The next generation of Social Cost of Carbon estimates

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Outline

- Federal policy
- Social Cost of Carbon: next steps

1.

2007: greenhouse gas emissions are air pollutants as defined in the Clean Air Act.

2.

2009 Endangerment finding: "[...] elevated concentrations of [...] greenhouse gases [...] endanger both the public health and the public welfare of current and future generations."
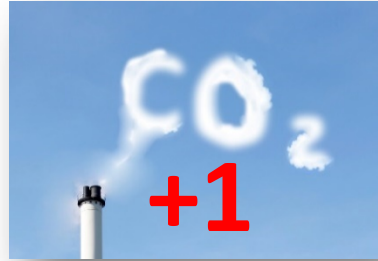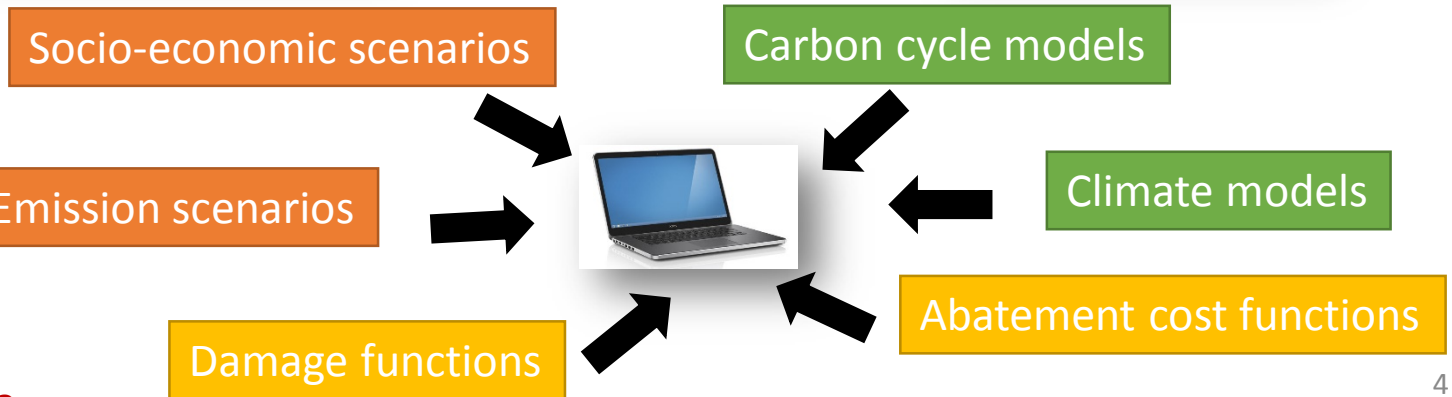
3.

Executive Order 12866

Social Cost of Carbon

Definition: Expected marginal damage from CO_2 emissions ($/tCO_2$)

Use: Impact analyses of federal rulemaking (clean power plan etc.)
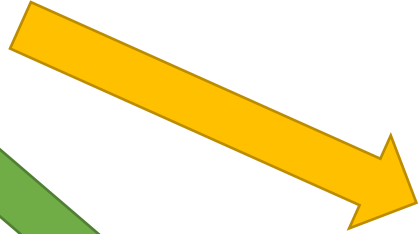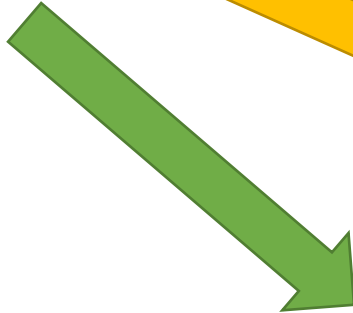
How: Integrated Assessment Models

SCC about \$40/tCO_2

Socio-economic scenarios

Carbon cycle models

Emission scenarios

Climate models

Damage functions

Abatement cost functions

4

Federal SCC

States:
- Minnesota
- Colorado
- Maine
- Nevada
- Illinois
- New York
- California

International:
- Canada
- …

Various court cases.

Used in dozens of federal regulatory impact assessments (including Clean Power Plan rule)

CLIMATE LEADERSHIP COUNCIL

THE CONSERVATIVE CASE FOR CARBON DIVIDENDS

How a new climate strategy can strengthen our economy, reduce regulation, help working-class Americans, shrink government & promote national security

James A. Baker, III   Henry M. Paulson, Jr.
Martin Feldstein   George P. Shultz
Ted Halstead   Thomas Stephenson
N. Gregory Mankiw   Rob Walton

Trump Administration

- "Regulatory Impact Analysis for the Review of the Clean Power Plan: Proposal" (yesterday)

- Still uses the Social Cost of Carbon concept

- Two key changes:
  - Discount rate (3% and 7% replace 2.5%, 3% and 5%)
  - Domestic SCC

- New SCC estimates: $6/tCO2 and $1/tCO2

- Nothing else seems to have changed (so climate science the same, impact estimates the same etc.)

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Updating and Improving the Social Cost of Carbon

- DICE

Bill Nordhaus (Yale University)

- PAGE

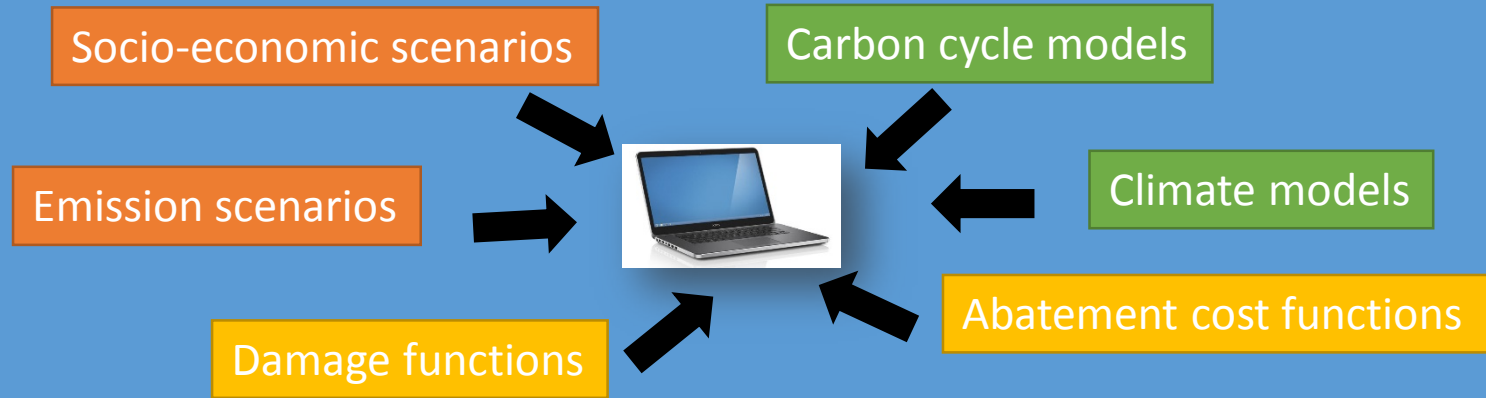

Chris Hope (Cambridge University)

- FUND

Richard Tol (U of Sussex) & me (UC Berkeley)

Science pipeline

- Involve more experts in the IAM building process

- Provide more transparency about the IAMs

- Create a closer loop between IAMs and underlying science

Decentralized/distributed workflow

Socio-economic scenarios

Emission scenarios

Carbon cycle models

Climate models

Damage functions

Abatement cost functions

Common Software Platform

Mimi.jl

- Brief history
- Goals
  - Decentralized workflow
  - Increased transparency
  - Run experiments on the models
  - Easier entry for new researchers
- Requirements
  - Open source license
  - Computationally efficient
  - Fully documented
  - High quality software
  - SIMPLE

Mimi.jl

- FUND.jl (currently in beta)
- Mimi-DICE.jl (currently in closed beta)
- Mimi-RICE-2010.jl
- Mimi-PAGE.jl (currently in closed beta)
- Mimi-SNEASY.jl (currently in closed beta)
- Mimi-FAIR.jl (currently in closed beta)
- Mimi-MAGICC.jl (CH4 parts currently in closed beta)
- Mimi-HECTOR.jl (CH4 parts currently in closed beta)
- Mimi-CIAM.jl (currently in development)
- Mimi-BRICK.jl (currently in development)

https://github.com/anthofflab/Mimi.jl

Next steps

- Lego for IAMs only first step
- What do you do with conflicting evidence?
  - An order of magnitude difference between SCC estimates in the federal numbers
- Modular approach can help us understand these differences
- What if there is still conflicting evidence?
  - Rigorous approaches to dealing with uncertainty (not just parametric, but also structural)
  - How can we make these operational for a policy setting?

Conclusion

- SCC is the main vehicle of bringing scientific evidence into the regulatory process in the US

- Engage! If you want your scientific insights to matter in that area, help us estimate a better SCC going forward!

Thank you!

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