The Impact of Demographic Change on Carbon Emissions

Presented by:

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Based on work by:

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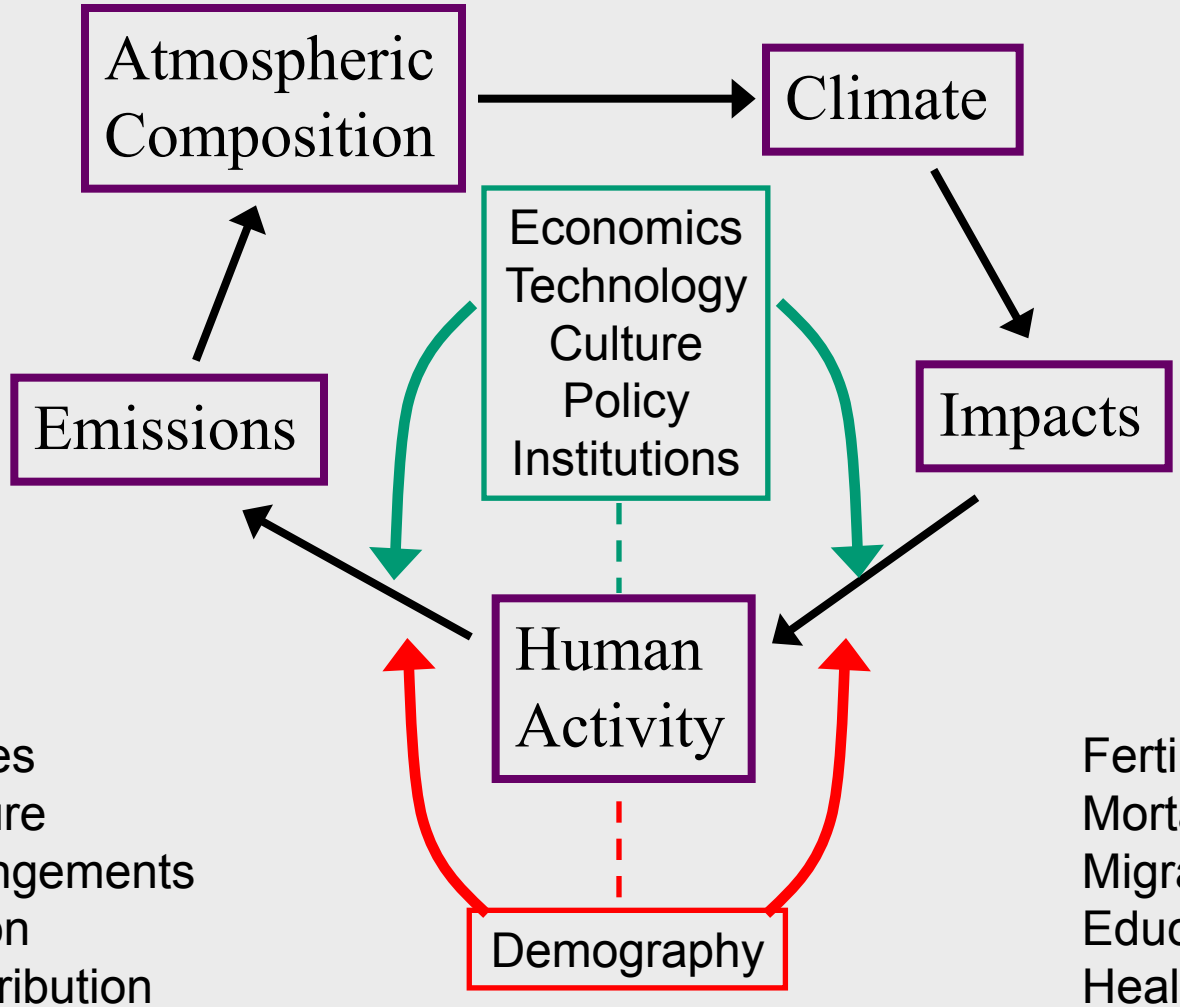
Take-Home Messages

Demography – including urbanization – matters to anticipating future demand for energy and associated carbon emissions

Slower population growth would not solve the climate problem, but would make the job easier

Population and Climate Change



Growth rates
Age structure
Living arrangements
Urbanization
Spatial distribution

Fertility
Mortality
Migration
Education
Health

Types of Population-Emissions Studies

Analyzing historical relationships

How have demographic factors influenced past trends in greenhouse gas emissions?

Population growth, urbanization, and aging have all influenced past emissions trends

Estimating effect of a single birth and descendants

What are the emissions associated with the activities of a single person over his or her lifetime, plus the activities of descendants?

Modeling future scenarios

How would different future population outcomes affect emissions?

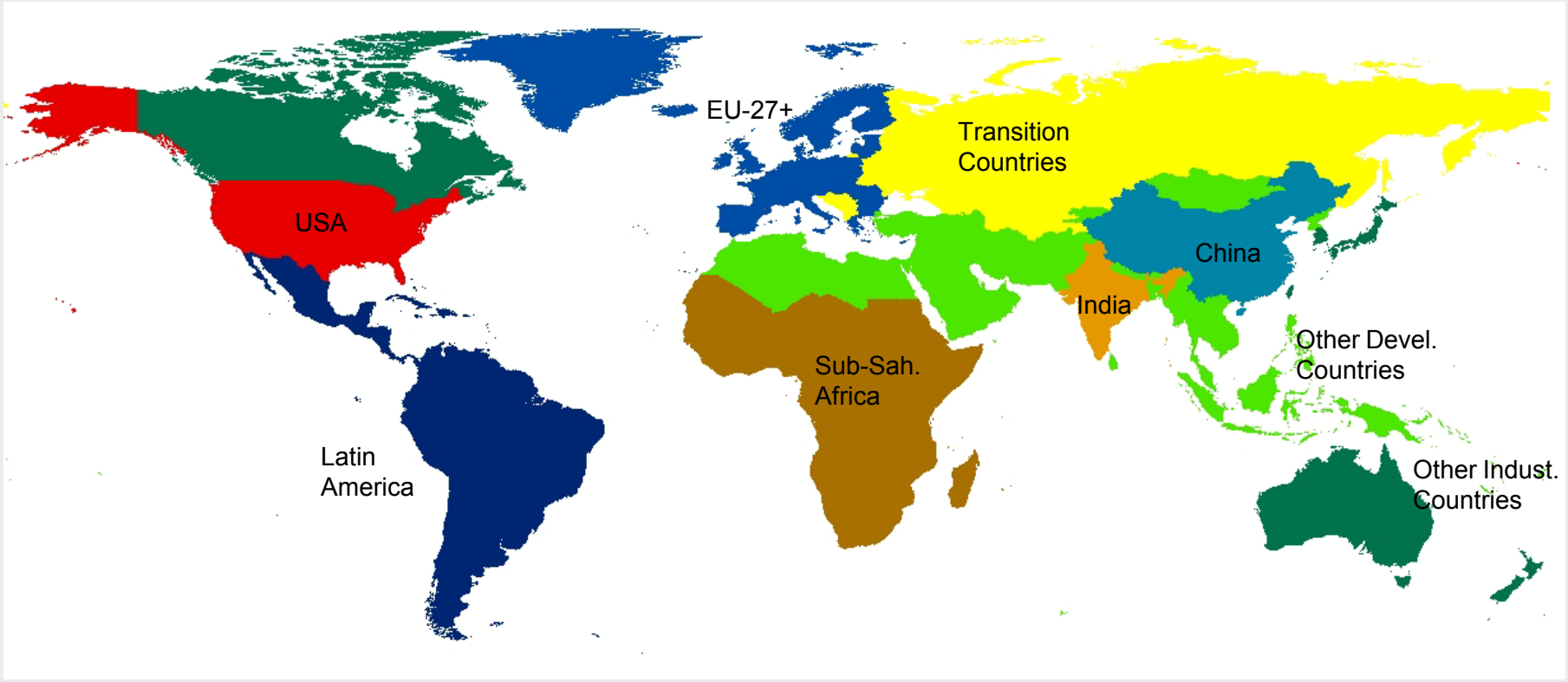
Our Analysis

“Integrated Assessment Model”

Long-term population/household projections

100-year emissions scenarios

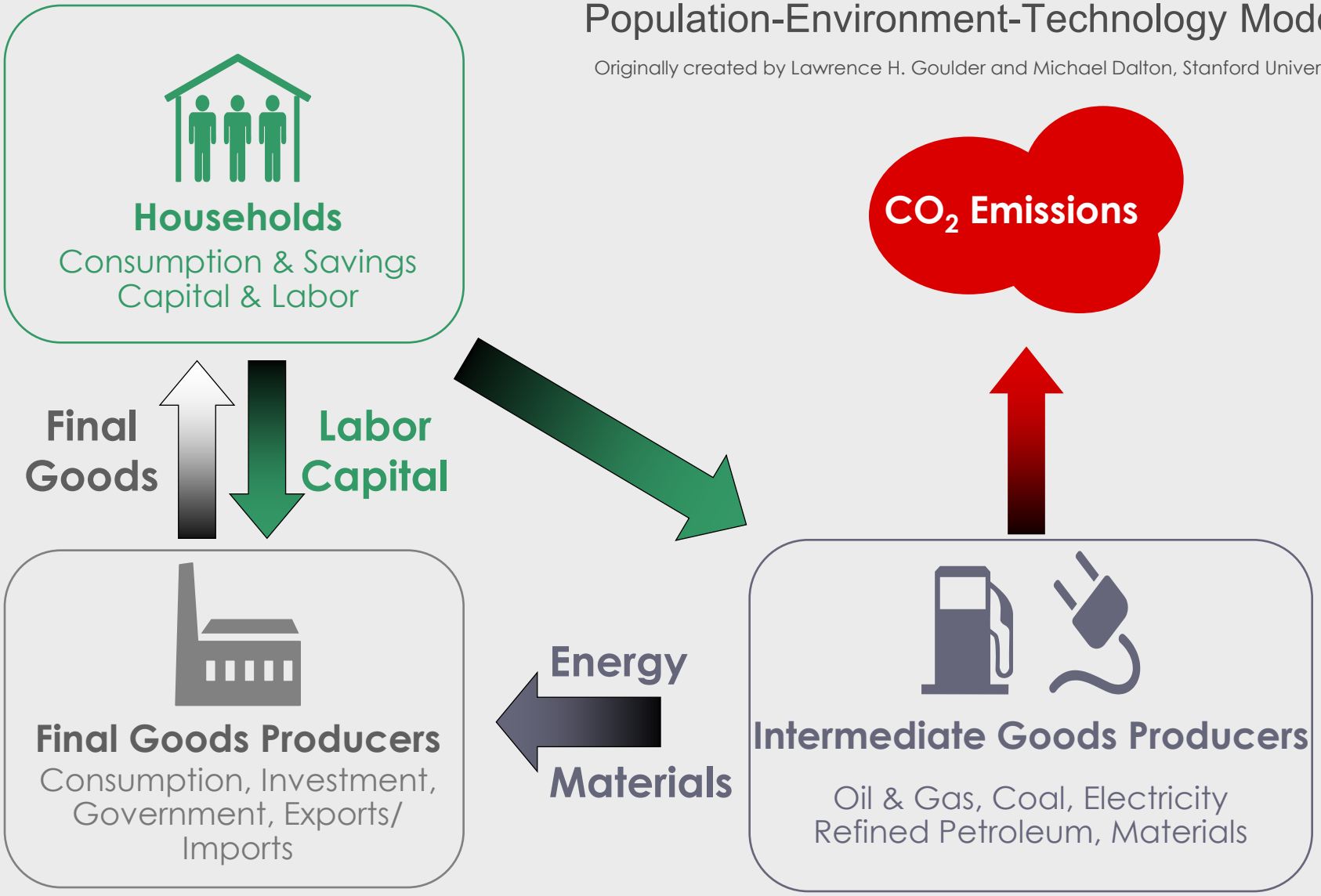
9-Region Model, with Trade



PET Model

Population-Environment-Technology Model

Originally created by Lawrence H. Goulder and Michael Dalton, Stanford University



What's "in" the model

Population growth rate → Per capita economic growth rate

Aging/Urbanization → Economic growth

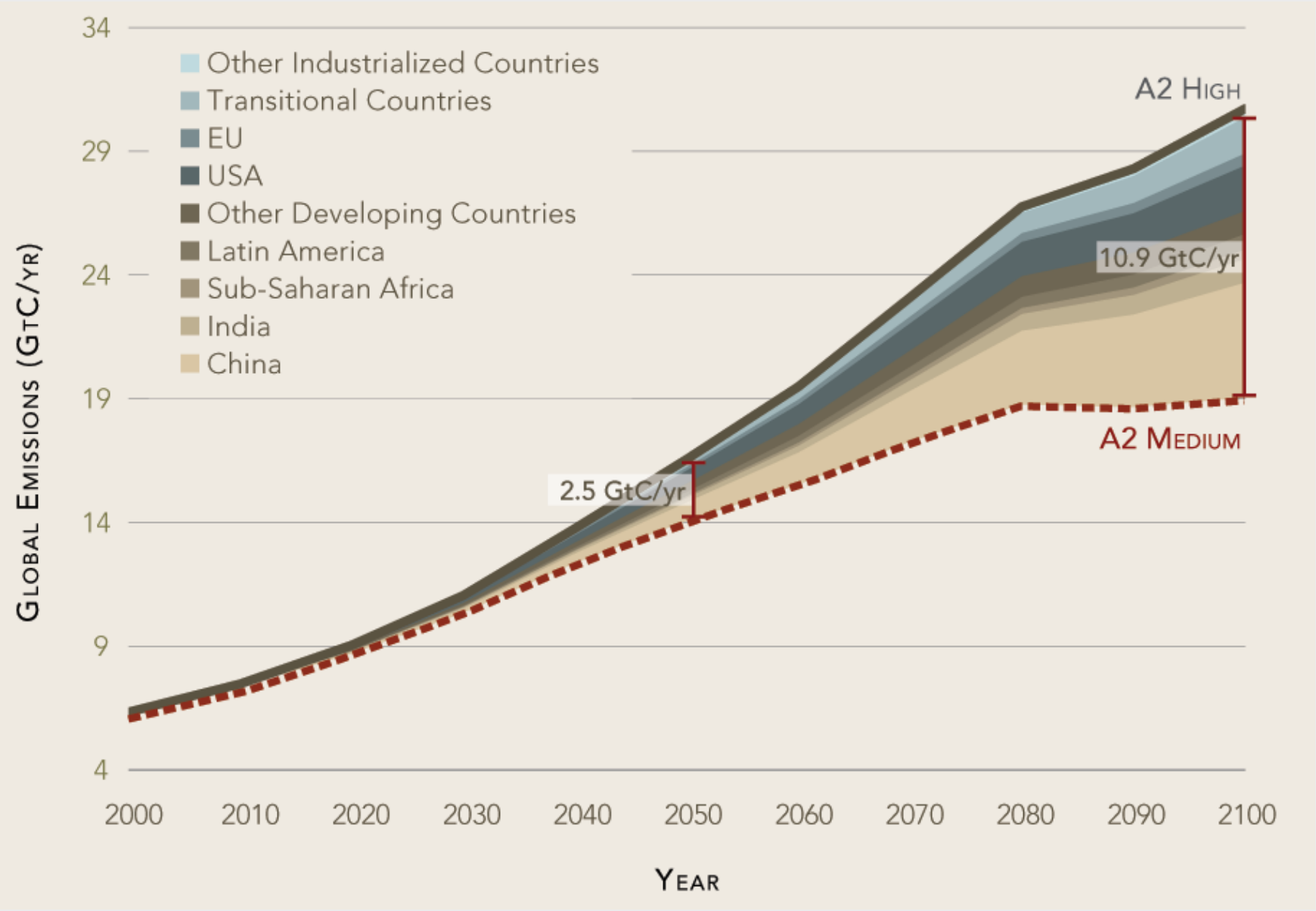
Changing labor supply

Changing savings rates

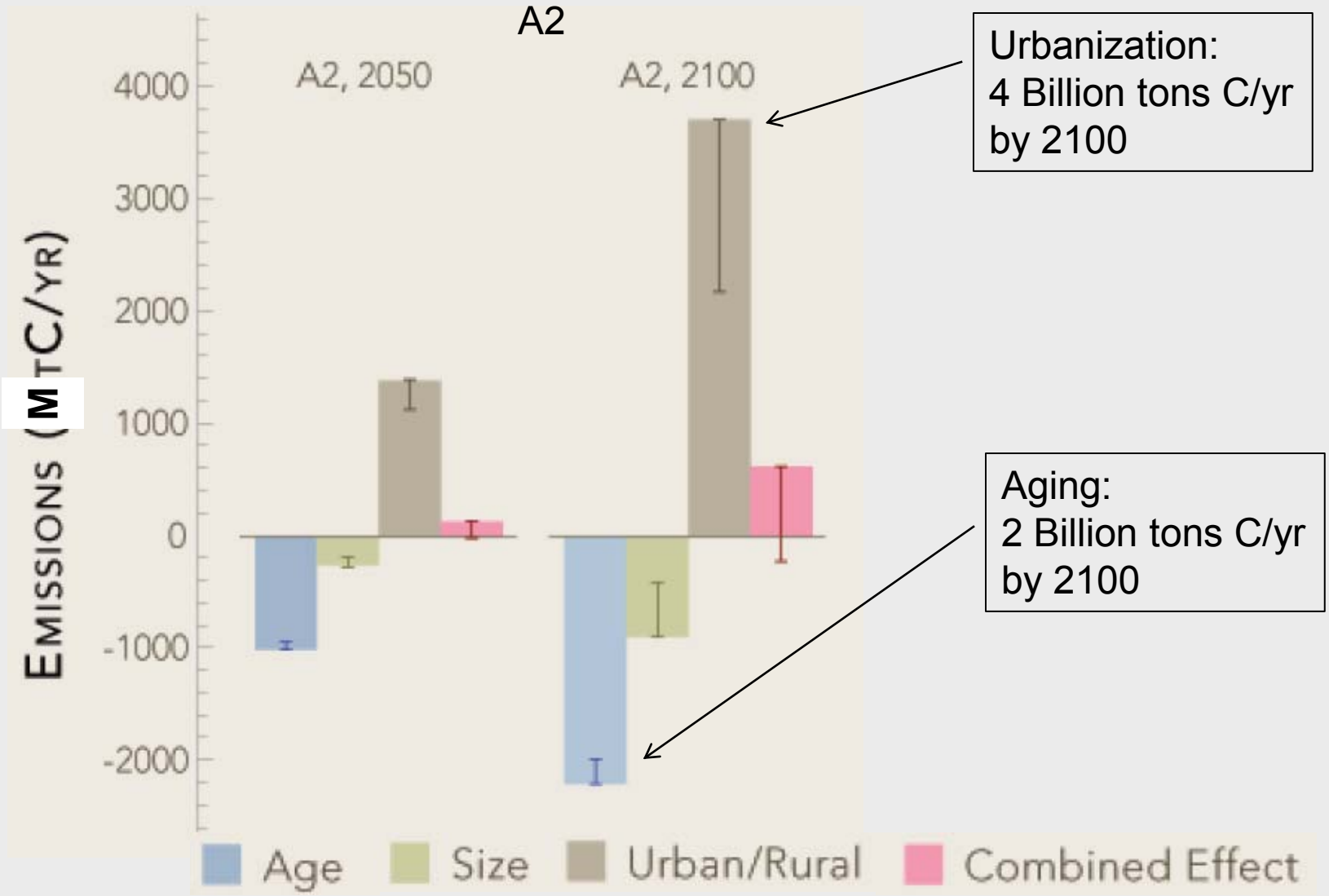
Aging/Urbanization → Consumption patterns

Changing consumption preferences

A2: Two Emissions Projections



Compositional Effects on Global Emissions



Urbanization:
4 Billion tons C/yr
by 2100

Aging:
2 Billion tons C/yr
by 2100

Conclusions

Demographic change matters

- **Aging can have significant negative impact on emissions in industrialized countries, in the long run**
- **Urbanization can have significant positive impact on emissions in developing countries, over next few decades**

Slower population growth cannot solve the climate problem, but it can make the job easier

- **Largest impact on emissions occurs after 2050**
- **By 2050, slower population growth could reduce emissions 2.5 billion tons C/yr**