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# Modeling Ancillary Costs & Benefits of Climate Policy

Hadi Dowlatabadi

Center for Integrated Study of the Human Dimensions  
of Global Change, Carnegie Mellon University  
University Fellow, Resources for the Future

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## Challenges

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- **Baseline**
  - ◆ Energy use;
  - ◆ Air pollution;
  - ◆ Regulations.
- **Exposure**
  - ◆ Outdoor sources;
  - ◆ Indoor sources.
- **Dose-response**
  - ◆ Cohort epidemiology;
  - ◆ Proxy environmental indicators.
- **Cart and horse**

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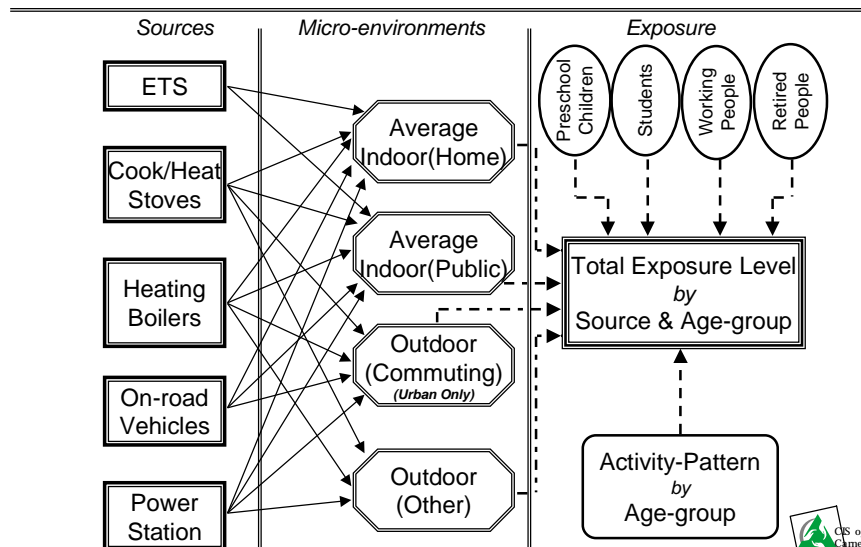
# Baseline

- The IPCC sRES is one approach
- Another approach is development of models that rely on endogenous and inter-related specification of:
  - ◆ Demographic dynamics;
  - ◆ Economic activity;
  - ◆ Technological change; and,
  - ◆ Evolution of norms (social, environmental,...)

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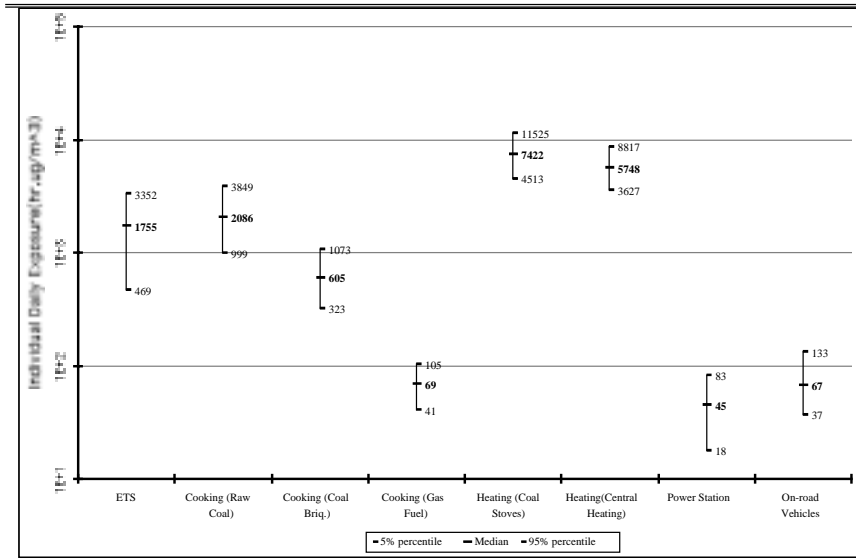
## Model of Exposure to PM<sub>10</sub> in China (Sun, Florig, Dowlatabadi)



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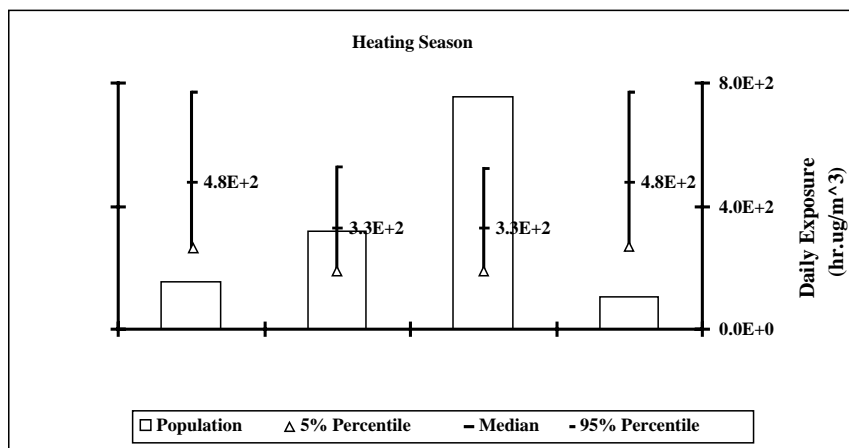
## China's air pollution sources (heating season in urban areas)



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## Population & exposure



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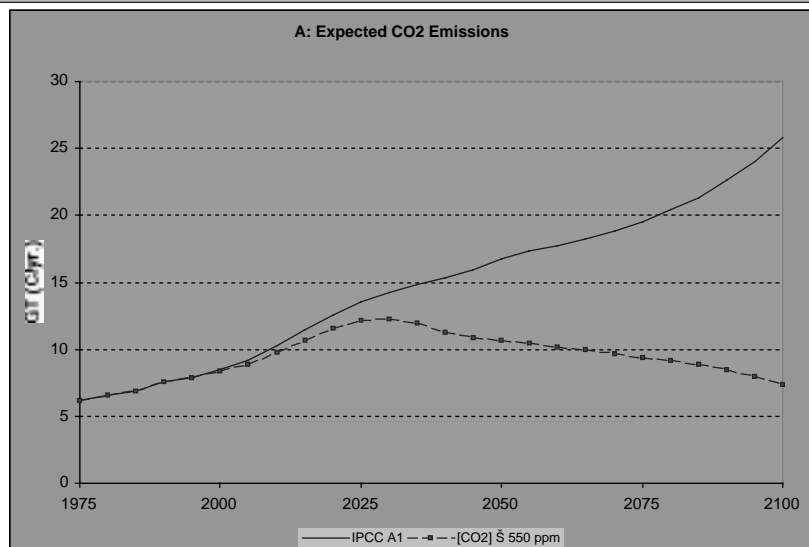
## Dose response models

- What are causative agent(s)?
- Is there: a threshold, saturation, interaction?
- What is the impact of nutrition and other ailments?
- How can be account for the impact of medical interventions?

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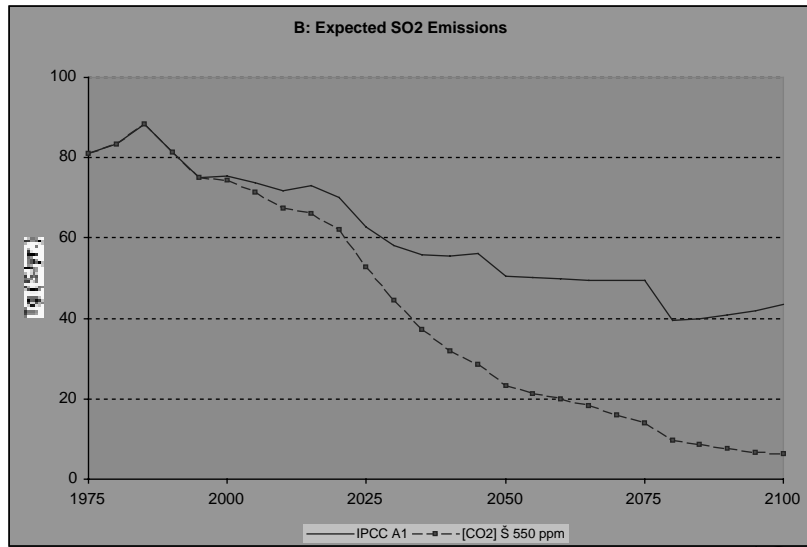
## IPCC A1 Scenario & 550 ppm policy: CO<sub>2</sub> Emissions



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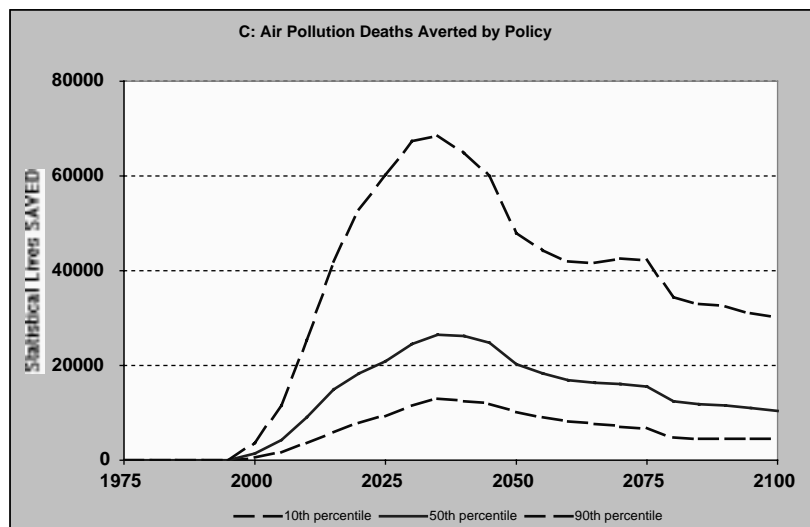
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## IPCC A1 Scenario & 550 ppm policy: SO<sub>2</sub> Emissions



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## IPCC A1 Scenario & 550 ppm policy: Health benefits of SO<sub>2</sub> reduction



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## Public health & development

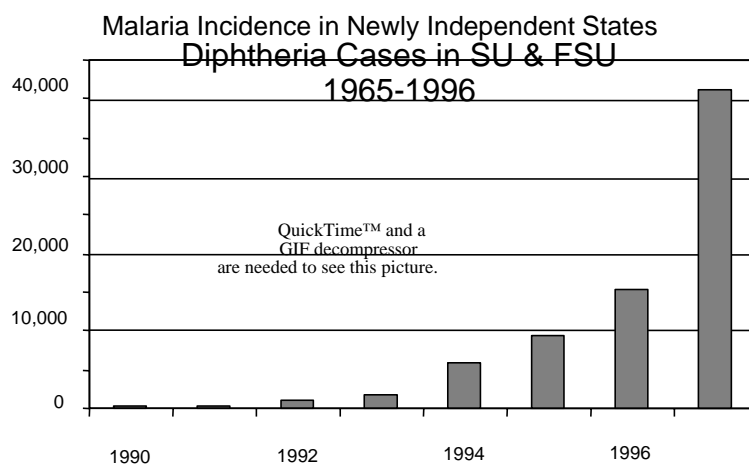
- With economic development, we begin to address problems of poor hygiene, infectious diseases and malnutrition.
- With economic development, we grow more susceptible to problems borne of consumption.

If climate policy hinders development can the policy lead to dramatic health losses?

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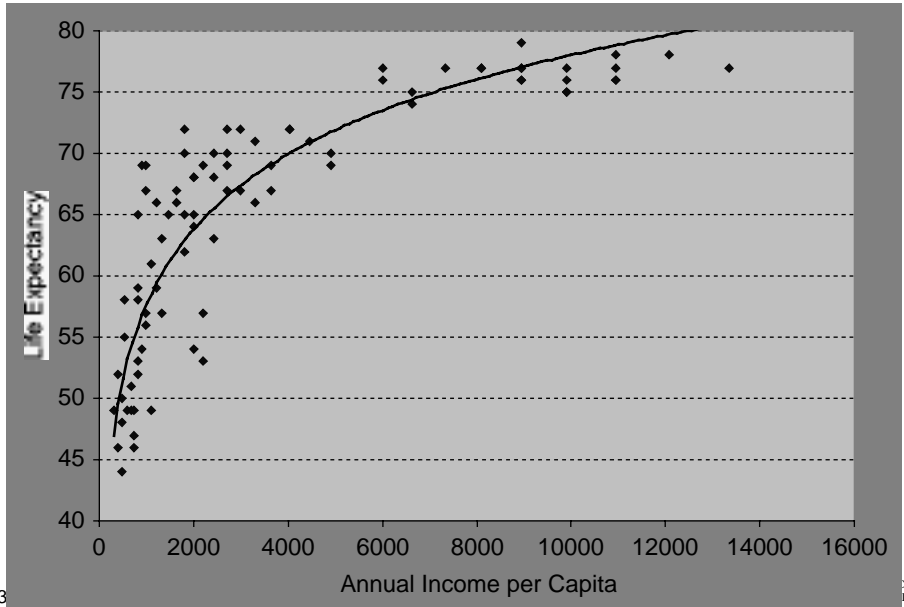
## What goes up can come down: Health impacts of US R breakup



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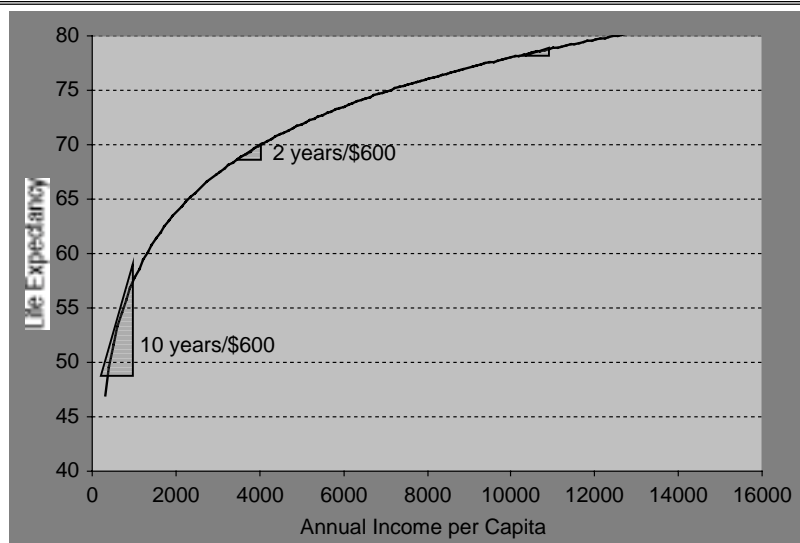


## Life expectancy (LE) and income



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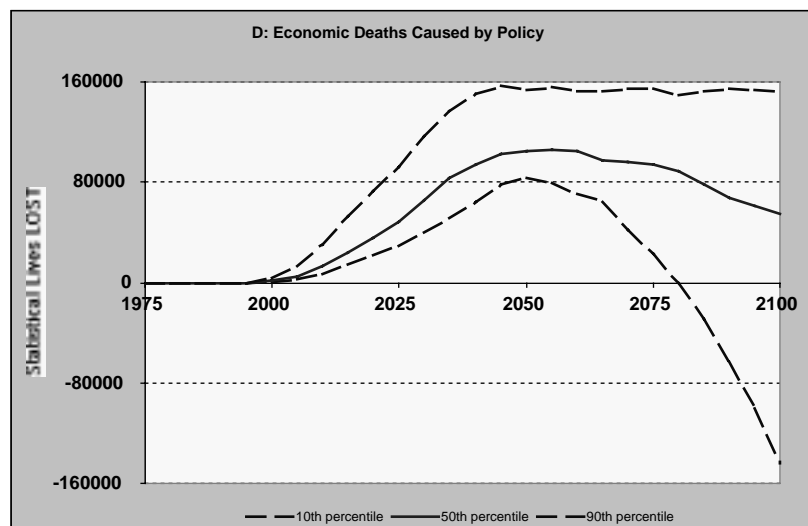
## ° Benefit-cost in context



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## IPCC A1 Scenario & 550 ppm policy: Health impacts of climate policy



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## Summary & unsupported assertions

- This is a far more complicated problem than a model of:  
Fossil Energy → PM<sub>10</sub> → health effects.
- By far the majority of world's population live on the steep slope of the welfare:life-expectancy curve. A costly climate policy can harm them.
- Well known steps towards better public health are yet to be taken in most of the world (e.g., potable water, control of indoor air pollution, etc.). Severe human resource constraints mean that concentration on climate policy will be to the detriment of these proven steps towards better public health & is unambiguously bad public policy.
- Leading by example in the OECD is both equitable and can lead to positive social externalities — via development of new social norms technology for their implementation.

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