Public Acceptability of Carbon Capture and Storage

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Today's Talk

- CCS is essential so it needs to be safe
- Public perception
- What's needed
- WRI project description

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A few big-picture issues…

- CCS is essential component because fossil fuels will not disappear soon
- Technology largely exists; voids in policy and regulatory framework
- Policy drivers essential
- Public acceptance uncertain
- Developing country participation crucial, but U.S. leadership needed first

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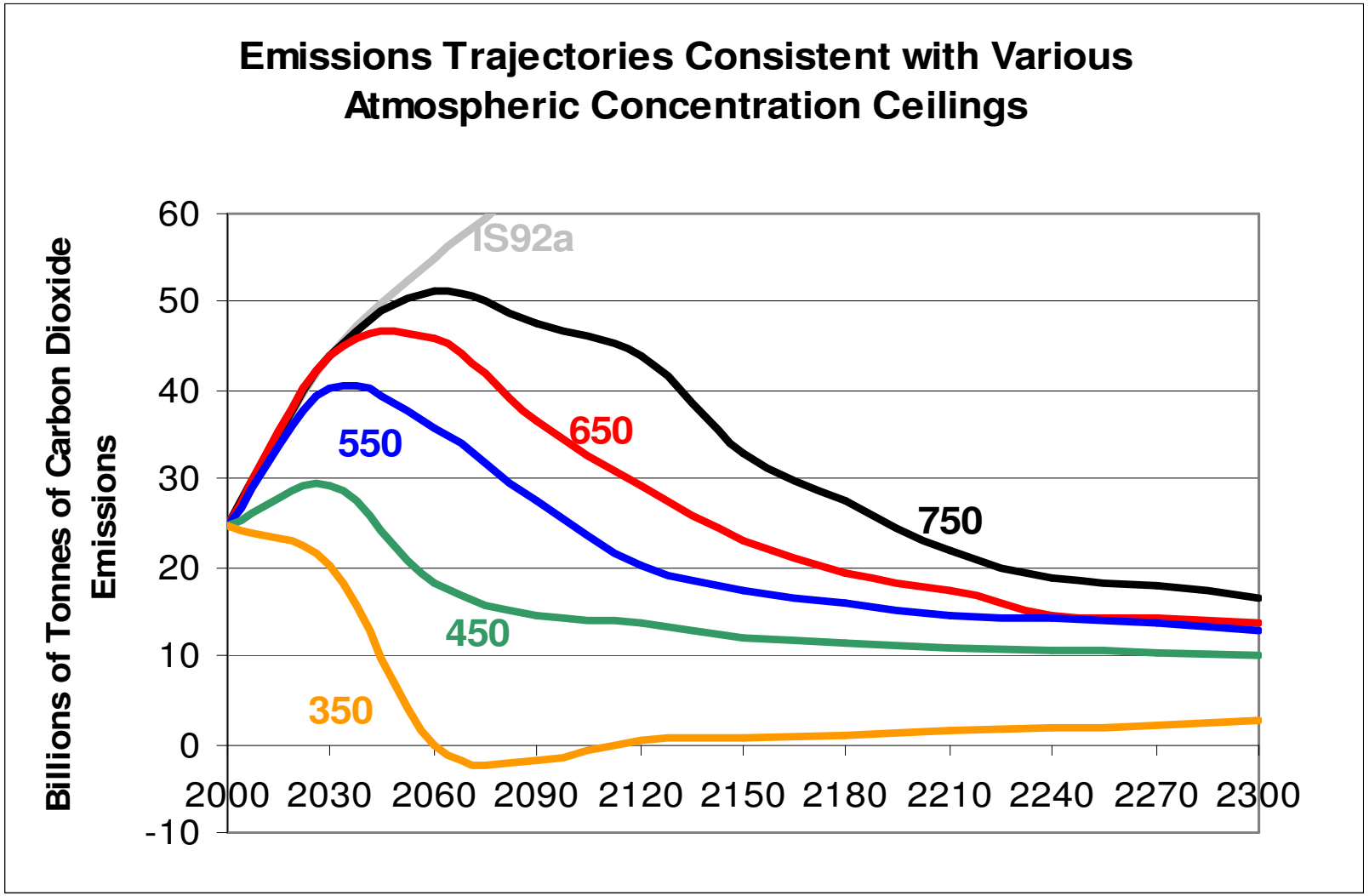
Running the Experiment



Wigley, Richels, Edmonds Emissions Curves, 1995.

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Challenge of “Wedge Analogy”

- Need to cut 7 GtC of emissions per year by 2055 to achieve “safe” stabilization
  - Equal to current global emissions
  - Over last 10 years, global emissions have increased by 15%
- CCS is essential component.
- Wedge analysis indicates it is plausible if we start now.

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Magnitude of Wedge Examples

Each providing 1GtC reduction by 2050

- **Wind**: new 2000 GW (50x today)
- **PV**: new 7200 square miles (700x today)
- **Natural Gas**: coal to gas at 700 large plants
- **Efficiency**: double mileage of 2 billion cars
- **CCS**: 800 GW of coal plants or 3600 Sleipners
- **Biofuels**: 1/6th of world's cropland (ethanol)
- **Nuclear**: new 700 GW (2x today)

Source: Pacala and Socolow, 2004.

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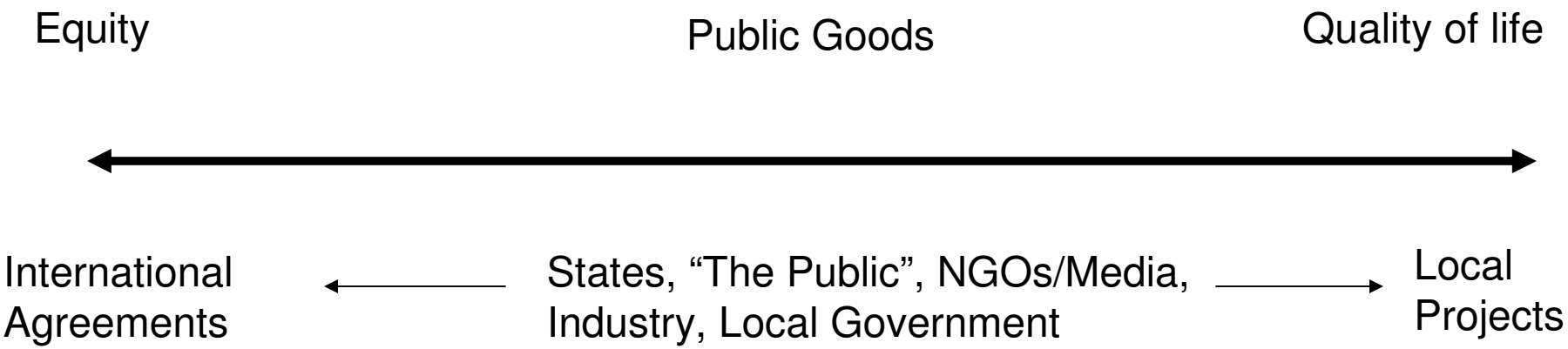
The “Public”

Typically thought of as local NIMBY issues, but very broad



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Forming public views on CCS

- Awareness of climate change and energy
- Perceived vs. actual risk
- Assemble facts to give meaning vs. “fitting” facts to existing understanding
- Importance of successful initial projects
- Local stakeholders…and everyone else

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U.S. Public Awareness of Climate and Energy

"Have you heard of…"

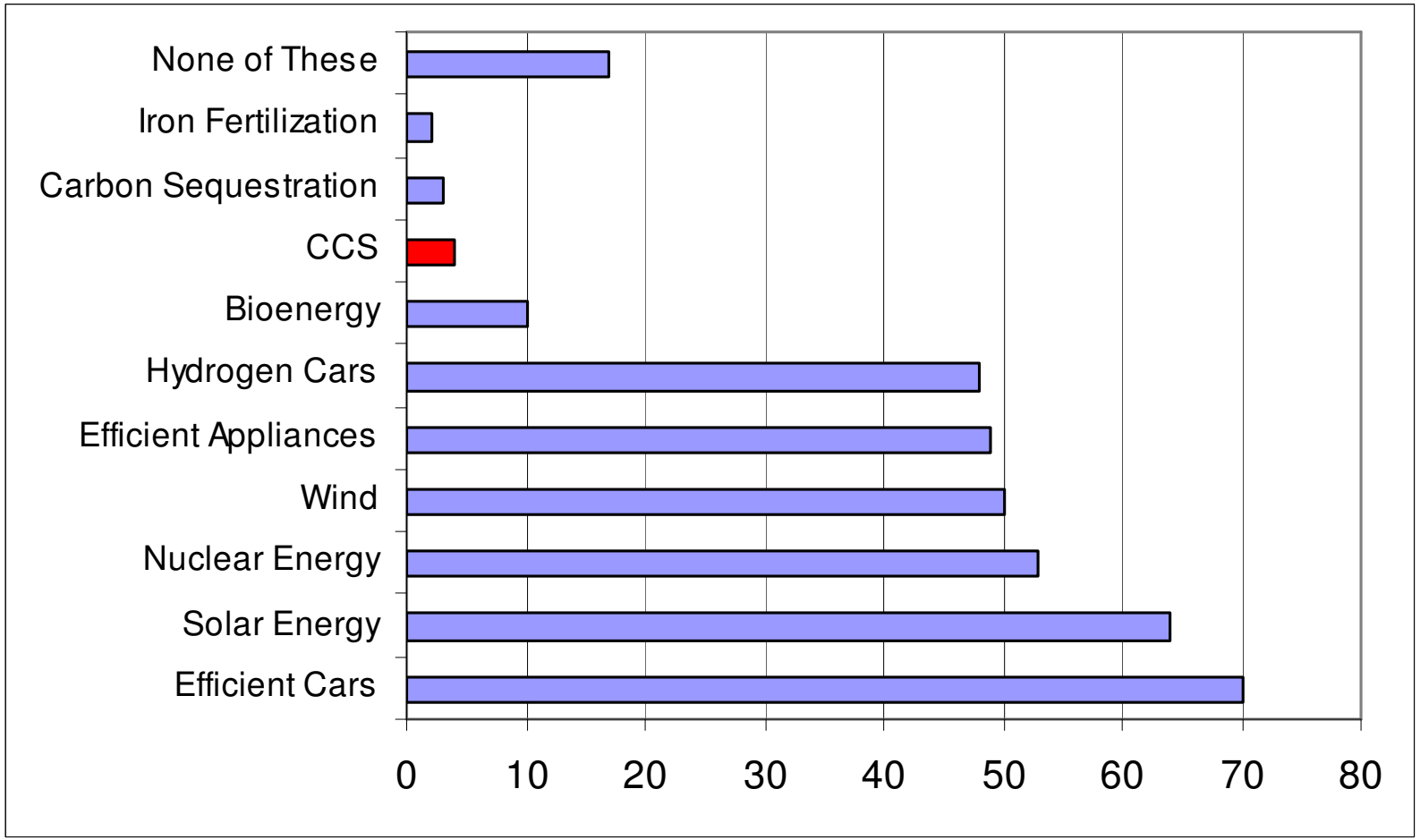

Chart displays responses to the following question: "Have you heard or read about any of the following in the past year? Click all that apply."
Survey conducted in Fall 2003 to 1200 US respondents.
Source: Curry, Reiner, Ansolabehere, and Herzog. Available at http://sequestration.mit.edu/pdf/GHGT7_paper137_Curry.pdf

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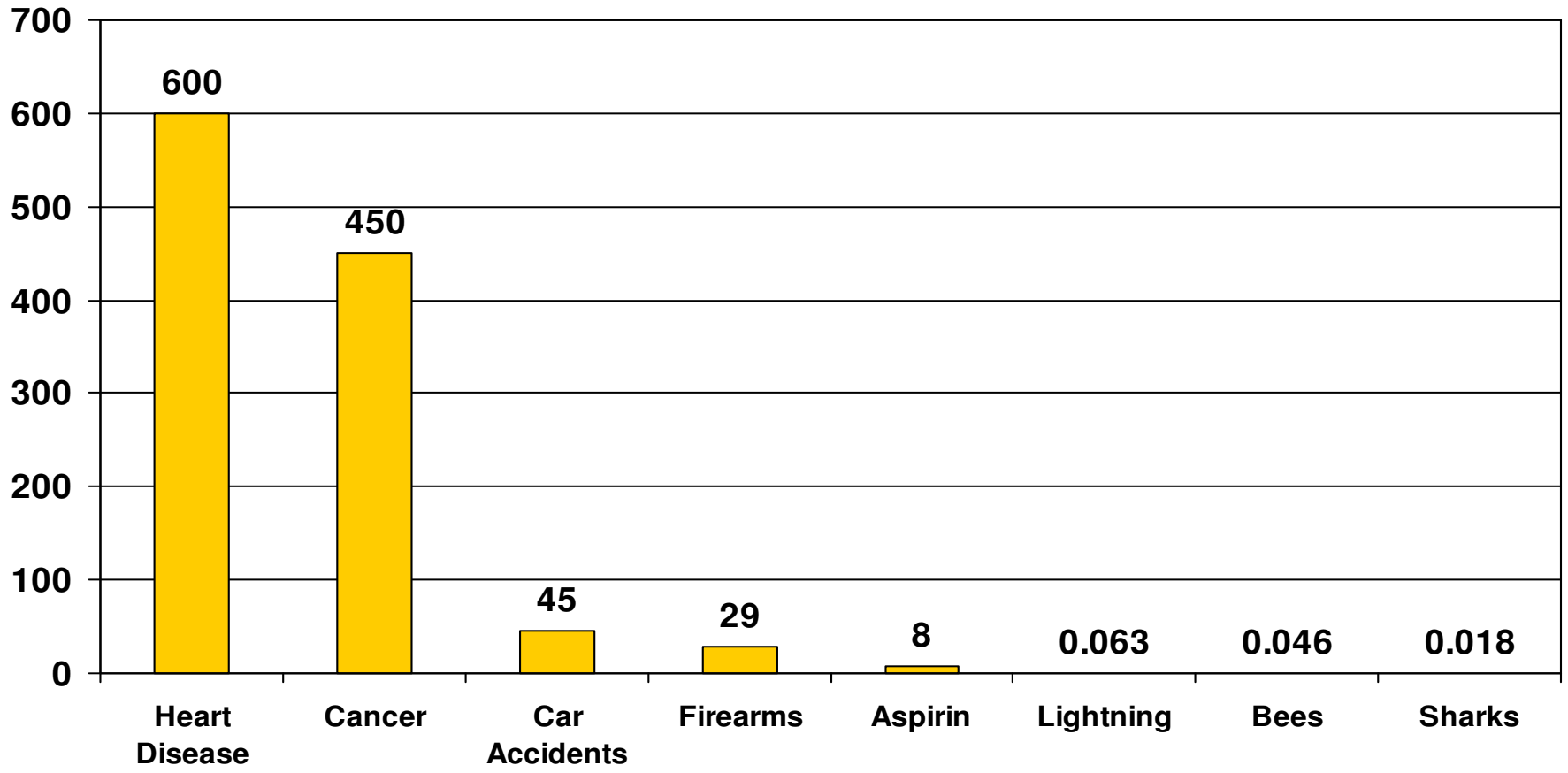
Perceived vs. Actual Risk



Source: National Center for Health Statistics, Center for Disease Control.

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Some Key Issues: What's Needed

- Siting: location, location, location
- Institutional cooperation and communication
- Safe for how long? Remediation?
- MMV during and after injection
- Inventory and accounting of stored CO_2
- Long-term liability
- Index CCS deployment to EERE activity?
- Something for everyone…

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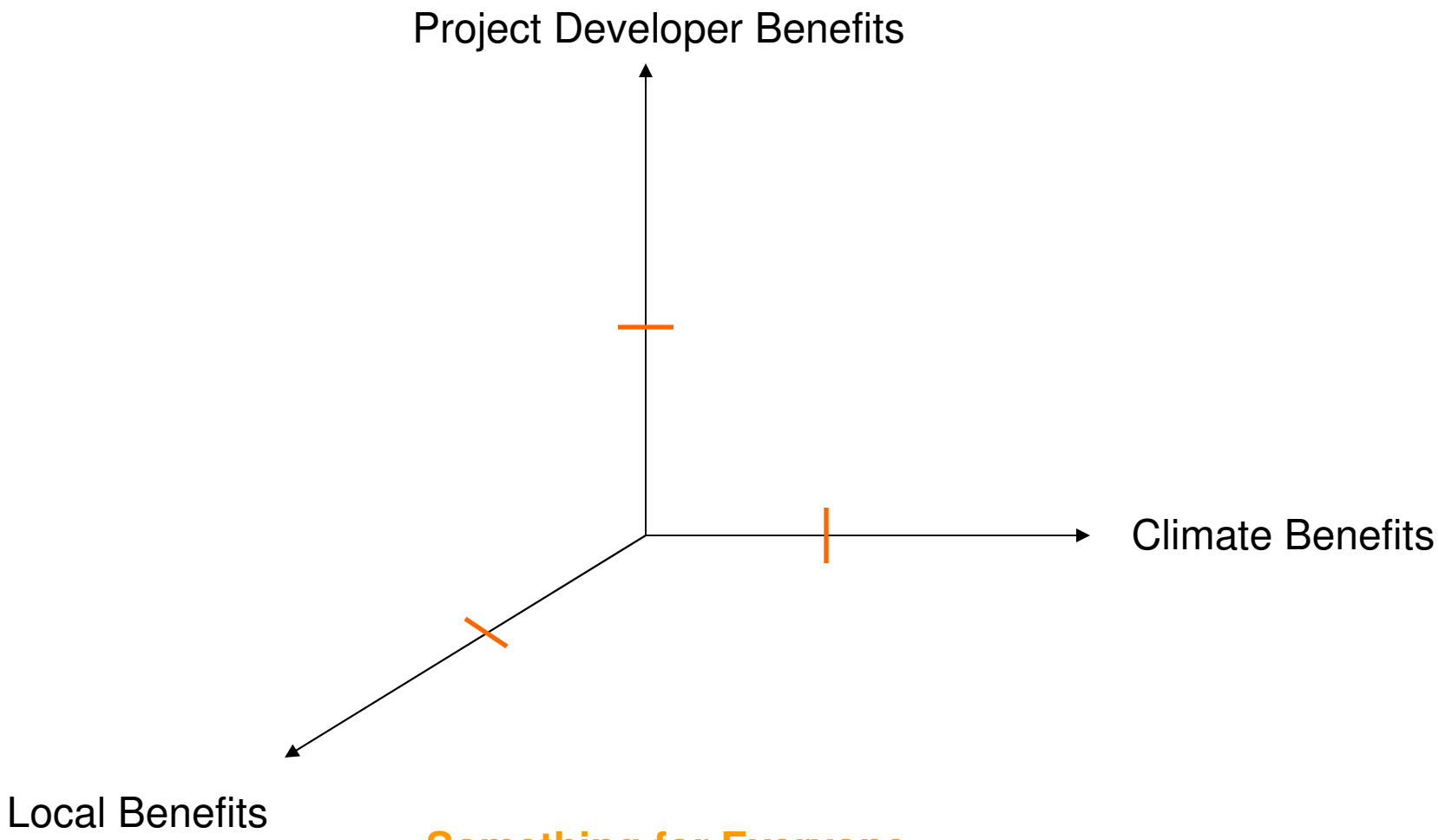
Meeting CCS Thresholds



Something for Everyone

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CO_2 EHS

- CO_2 could: escape into atmosphere; contaminate USDW; contaminate soil
- OSHA 8-hr level: 0.5%; >10% can be lethal
- 2 risk scenarios
  - Slow, steady escape
  - Massive accidental release
- Can be stored with zero effective escape
- Local focus: safety; larger: GHG emissions

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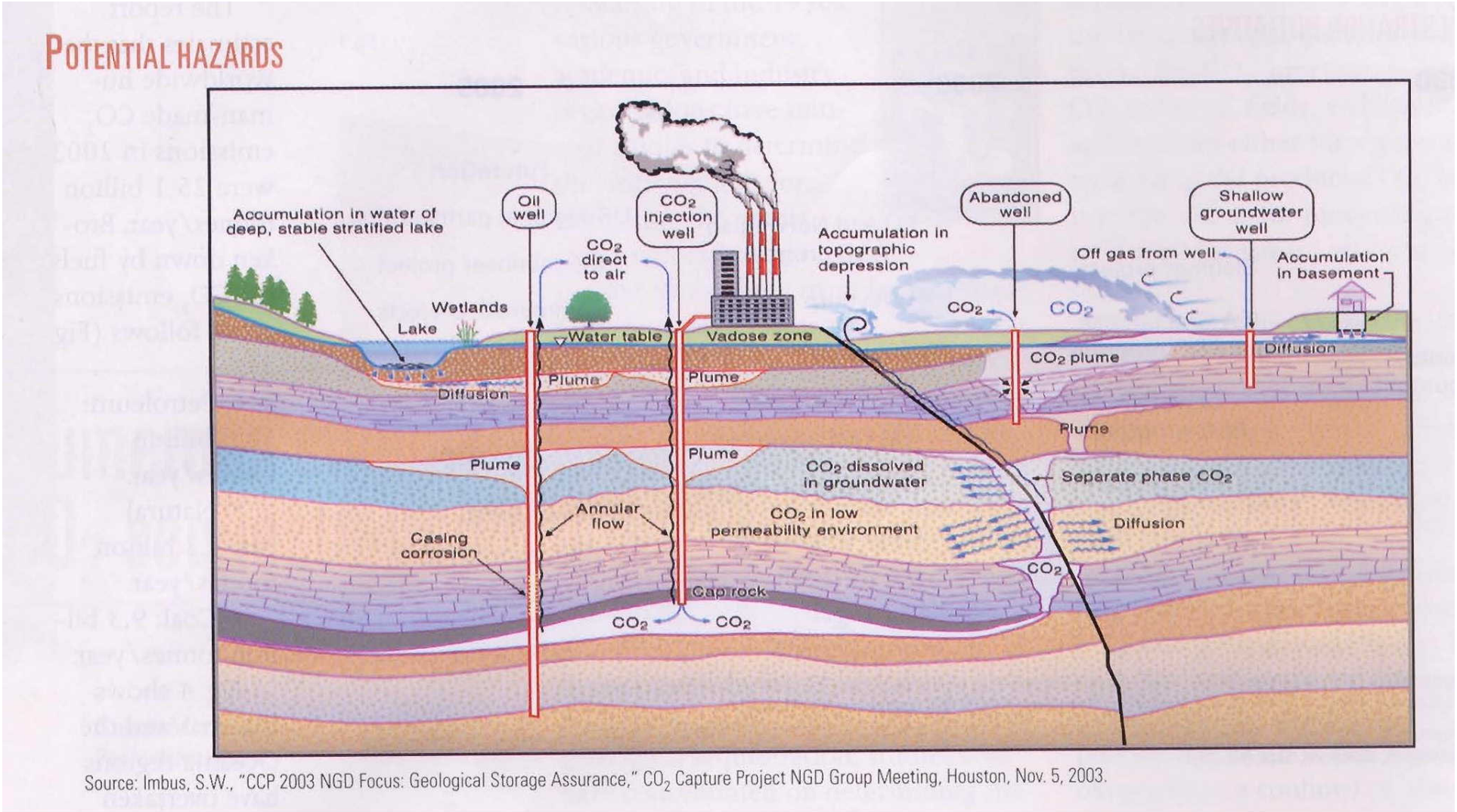
Potential CO_2 Hazard Pathways



Source: Imbus, S.W., "CCP 2003 NGD Focus: Geological Storage Assurance," CO_2 Capture Project NGD Group Meeting, Houston, Nov. 5, 2003.

Local Dimensions

- One large (1000 MW) coal plant:
  - Produces 6 m tons CO_2/year
  - 300 m tons over 50 year life
- Stored volume after 50 years:
  - nearly 6 billion barrels
  - Underground footprint could span 20-300 square miles
- Need 800 globally for 1 wedge

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Analogs

- What can we use from understanding of and experience with:
  - Natural carbon dioxide storage formations,
  - Natural gas storage systems,
  - Enhanced oil recovery,
  - Acid gas and wastewater injection practices,
  - Nuclear waste disposal?

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WRI Project on CCS Gaps

- **Objective**: Identify key regulatory and policy gaps in CCS framework. Build consensus on addressing them through stakeholder convening process.

- Stakeholders to meet 2-3 times annually
  - Power producers
  - Oil/gas companies
  - CO_2 pipeline company
  - Financiers
  - Federal and state regulators/policymakers
  - Academic
  - NGOs

- 2+ year project

- Initial focus primarily on US, but outreach with EU and Asian partners

- Tie into pilot/demonstration projects

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Likely WRI Project Topics

- Storage siting and oversight
  - Institutional coordination and outreach
  - Site standards
  - MMV
- Inventory framework
  - Accounting (source reduction or sink removal?)
  - WRI experience with GHG Protocol
- Liability Handoff
  - How might the public assume long-term responsibility for site management?

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