

Interim targets: Guideposts to reaching long-term climate change goals

Brian O'Neill
International Institute for Applied Systems Analysis
Laxenburg, Austria

Contributors:

James Wang & Bill Chameides, Environmental Defense
Michael Oppenheimer, Princeton University
Annie Petsonk, Environmental Defense
Ilkka Keppo & Keywan Riahi, IIASA

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Long-term Climate Change Policy Goals

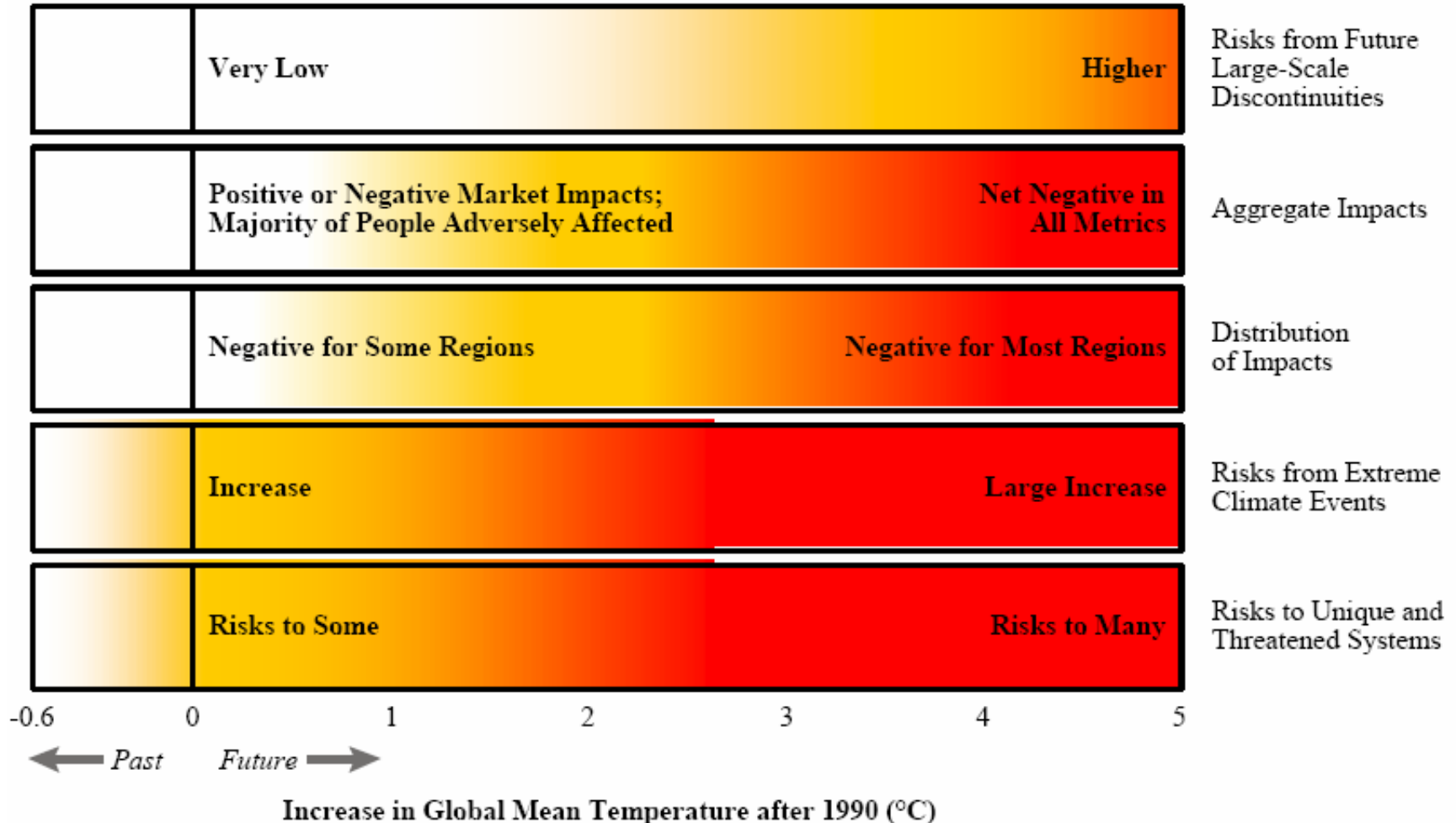
◆ 1992: Framework Convention

- Objective: "...stabilization of greenhouse gas concentrations concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."
- "...within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner."

Short-term Climate Change Policy Goals

- ◆ 1997: Kyoto Protocol
 - Legally binding emissions reductions targets for industrialized countries for 2008-2012
- ◆ 2001: Many details of flexible mechanisms agreed to at COP 10 in Marrakech
- ◆ 2005: Entry into force

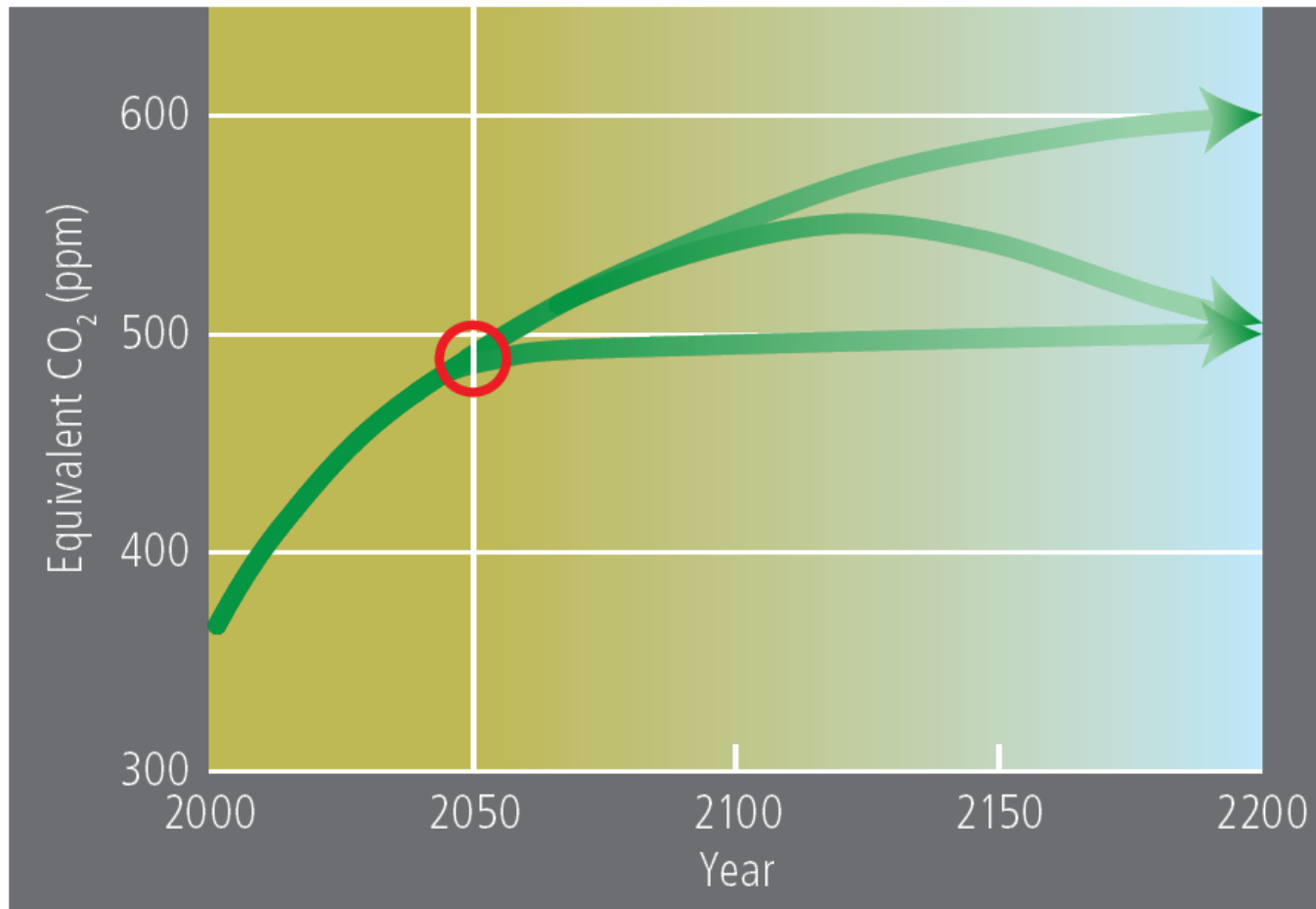
Dangerous interference: Criteria for Concern, IPCC



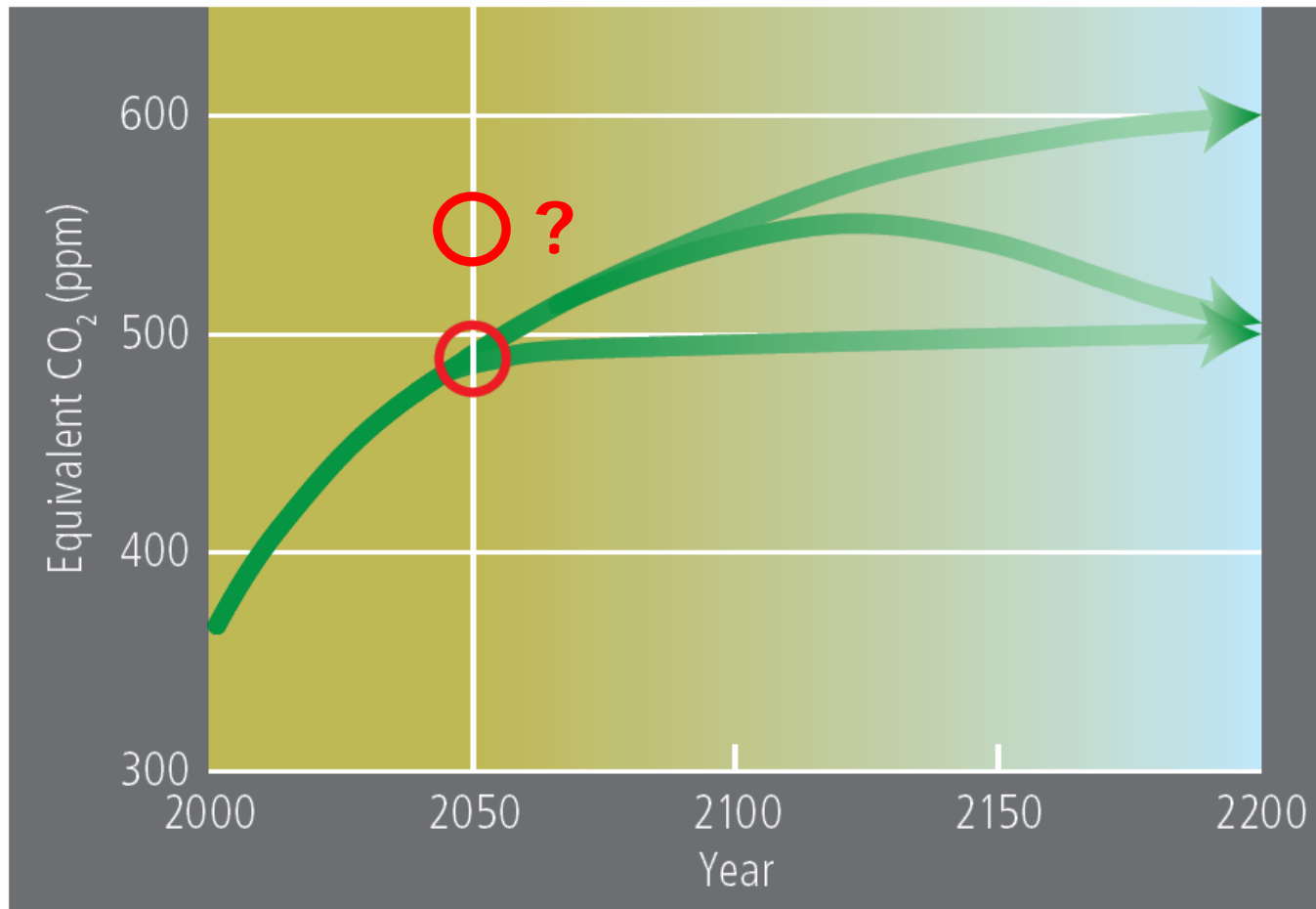
Problem

- ◆ Will be difficult (in the near future, impossible?) to agree on what level of climate change is “dangerous”
- ◆ Meanwhile,
 - we may commit ourselves to potentially dangerous *levels* of climate change
 - we may commit ourselves to potentially dangerous *rates* of climate change
 - we lack policy signals to guide decisions with long time horizons – exactly the kinds of decisions necessary for meeting long-term goals
- ◆ Short-term policies (e.g., Kyoto Protocol) do not sufficiently guard against these problems

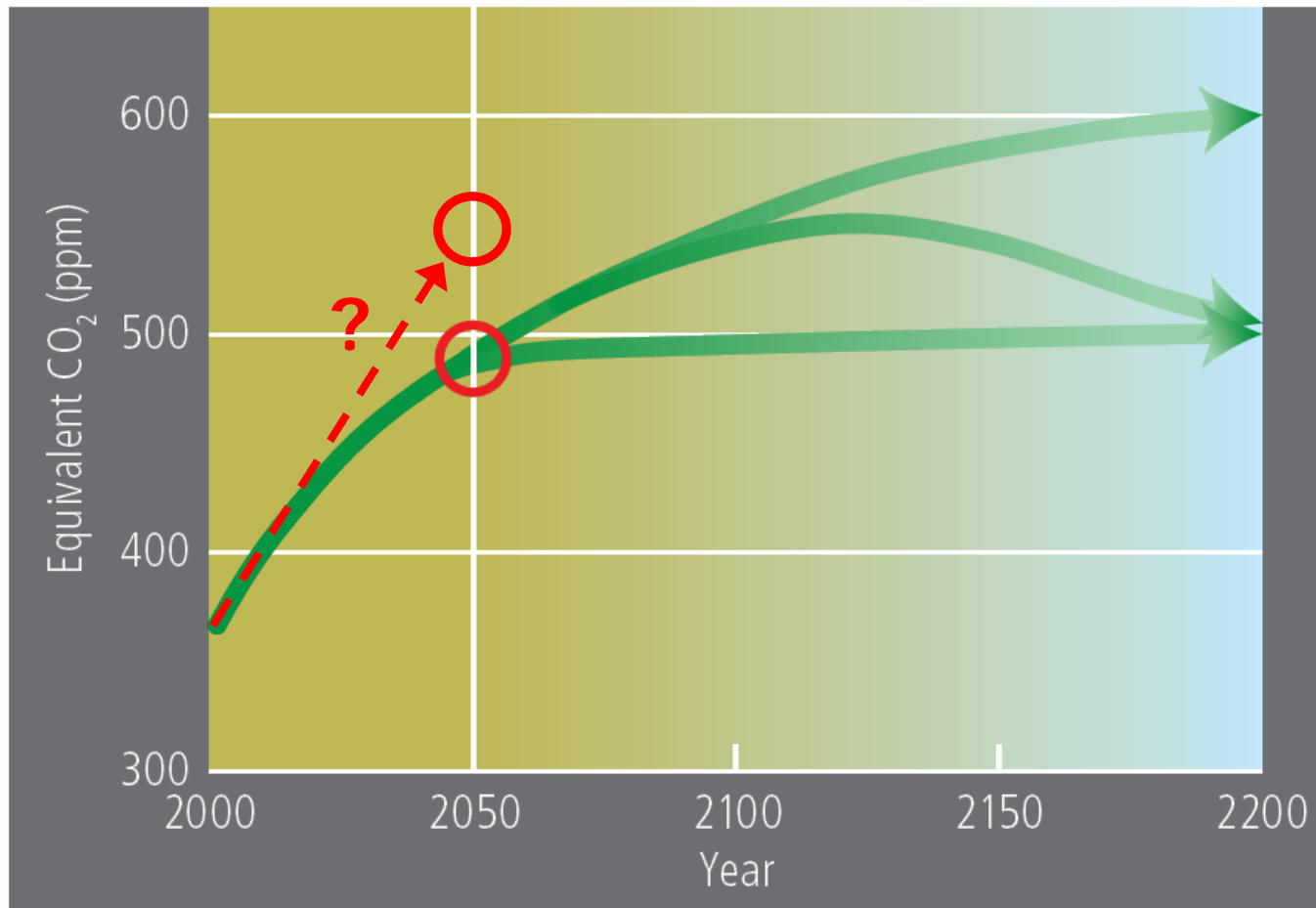
Proposal: Interim (Mid-Century) Concentration Targets



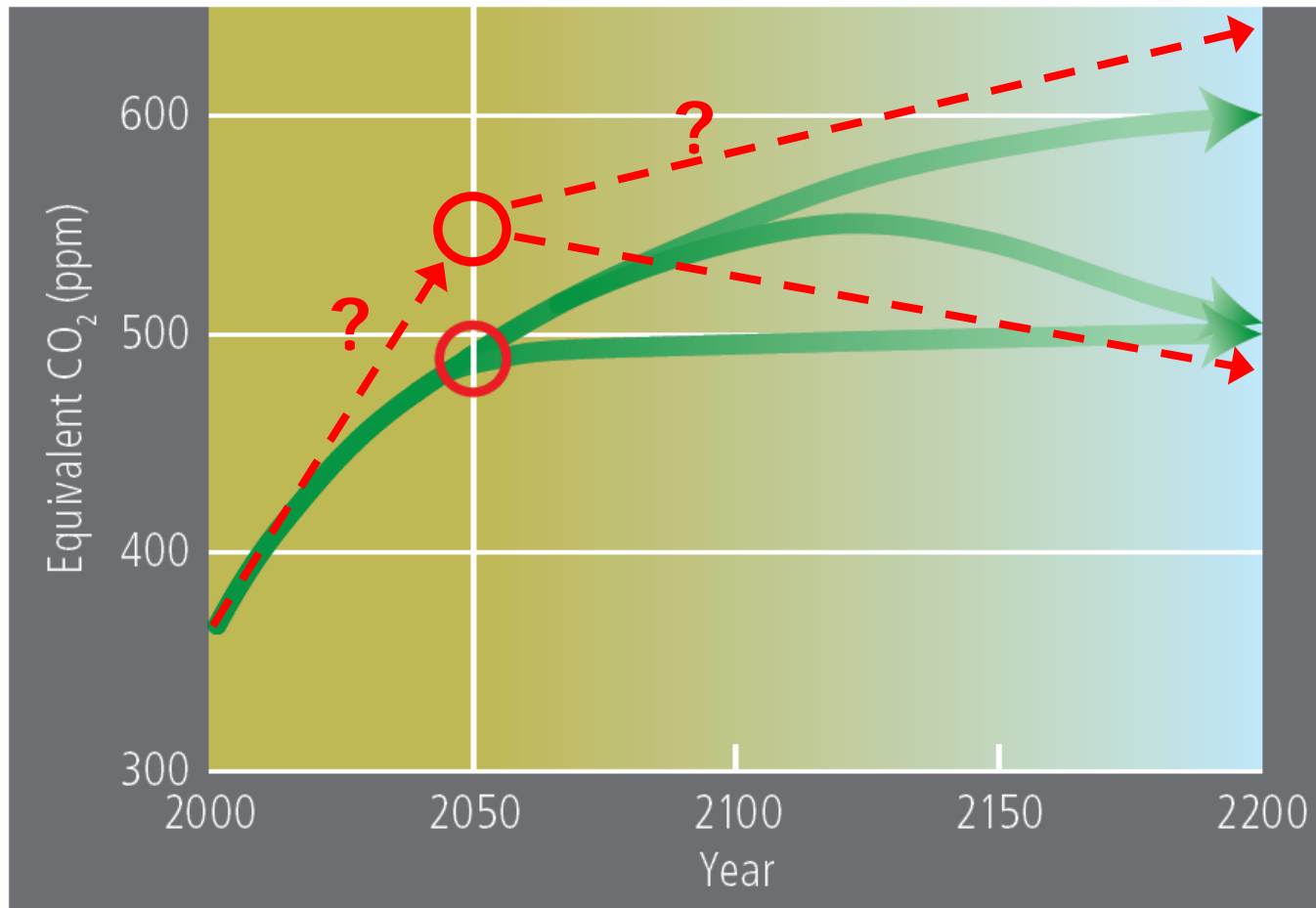
Proposal: Interim (Mid-Century) Concentration Targets



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Interim Concentration Targets

- ◆ Keep a range of century-scale targets feasible while uncertainties are narrowed
- ◆ Limit rates of climate change in the medium term
- ◆ Better inform multi-decade planning horizons
- ◆ May broaden grounds for agreement in policy discussions
- ◆ Would require periodic review and updating as new information became available
- ◆ **Does not imply any single policy regime for achieving it**

Interim Concentration Targets

- ◆ Targets could take range of forms, from weak to strong:
 - Evaluation framework for climate policy proposals
 - Informal aspirational goal(s)
 - Formal targets under Convention/Protocol regime
 - ◆ Integrating point for parallel policy regimes?

Why Concentrations?

- ◆ Balances uncertainty in consequences with uncertainty in required mitigation activity

activities -> emissions -> **concentrations** -> climate change -> impacts

- ◆ Easier to detect progress toward concentration goal than temperature goal
- ◆ Equivalent CO₂ integrates across multiple gases

Why Mid-Century?

- ◆ Psychologically tractable
- ◆ Political precedents (GATT/WTO, Social Security)
- ◆ Long enough to affect rates of temperature change, short enough to constrain them
- ◆ Consistent with timescale of long-lived capital

Related Proposals or Analyses

- ◆ Medium-term emissions goals by countries (e.g., UK) or states (e.g., California)
- ◆ Global emissions goals (Corfee-Morlot and Hoehne, 2003; Pacala and Socolow, 2004)
- ◆ Technology needs in medium term (Hoffert et al., 2002; Pershing and Tudela, 2003)
- ◆ Recent policy proposals:
 - WBCSD (Nov. 2006): mid-century global emissions goal
 - GROCC (Feb. 2007): “ambitious but achievable” mid-century CO₂ concentration target

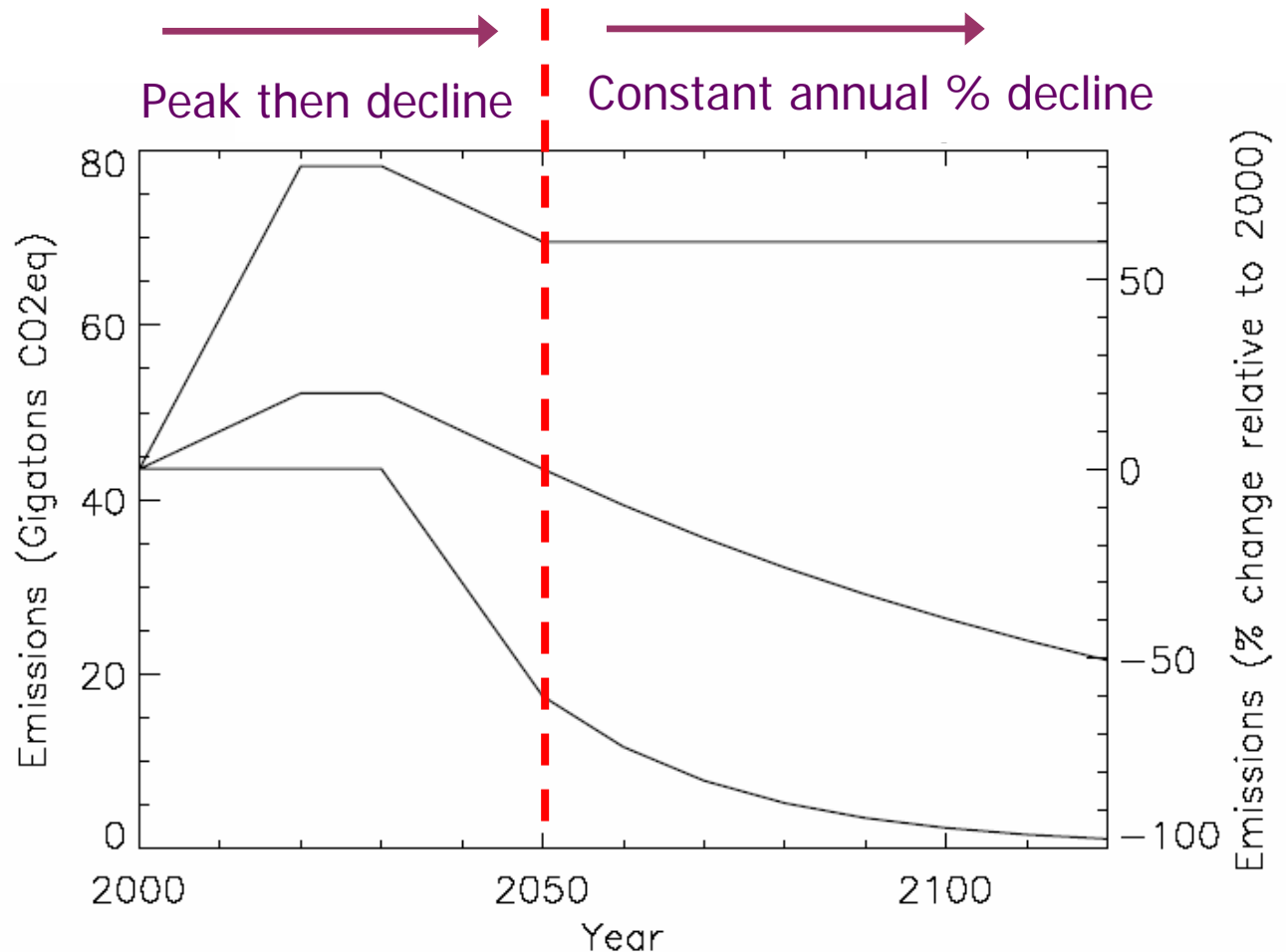
Constraining Rates of Change

Rate of Temperature Change

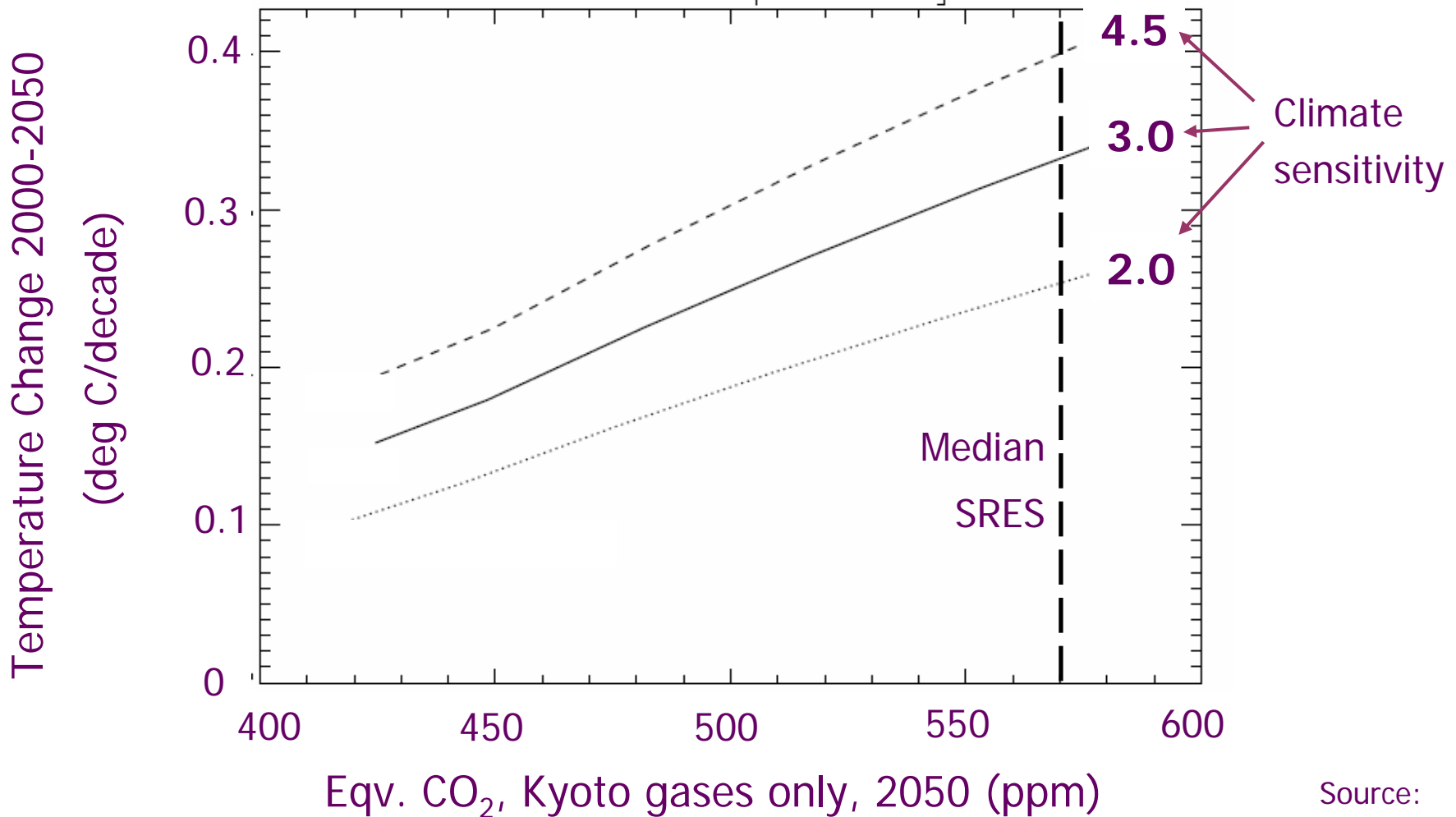
- ◆ Different pathways to same long-term stabilization level imply substantially different rates of warming in the interim period
- ◆ Differences in rates of warming are large enough to be of concern for impacts that might be considered “dangerous”
- ◆ Examples: Thermohaline circulation shutdown, ecosystem impacts.

Illustrative Emissions Pathways

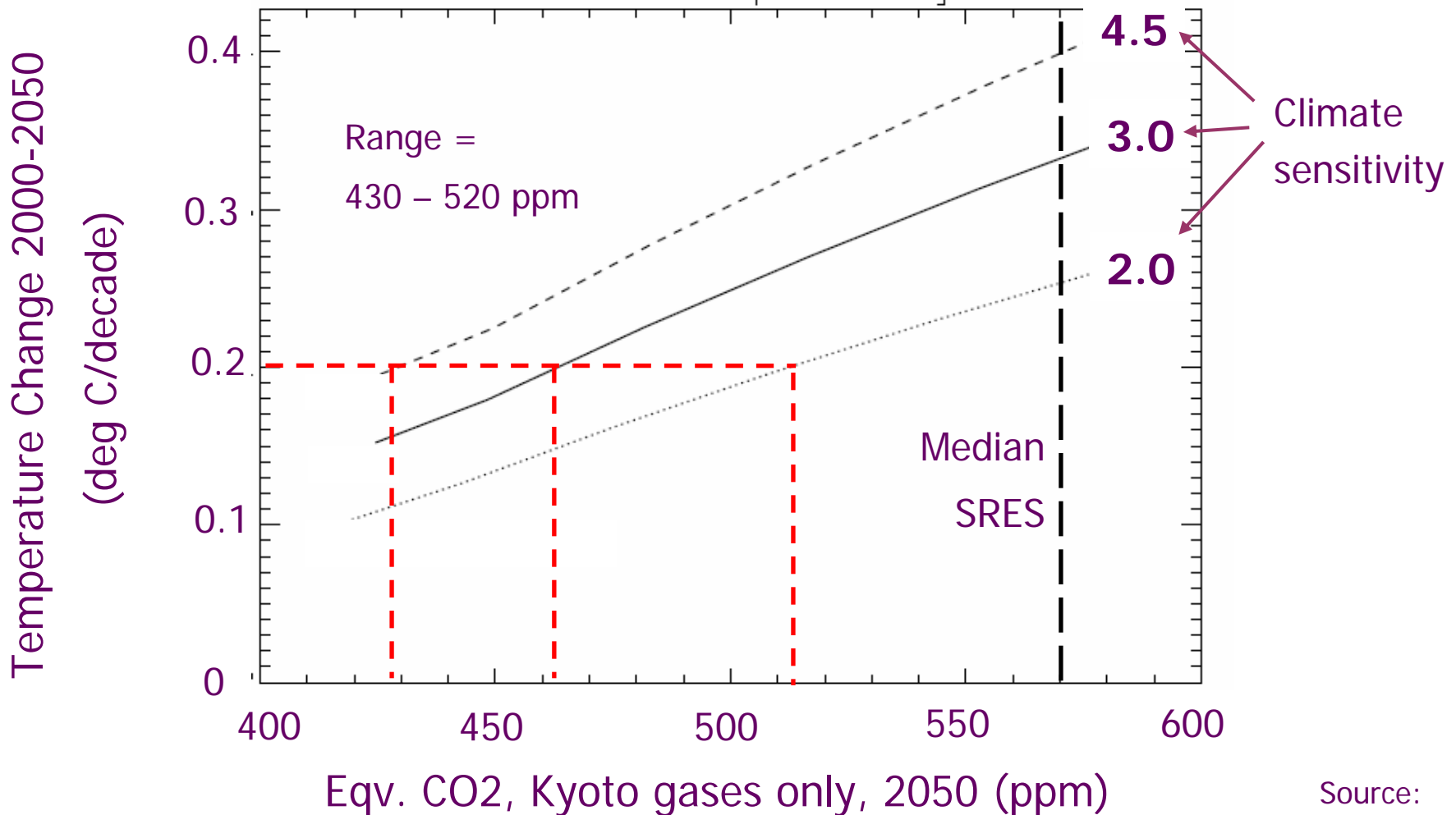
- ◆ Peak then decline pathway for Kyoto gases
- ◆ Non-Kyoto gases follow median of SRES scenarios
- ◆ A range of concentration targets achieved in 2050



Rate of Change vs. 2050 Target

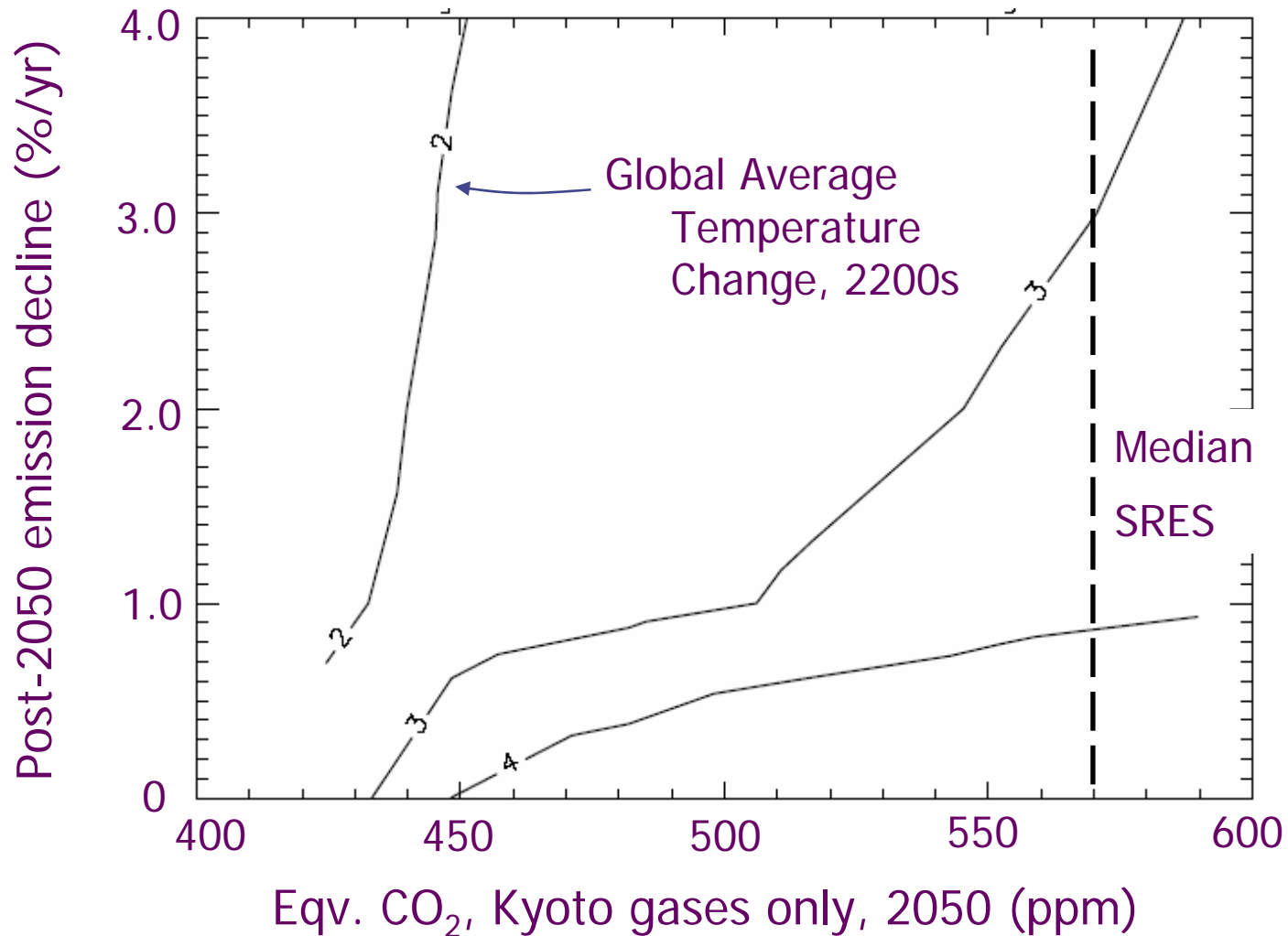


Rate of Change vs. 2050 Target

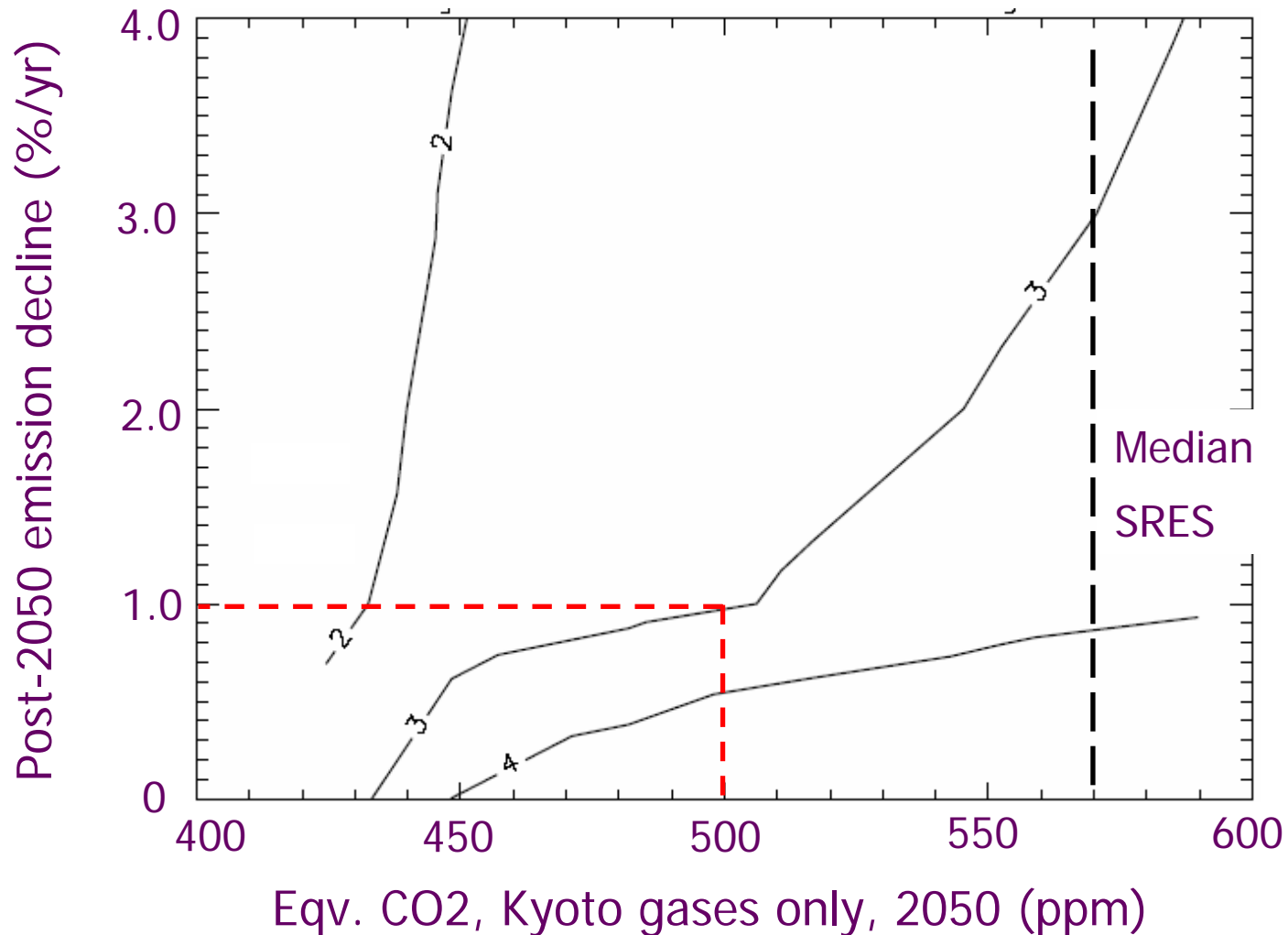


Keeping Long-Term Options Open: Exploring Atmospheric Pathways

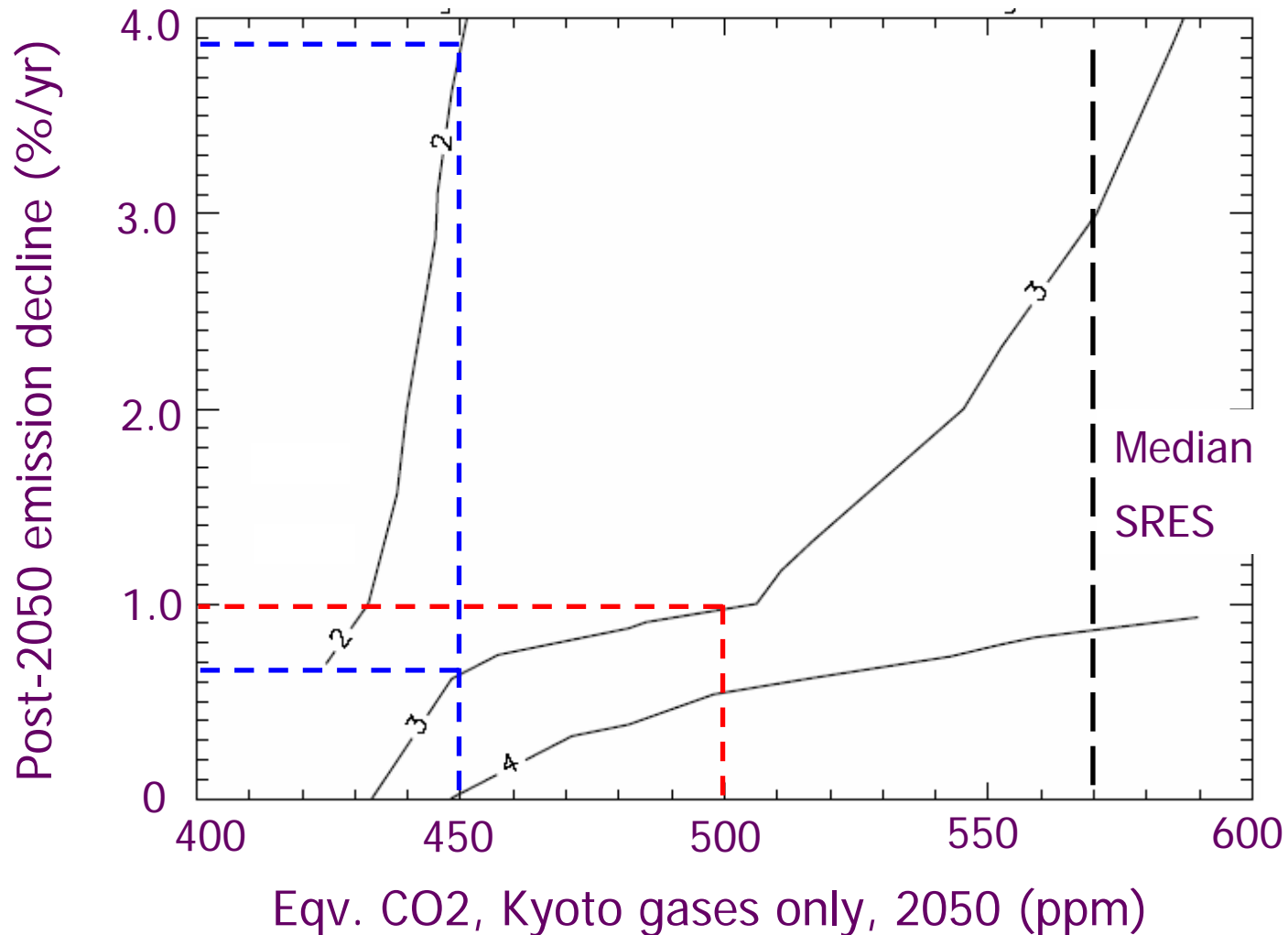
Interim Targets and Long-Term Temperature Change



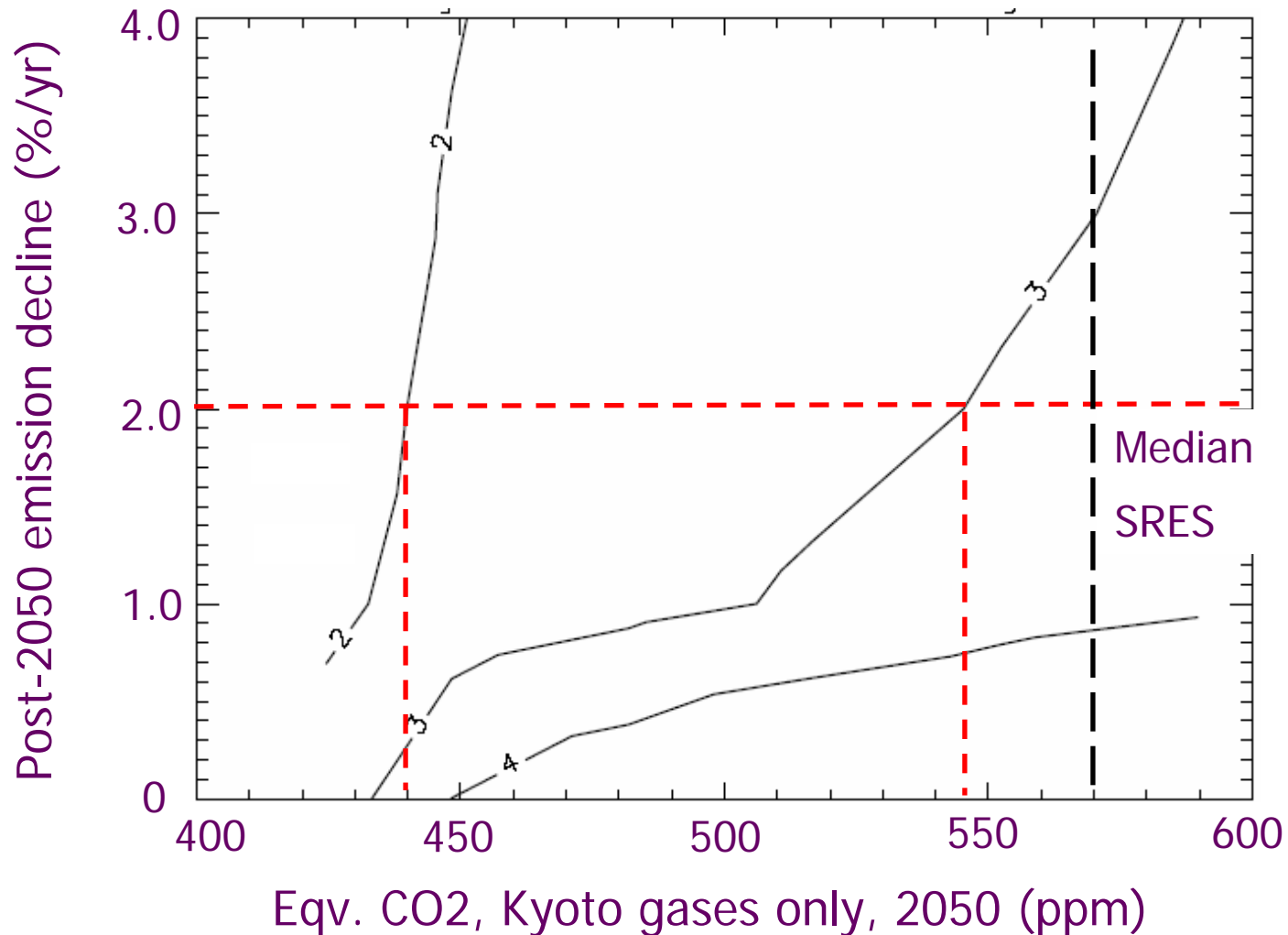
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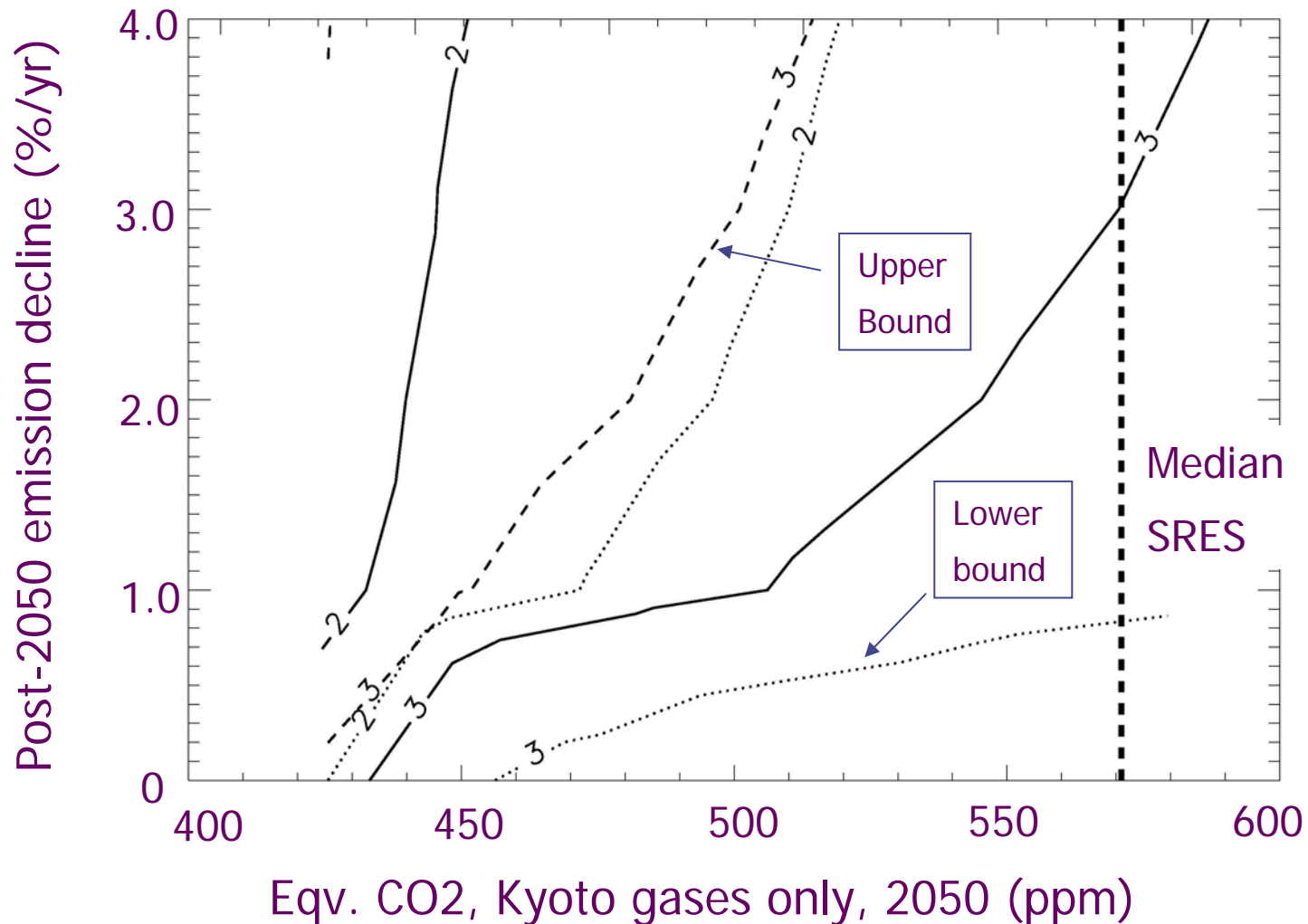
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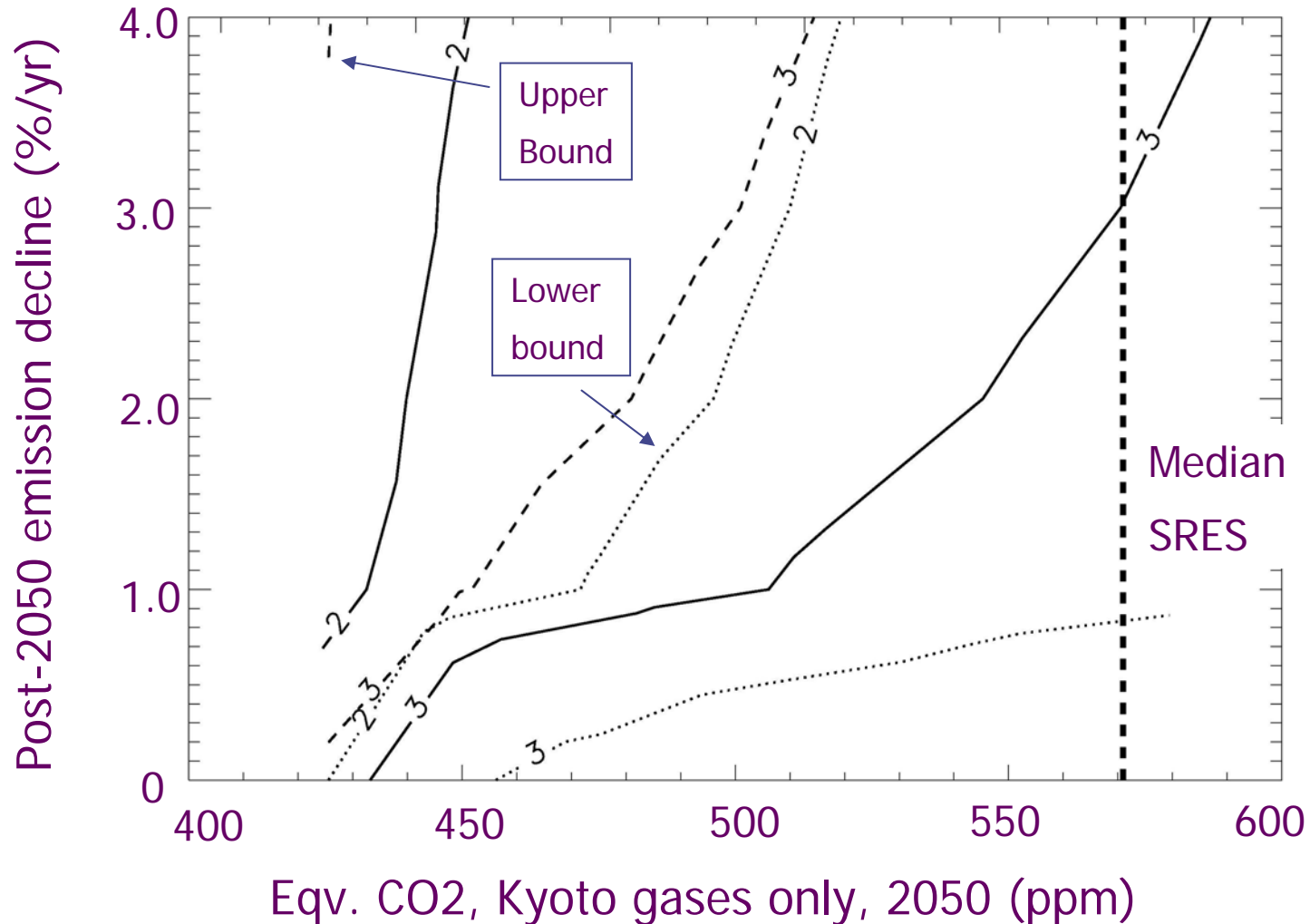
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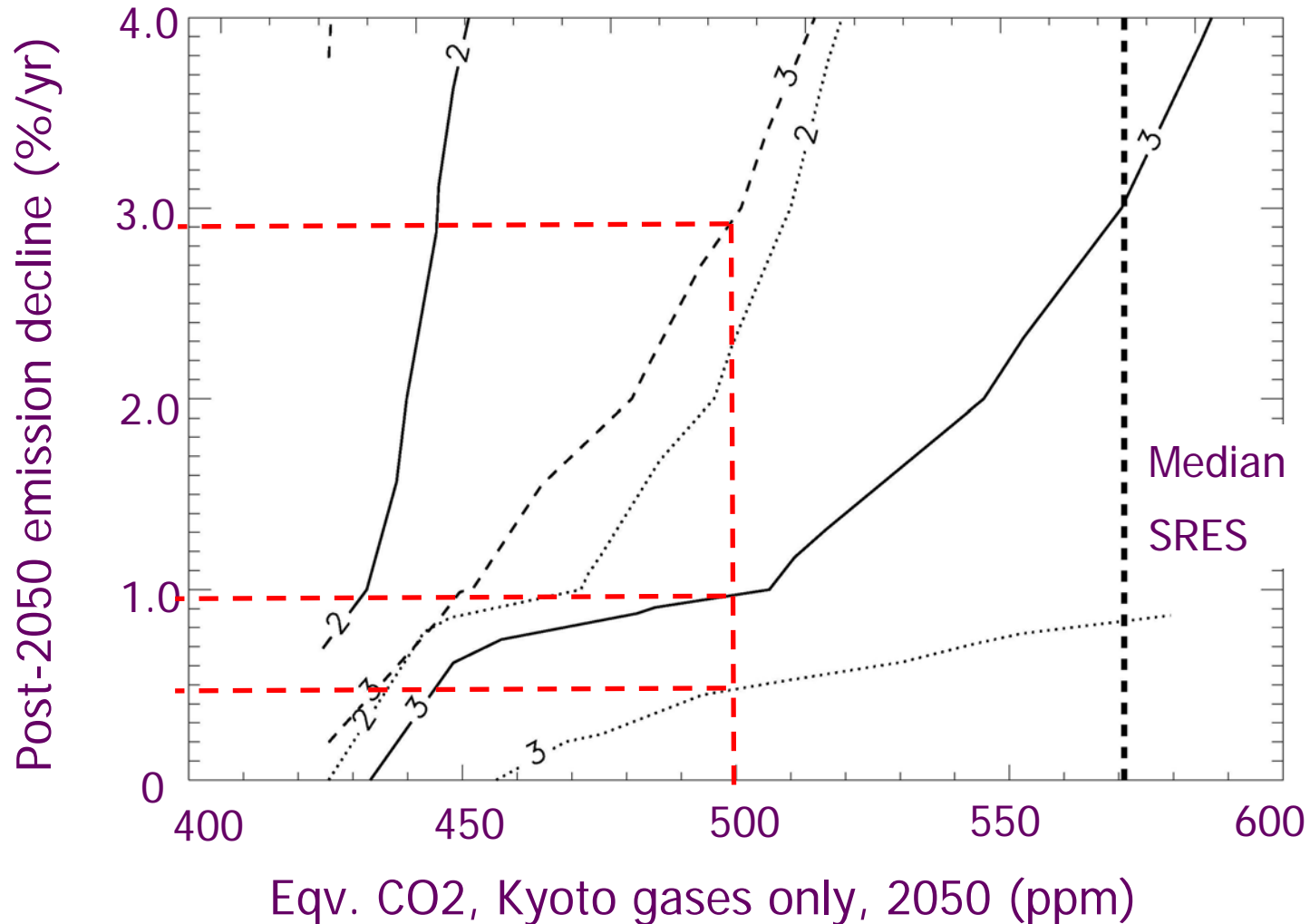
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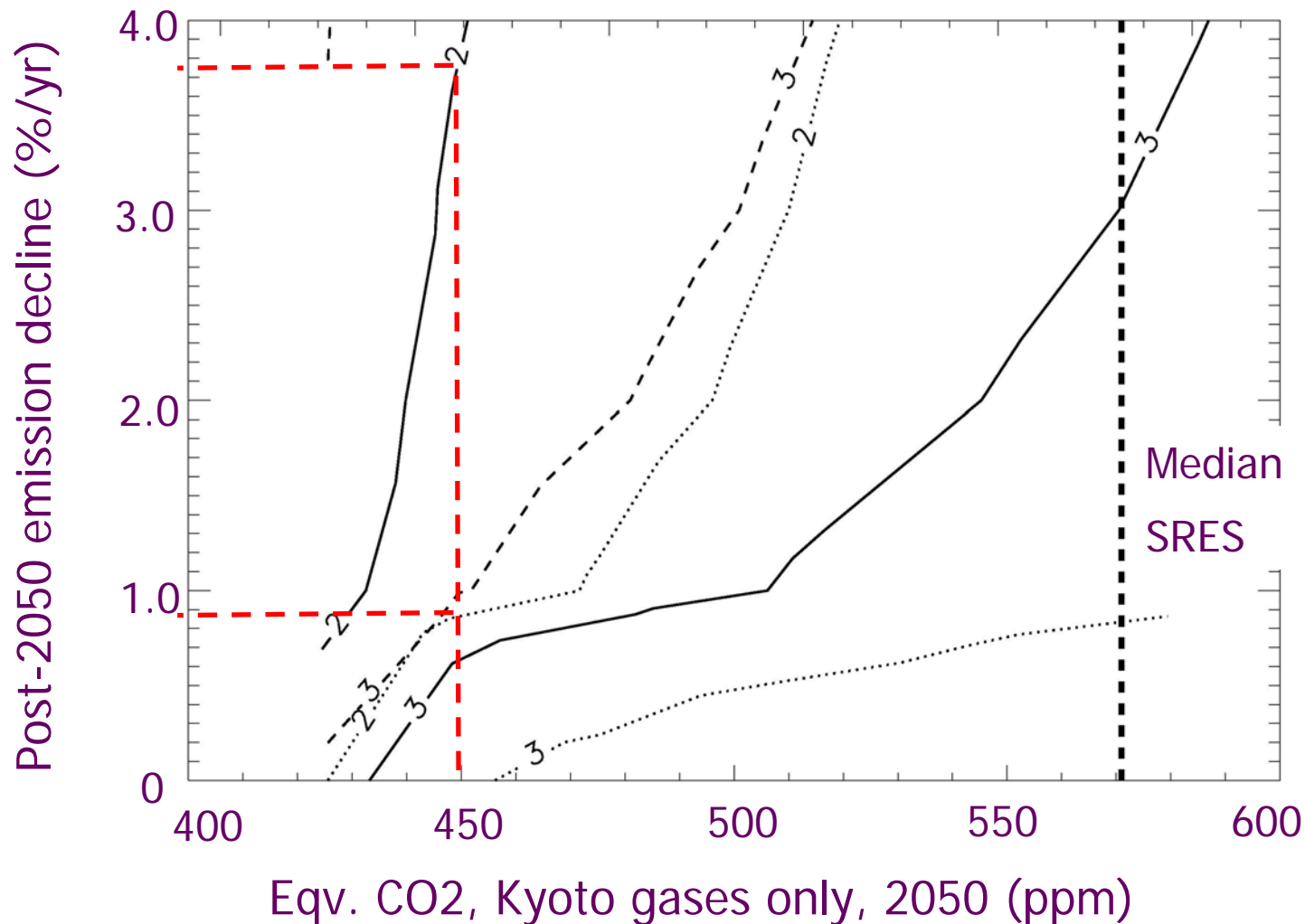
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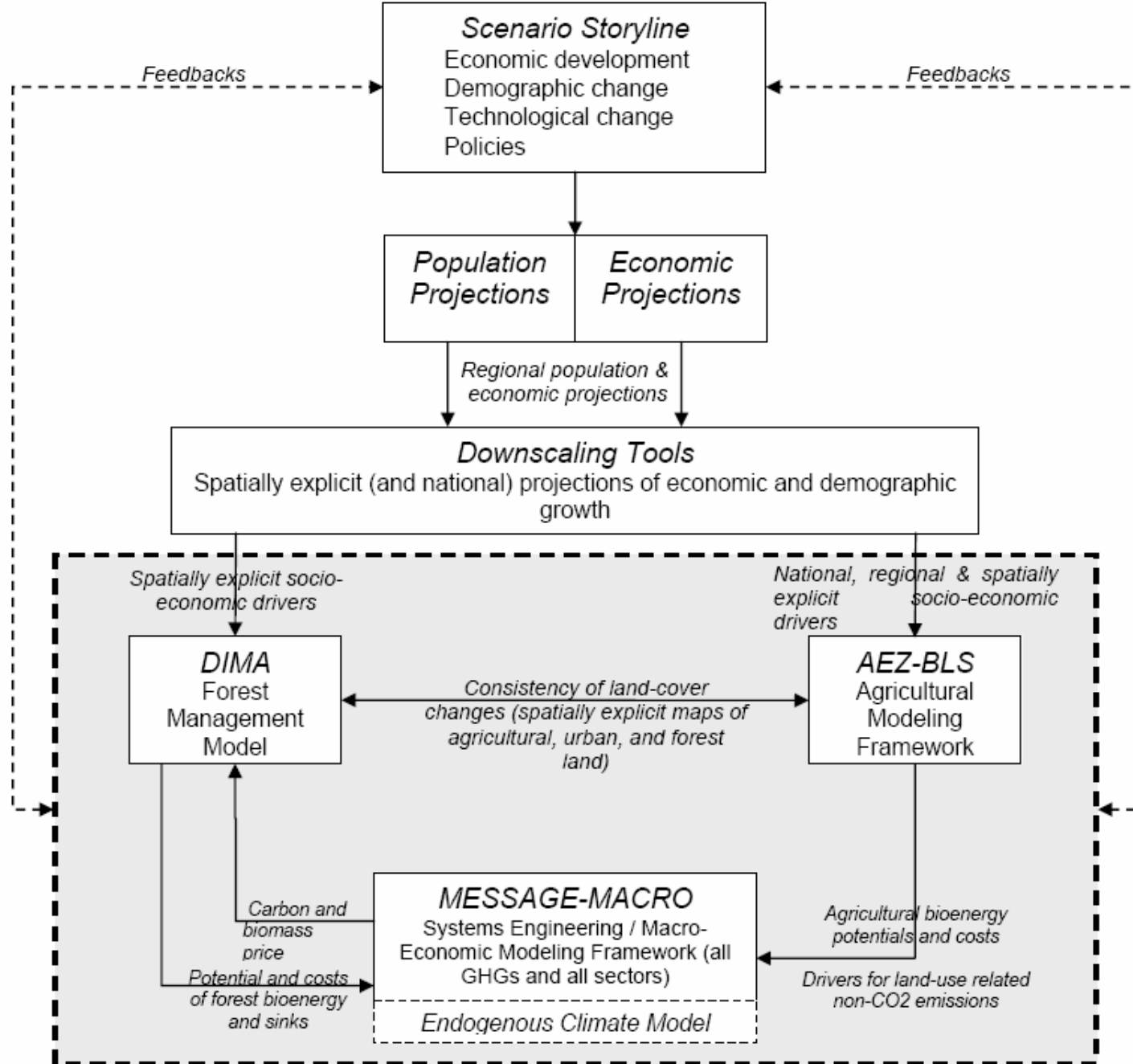
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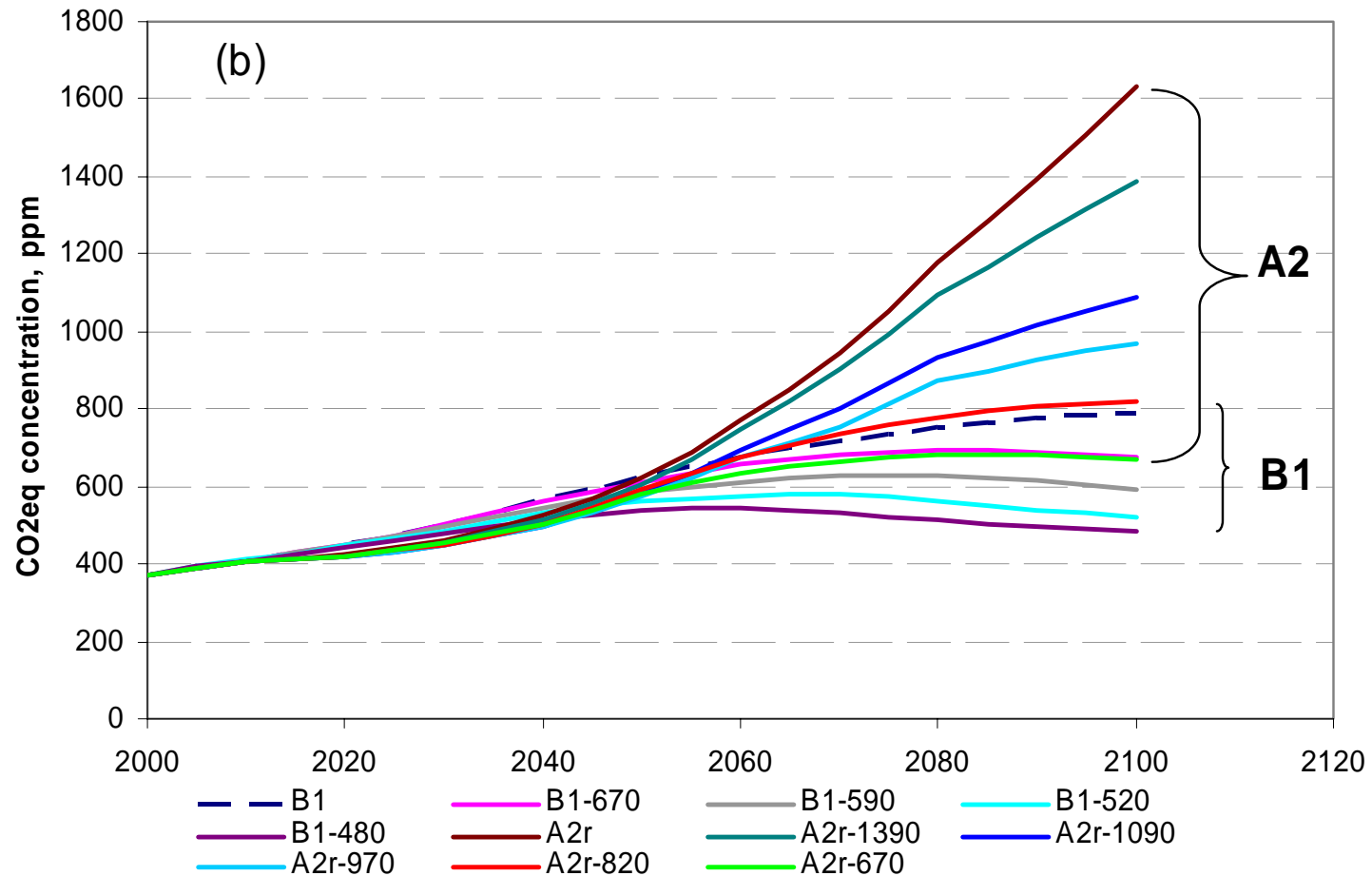


Keeping Long-Term Options Open: What Kind of Target?

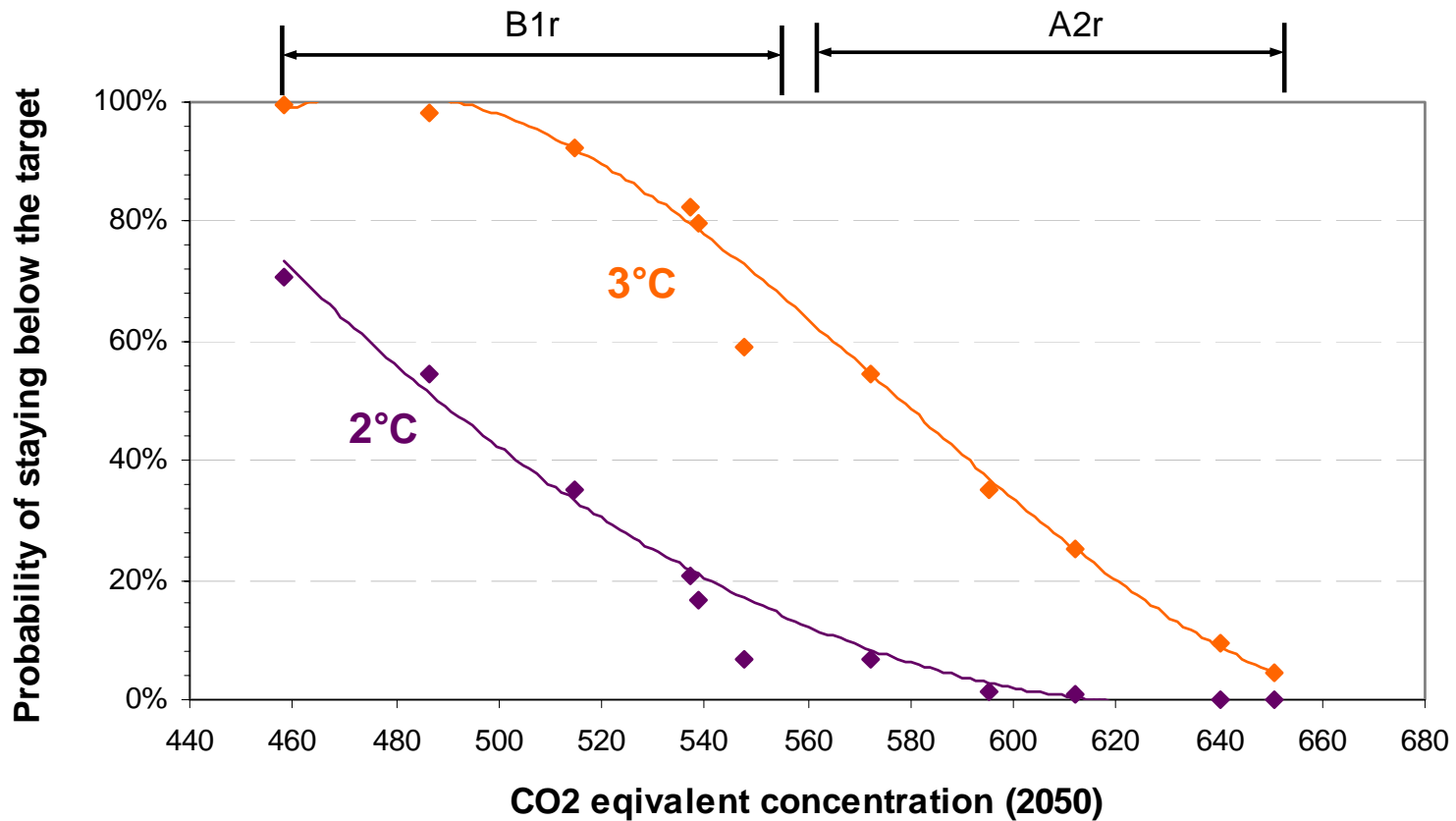


IIASA Integrated Assessment Framework

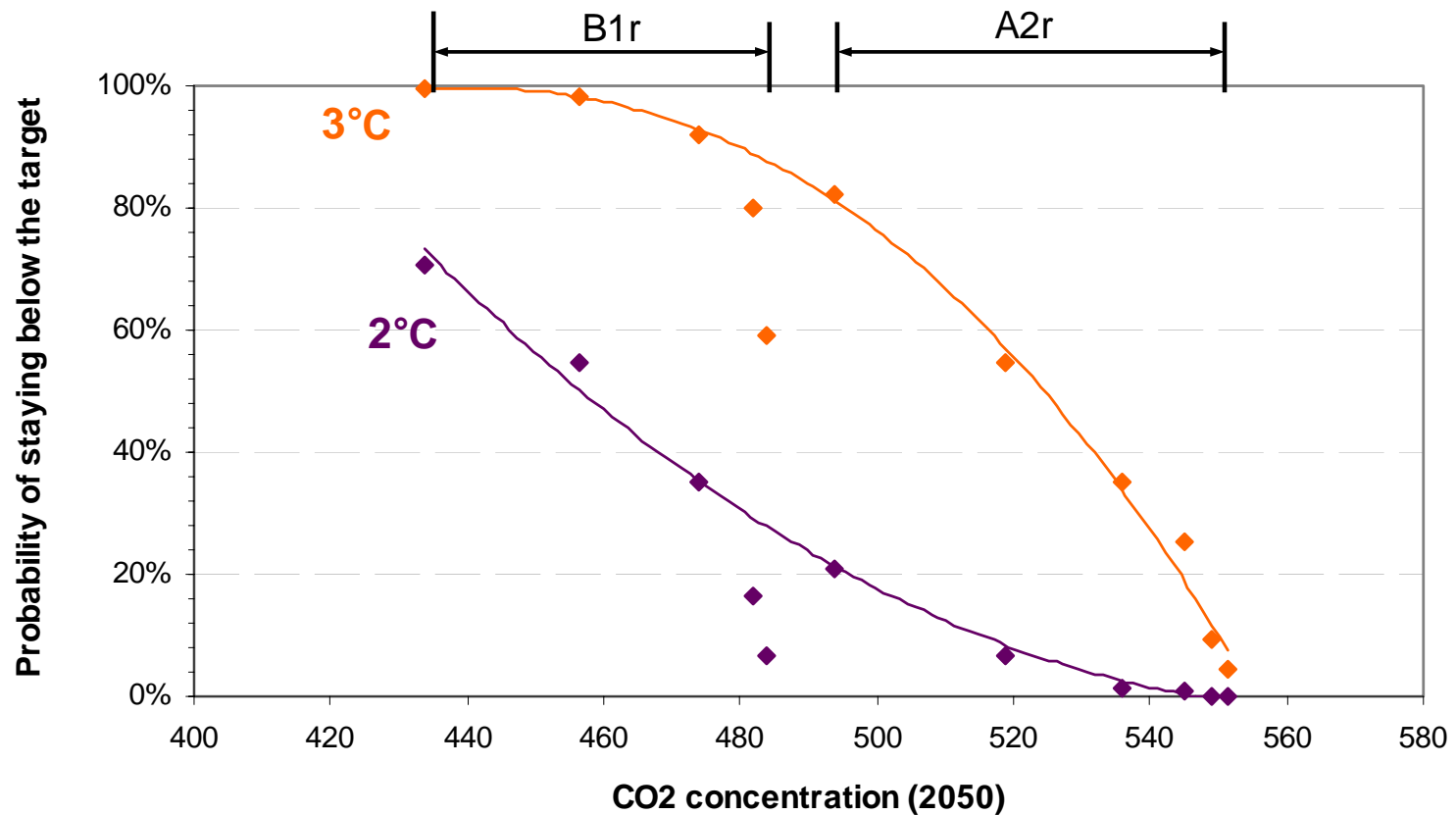
Medium-term Conditions in GGI Mitigation Scenarios



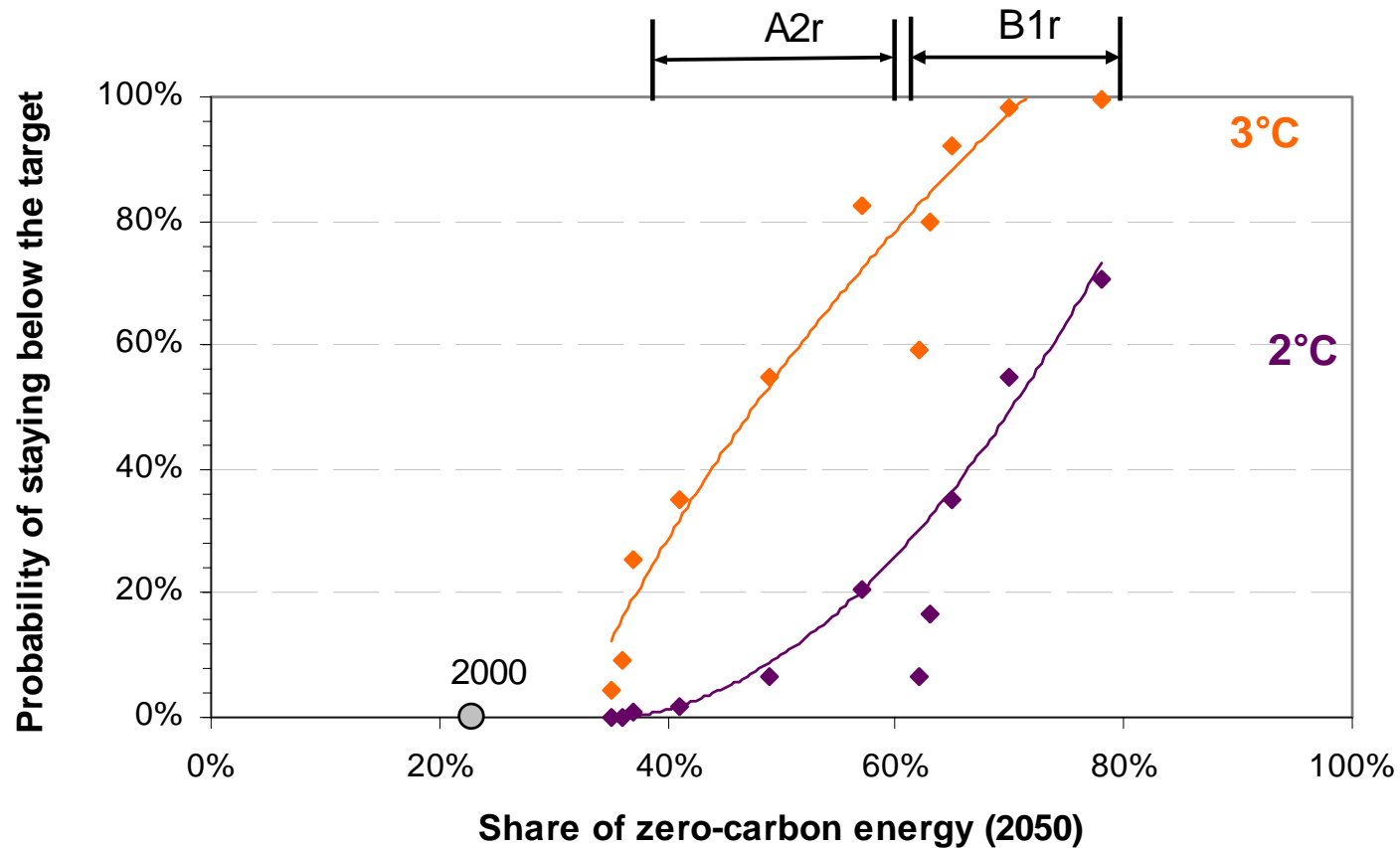
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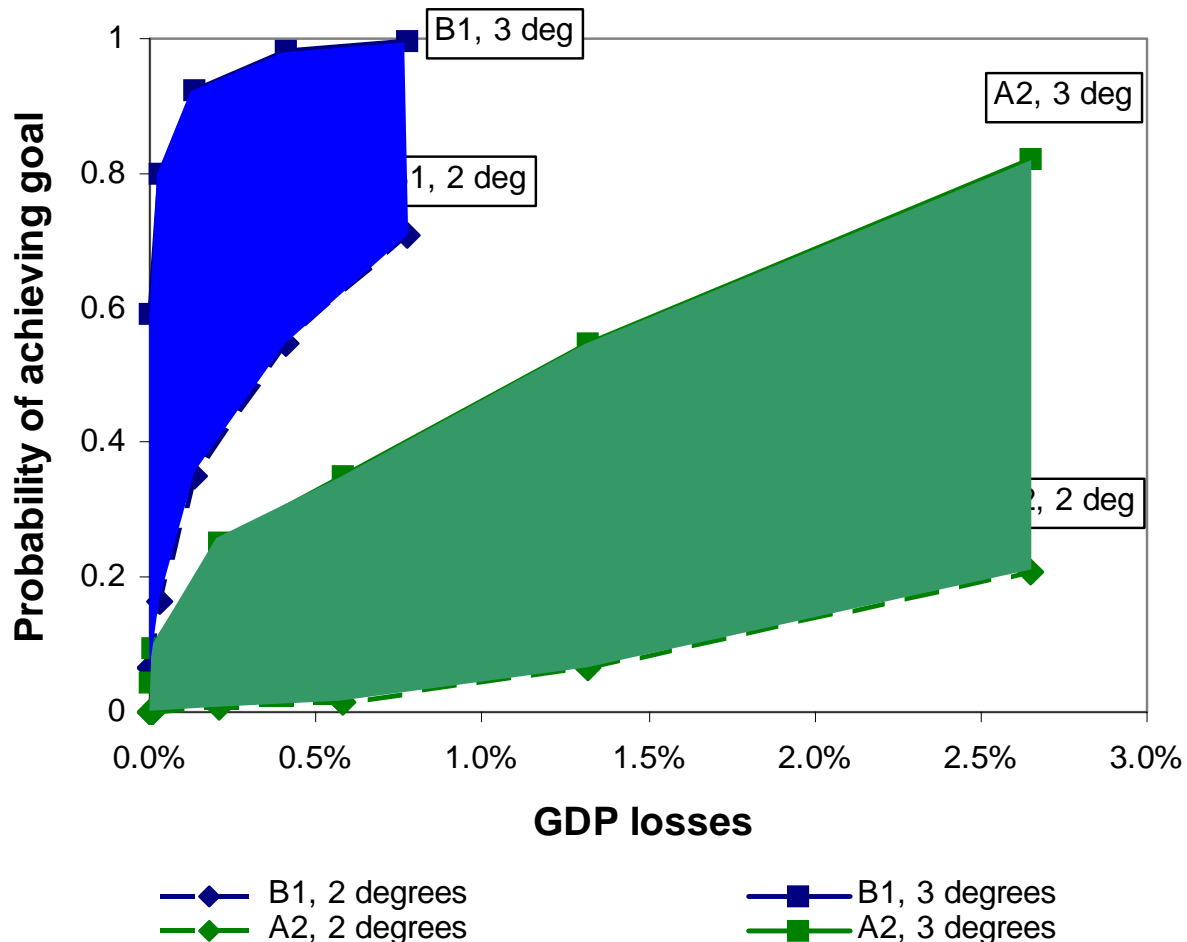


Conclusions

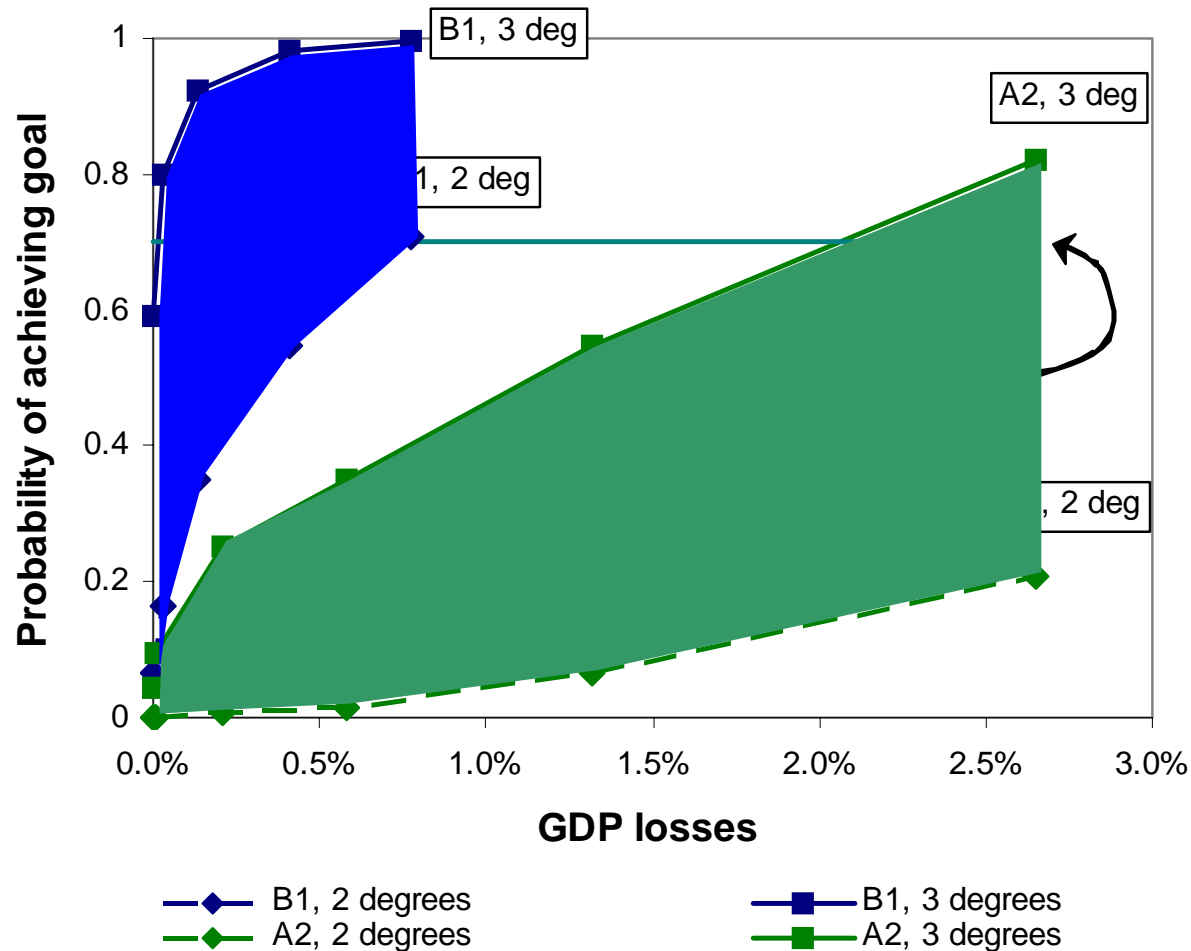
- ◆ An interim target could constrain rates of temperature change and preserve long-term options, serving as a bridge to a longer term climate goal
- ◆ Target setting plus regular review could serve as important anchor for medium-term policy expectations, facilitating long-term investments
- ◆ A globally-agreed interim target could serve as means of integrating across a fragmented international policy regime
- ◆ Useful additional analysis:
 - Implications of different metrics for an interim target: what medium-term conditions would position us best for the second half of the century?
 - Costs and political feasibility of different interim targets
 - Implications of interim targets for shorter-term actions

Mitigation Costs of Interim Targets: Research Needs

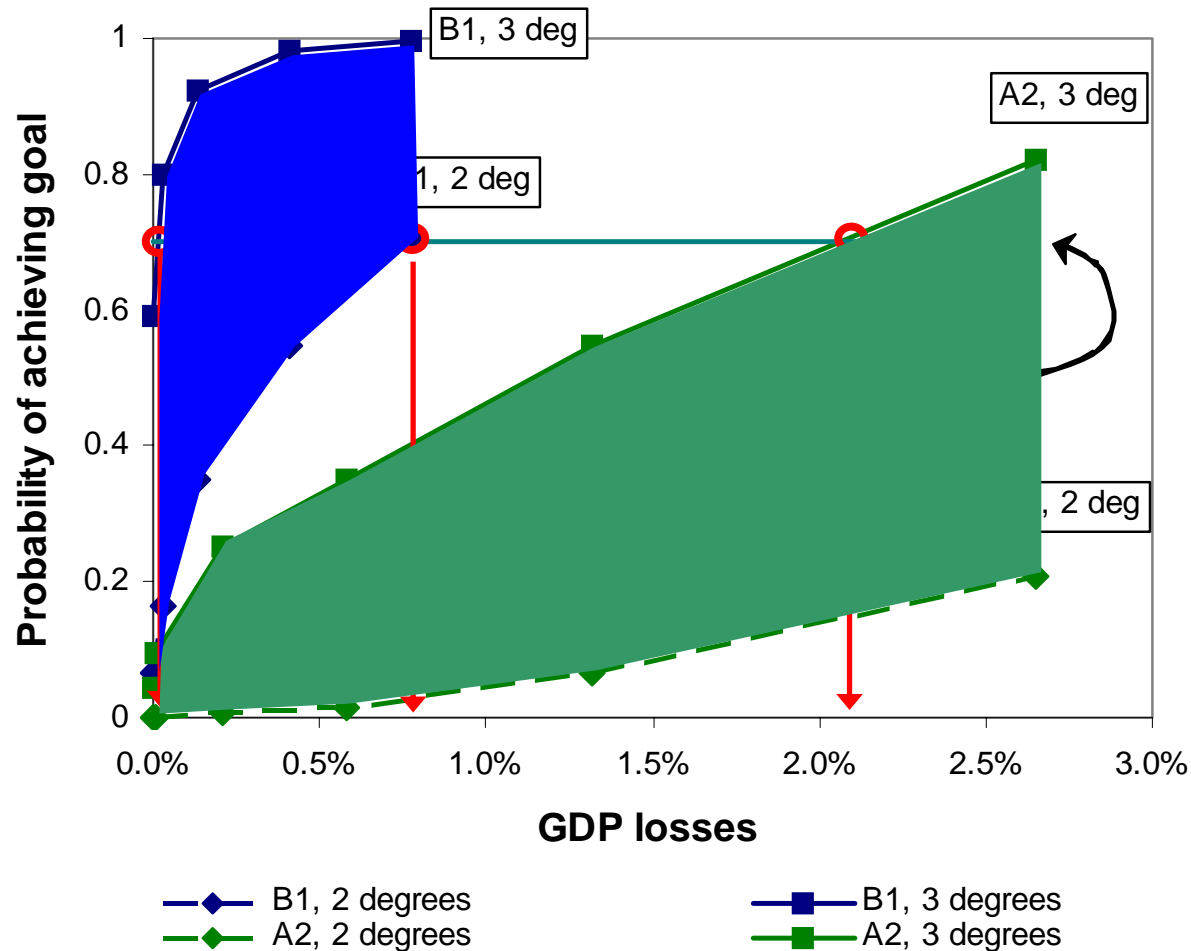
Costs in GGI Mitigation Scenarios



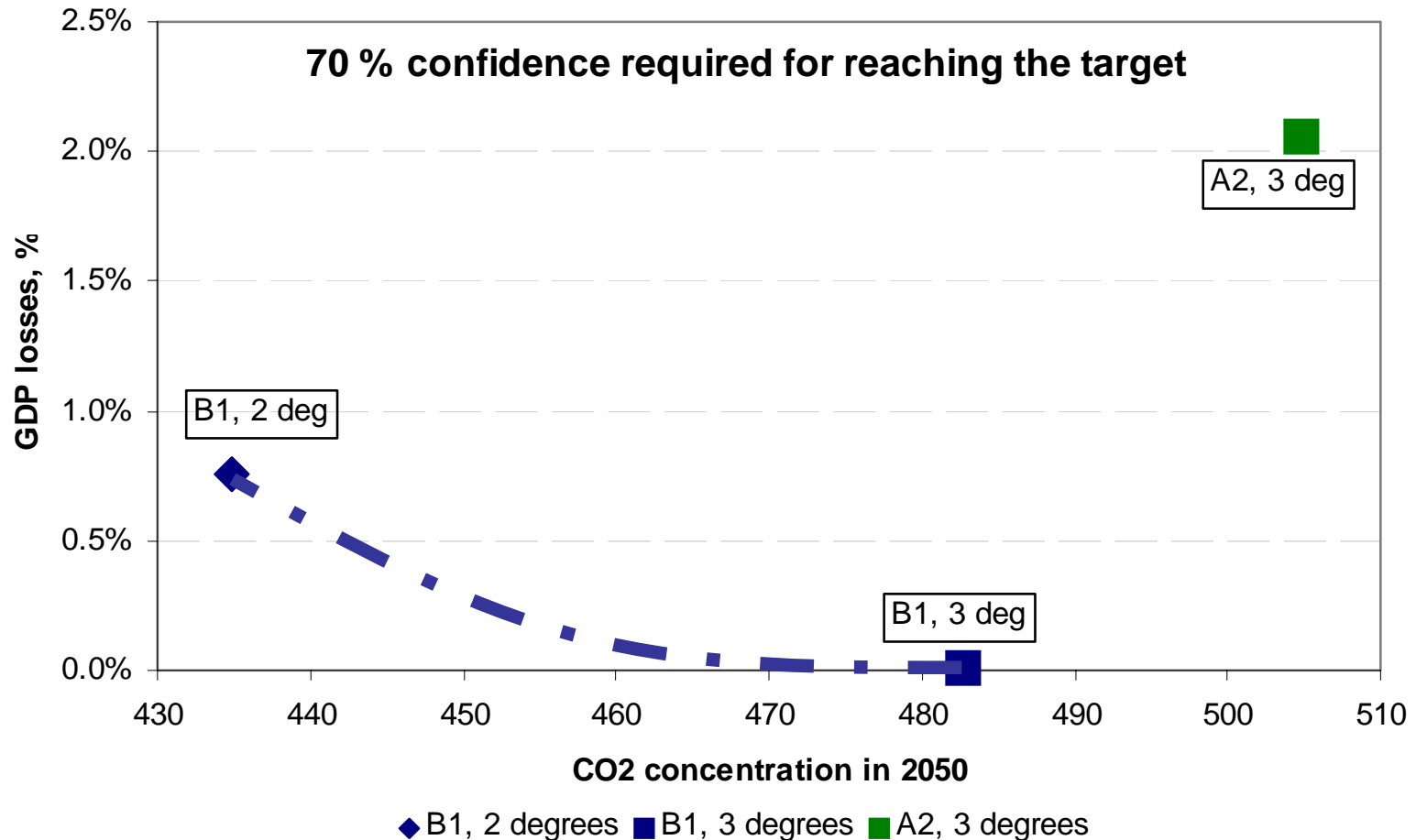
Costs in GGI Mitigation Scenarios



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Costs of Interim Targets



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