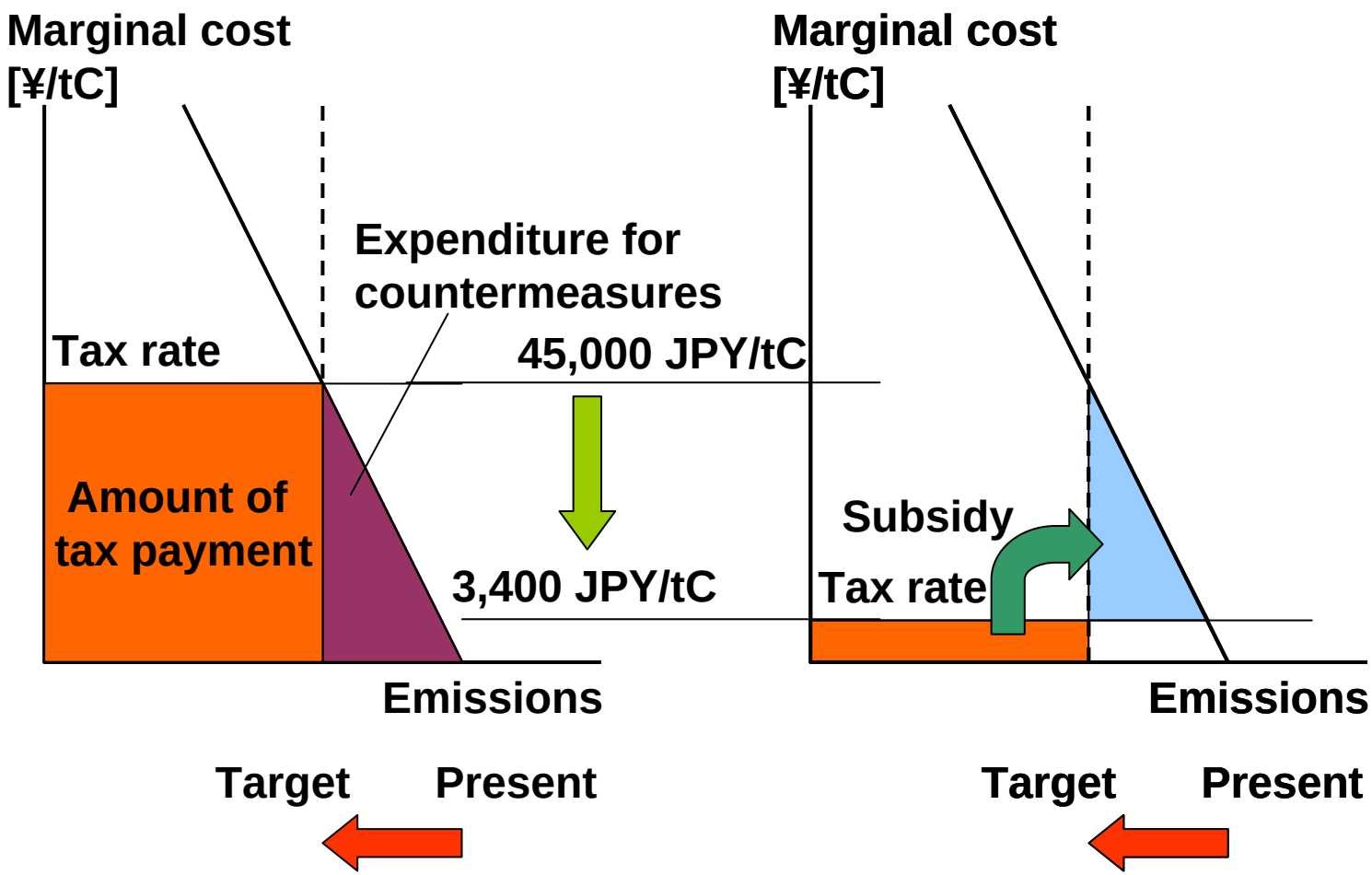
-carbon emissions-



CO2 emissions trajectories by scenarios

Model analysis on CO2 reduction policy

- policy mix with carbon tax and recycling of tax revenue-

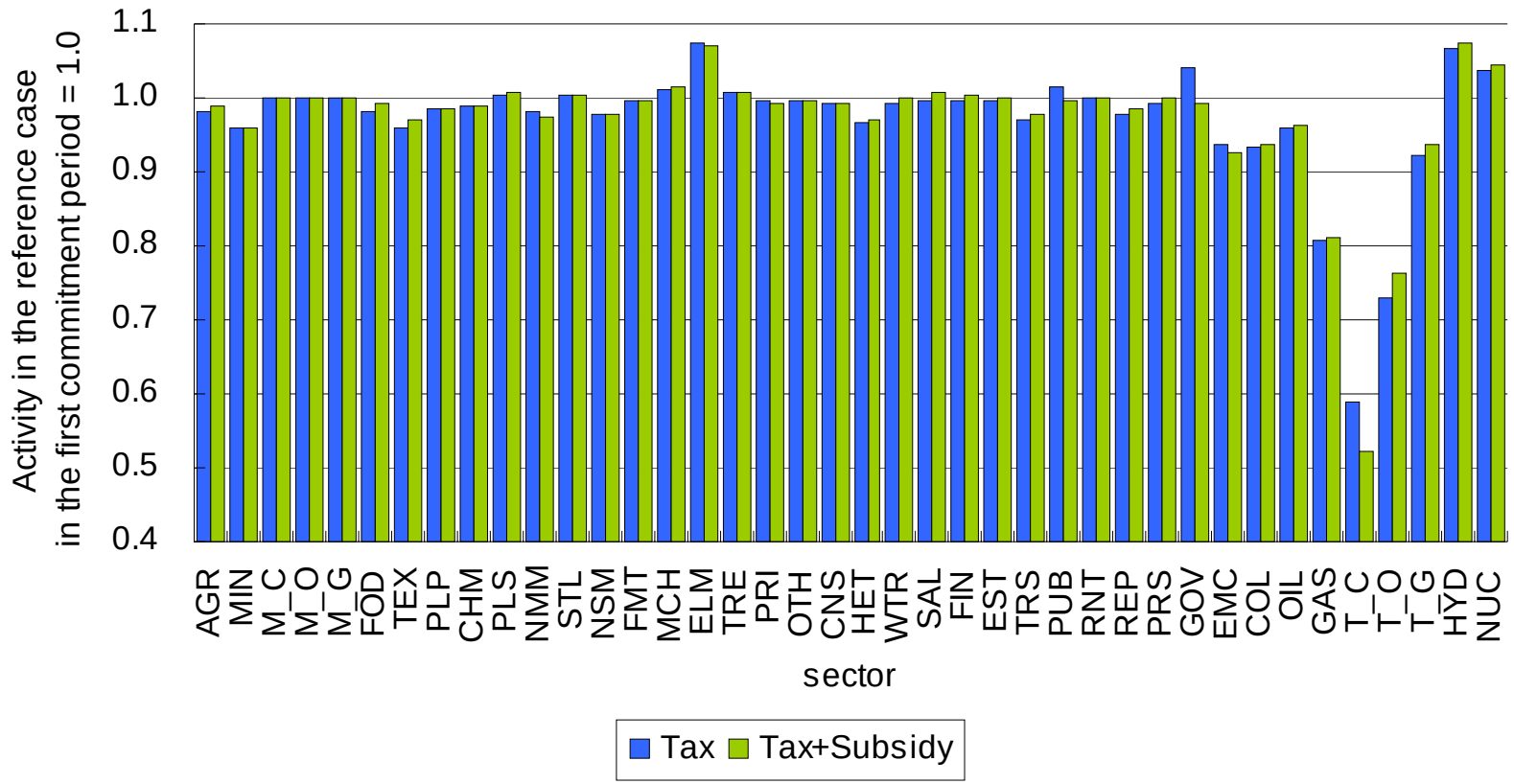


Carbon tax rate and required additional investments for reducing CO2 emissions in Japan

sector	Subsidized measures and devices	Add. investment
Industrial sector	Boiler conversion control, High performance motor, High performance industrial furnace, Waste plastic injection blast furnace, LDF with closed LDG recovery, High efficiency continuous annealing, Diffuser bleaching device, High efficiency clinker cooler, Biomass power generation	101.3 bil. JPY/yr
Residential sector	High efficiency air conditioner, High efficiency gas stove, Solar water heater, High efficiency gas cooking device, High efficiency television, High efficiency VTR, Latent heat recovery type water heater, High efficiency illuminator, High efficiency refrigerator, Standby electricity saving, Insulation	353.9 bil. JPY/yr
Commercial sector	High efficiency electric refrigerator, High efficiency air conditioner, High efficiency gas absorption heat pump, High efficiency gas boiler, Latent heat recovery type boiler, Solar water heater, High efficiency gas cooking device, High frequency inverter lighting with timer, High efficiency vending machine, Amorphous transformer, Standby electricity saving, Heat pump, Insulation	194.5 bil. JPY/yr
Transportation sector	High efficiency gasoline private car, High efficiency diesel car, Hybrid commercial car, High efficiency diesel bus, High efficiency small-sized truck, High efficiency standard-sized track	106.6 bil. JPY/yr
Forest management	Plantation, Weeding, Tree thinning, Multilayered thinning, Improvement of natural forest	195.7 bil. JPY/yr
Total		952.0 bil. JPY/yr
Tax rate to appropriate required subsidiary payments		3,433 JPY/tC

Model analysis on CO2 reduction policy

-Economic impact-



Activity Change of each sector in the first commitment period (compared to reference case)