Approaches to Modeling Mitigation Costs

Billy Pizer

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Ways to think about costs

- Loss of income
  - Typically expressed as a percent of future income – "a 1% loss of GDP in 2030"
  - GDP is growing, perhaps almost 3% per year
    - But per capita GDP is only growing by half that.
    - And *median* GDP is only growing by half that again – or about 0.7%
  - Big or small?
  - All existing environmental regulation ~2%
- Prices
- Impacts on industry and jobs

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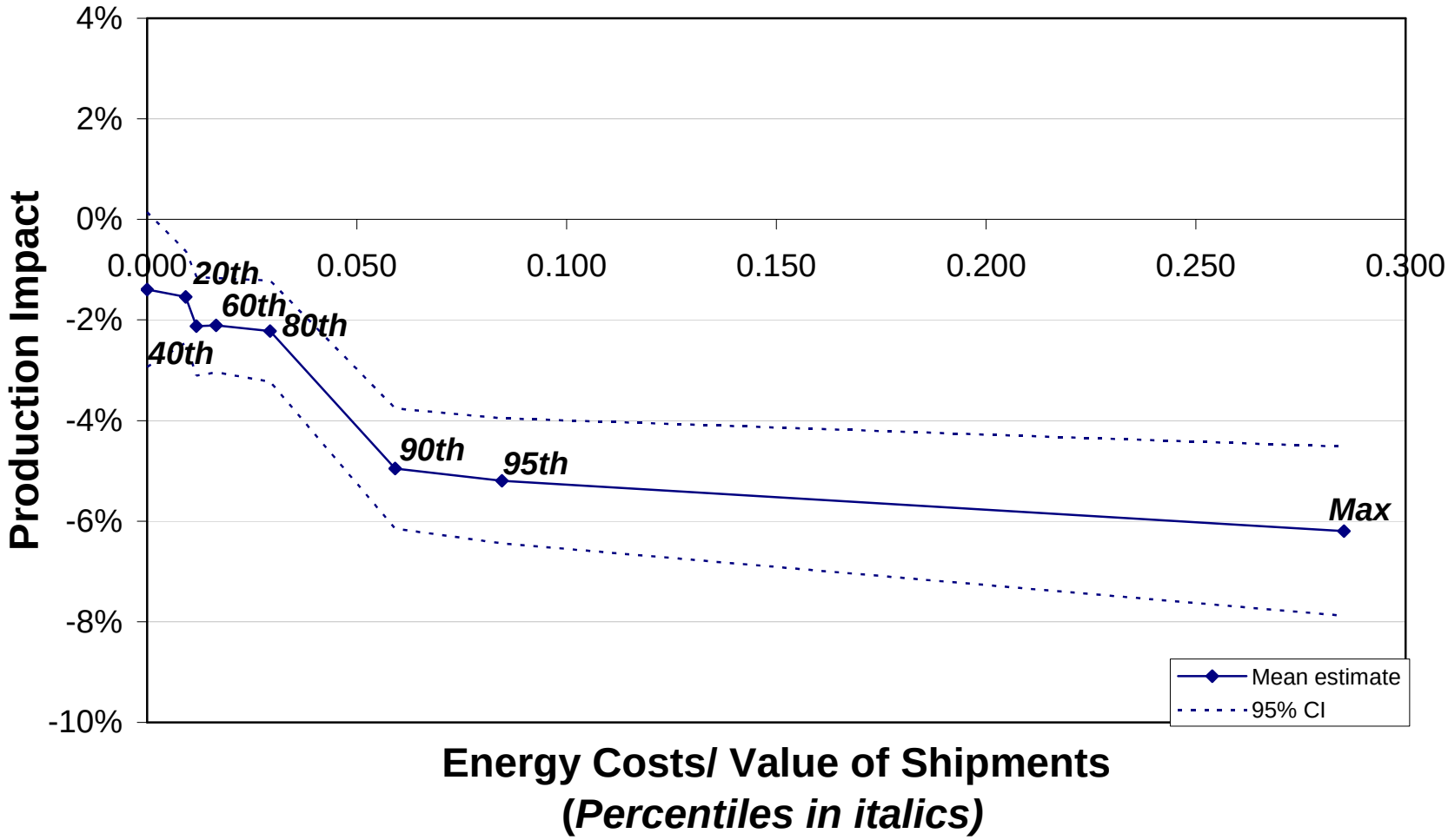
Simulated production impacts, 2015 Allowance Price: $15/ton CO2-e, by energy intensity



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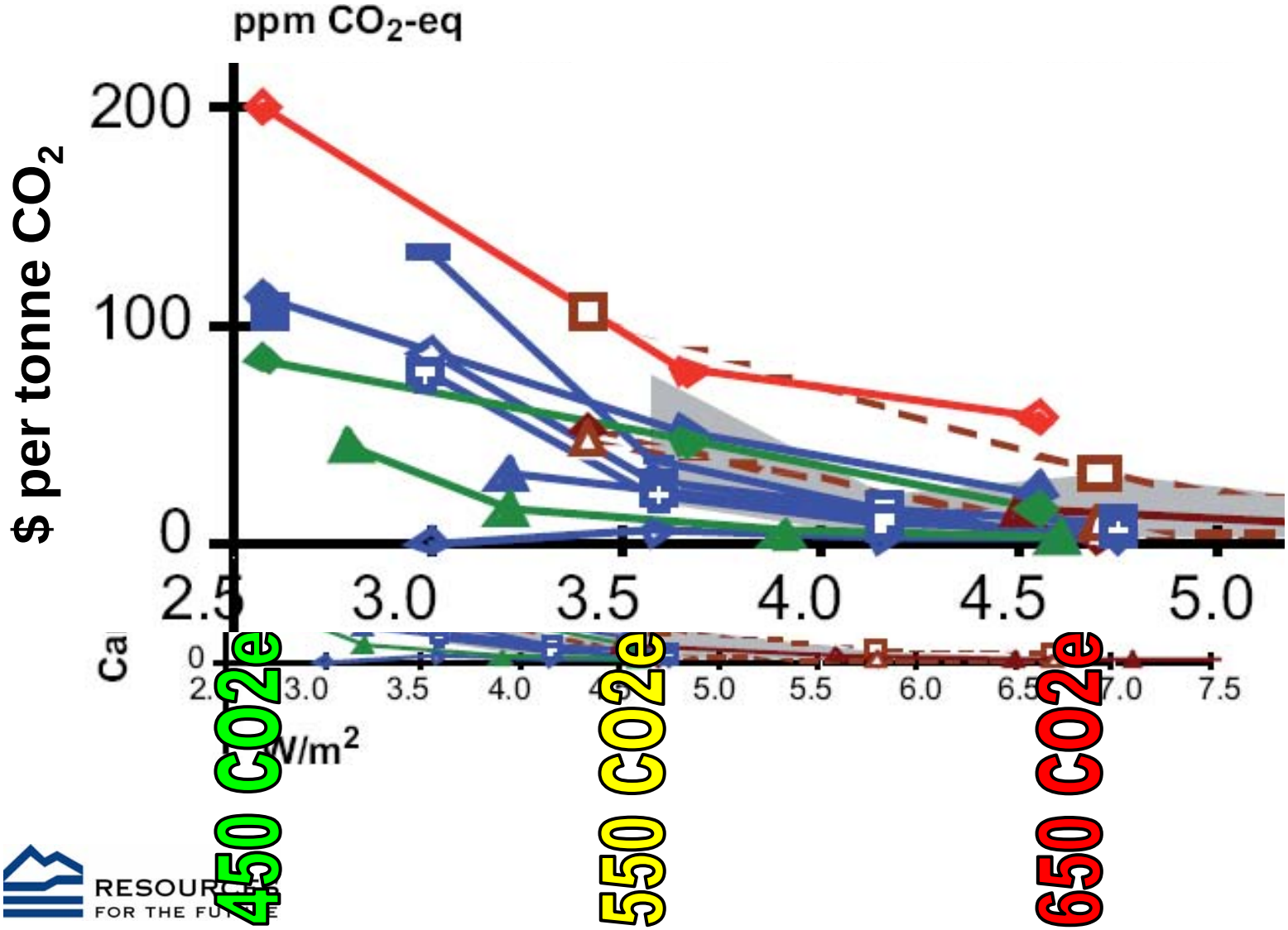
2030 CO_2 Prices to Stabilize



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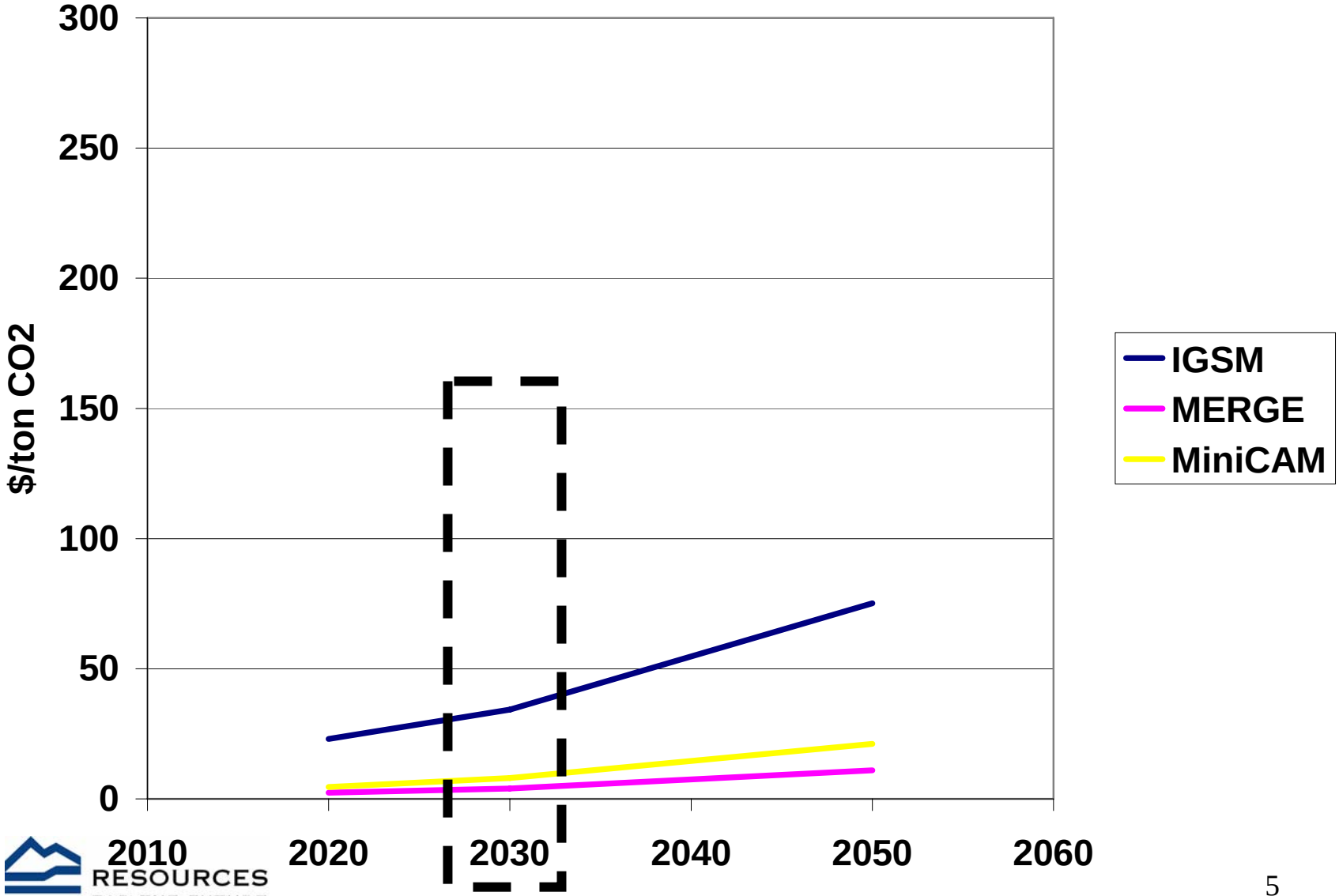
CCSP Estimated Prices for 650 CO2e



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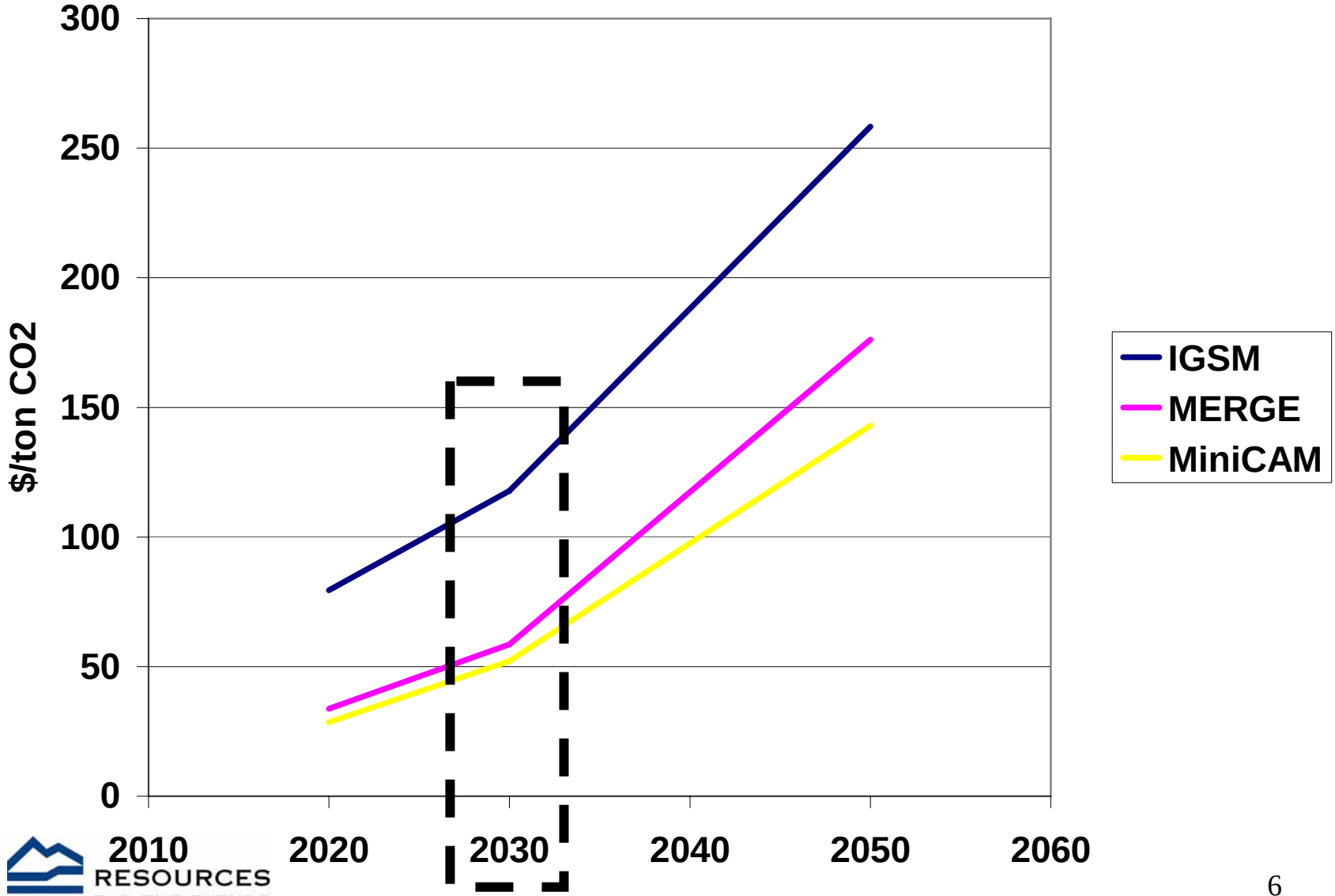

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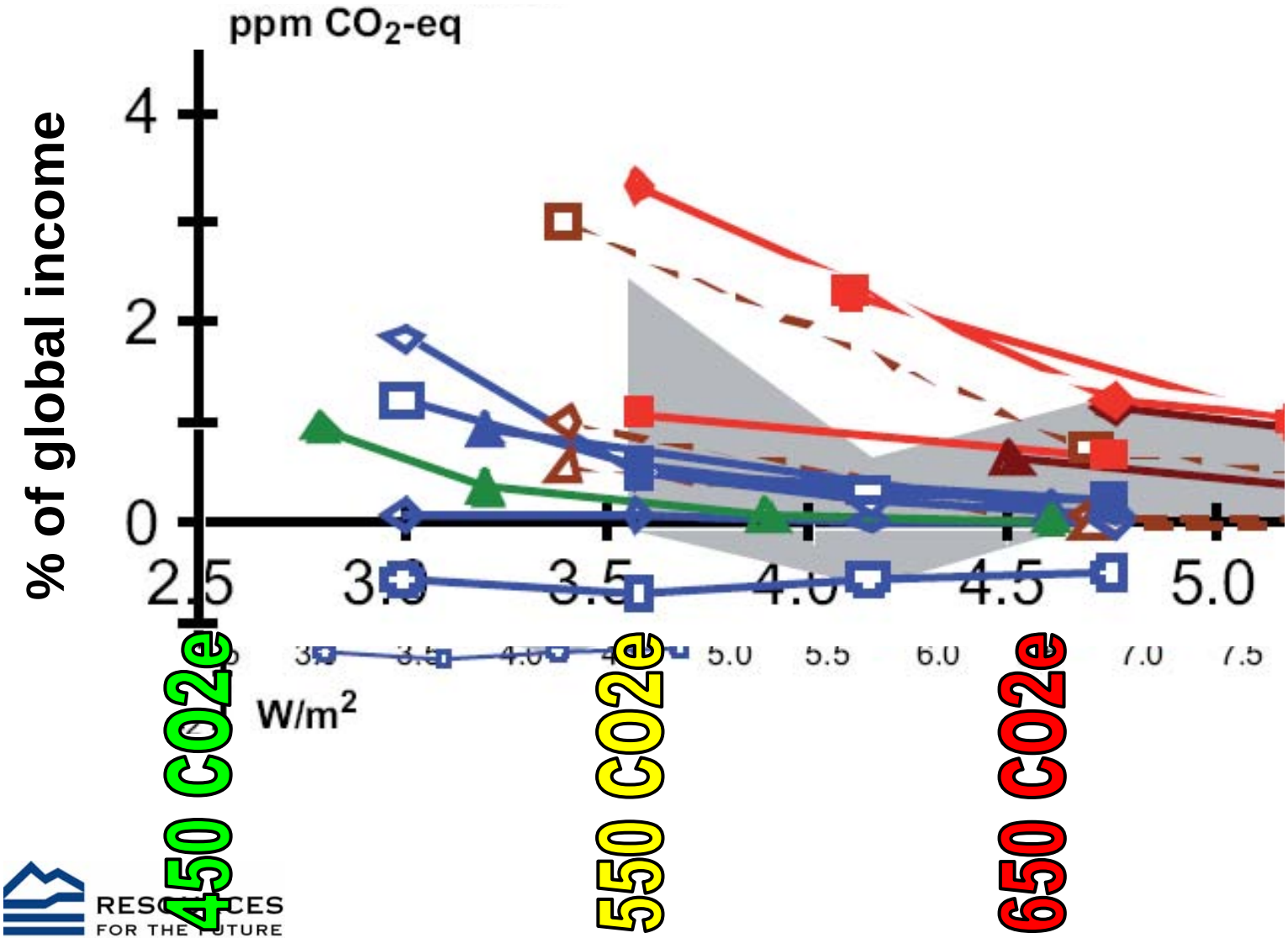
2030 GDP loss to Stabilize



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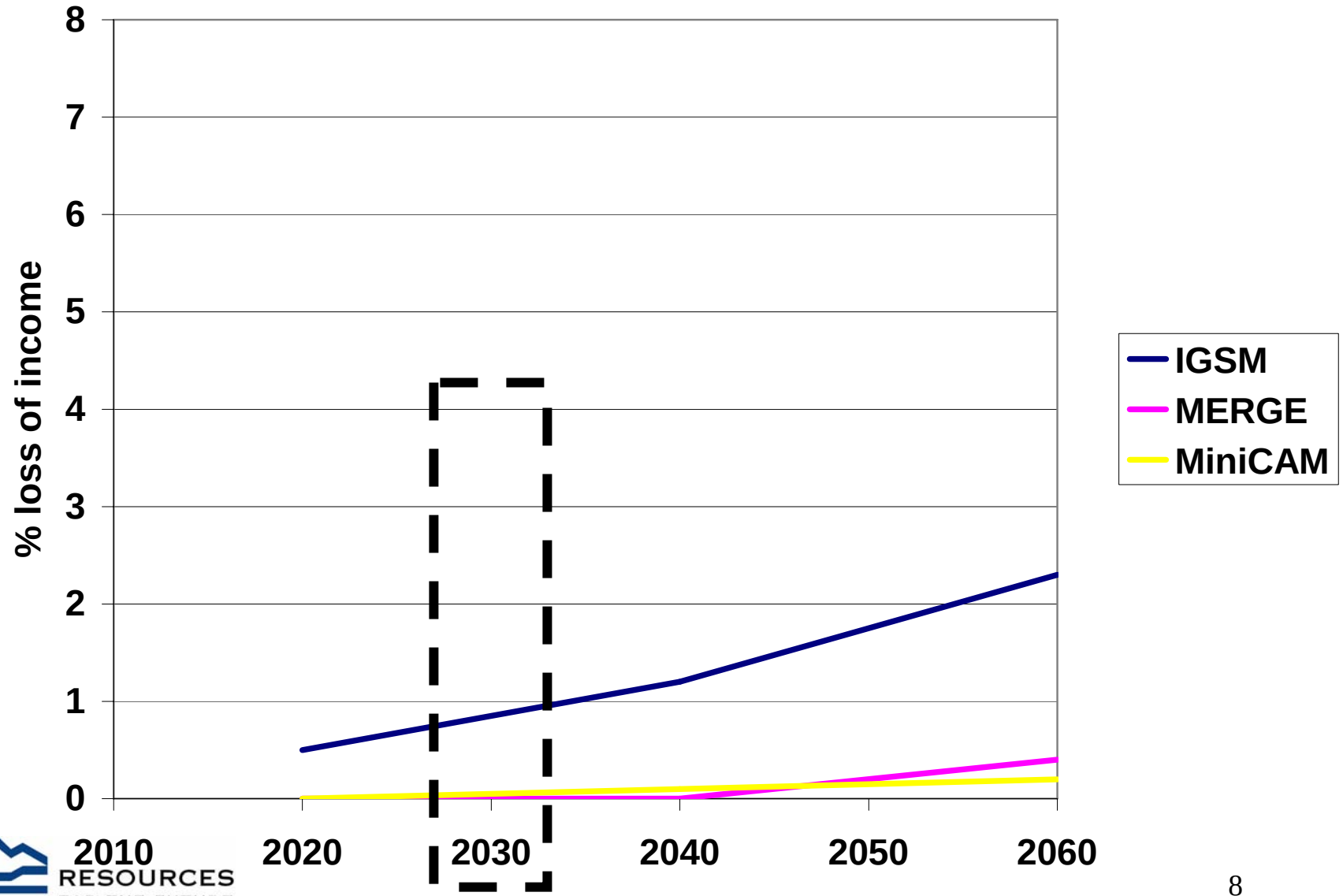
CCSP Estimated GDP Loss for 650 CO2e



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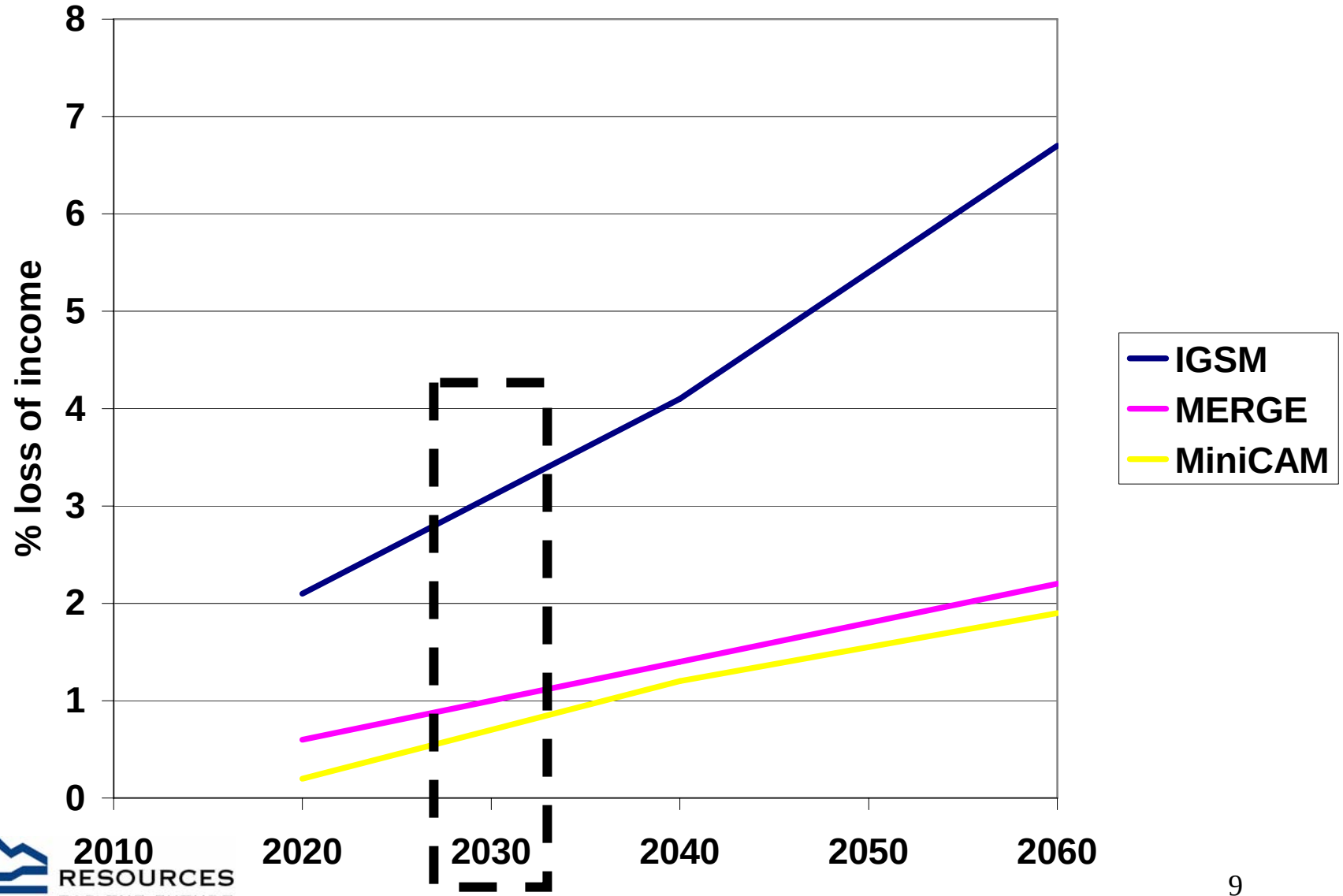

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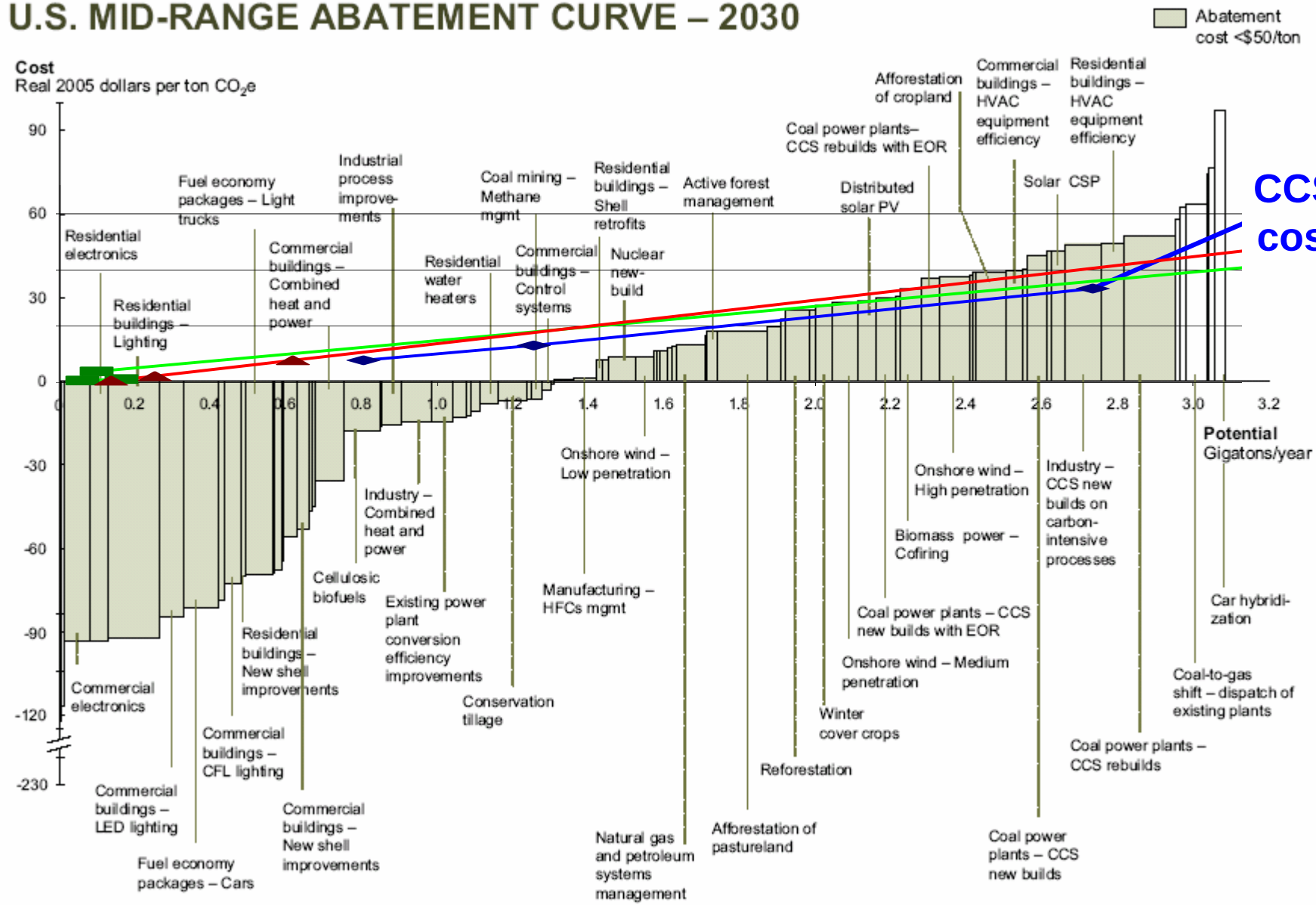
A Word on Negative Costs

- Energy efficiency gains that are already "cost effective"
  - Why not already done?
  - Will CO_2 pricing create incentives to do these actions now?
  - If not, what will?
- Spillovers from new technologies
  - New carbon saving technologies lead to other discoveries with net benefits.
  - Why does other research not do the same thing?

Exhibit B

U.S. MID-RANGE ABATEMENT CURVE – 2030



Source: McKinsey analysis

Summary on Costs

- **650 CO2e** would require \$5-35/tCO_2 prices in 2030 and cost less than 1% of income.
- **550 CO2e** would require \$50-100/tCO_2 prices in 2030 and cost 1-2% of income.
- We know very little about what it would cost to stabilize at **450 CO2e**
- All estimates assume perfect implementation over time, countries, sectors; otherwise, more expensive—easily several times more expensive

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