Welcome to the EBC Seminar

Global Climate Change - A Primer

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Global Climate Change – A Primer

Moderator

John Bewick
President
Compliance Management, Inc.

Climate Change: The Planetary Experiment

Prof. Daniel Schrag

Harvard University

How Good Are Climate Forecasts?

Prof. Ronald G. Prinn

Massachusetts Institute of Technology

What Will It Take to Manage the Risk?

Prof. Henry D. Jacoby

Massachusetts Institute of Technology

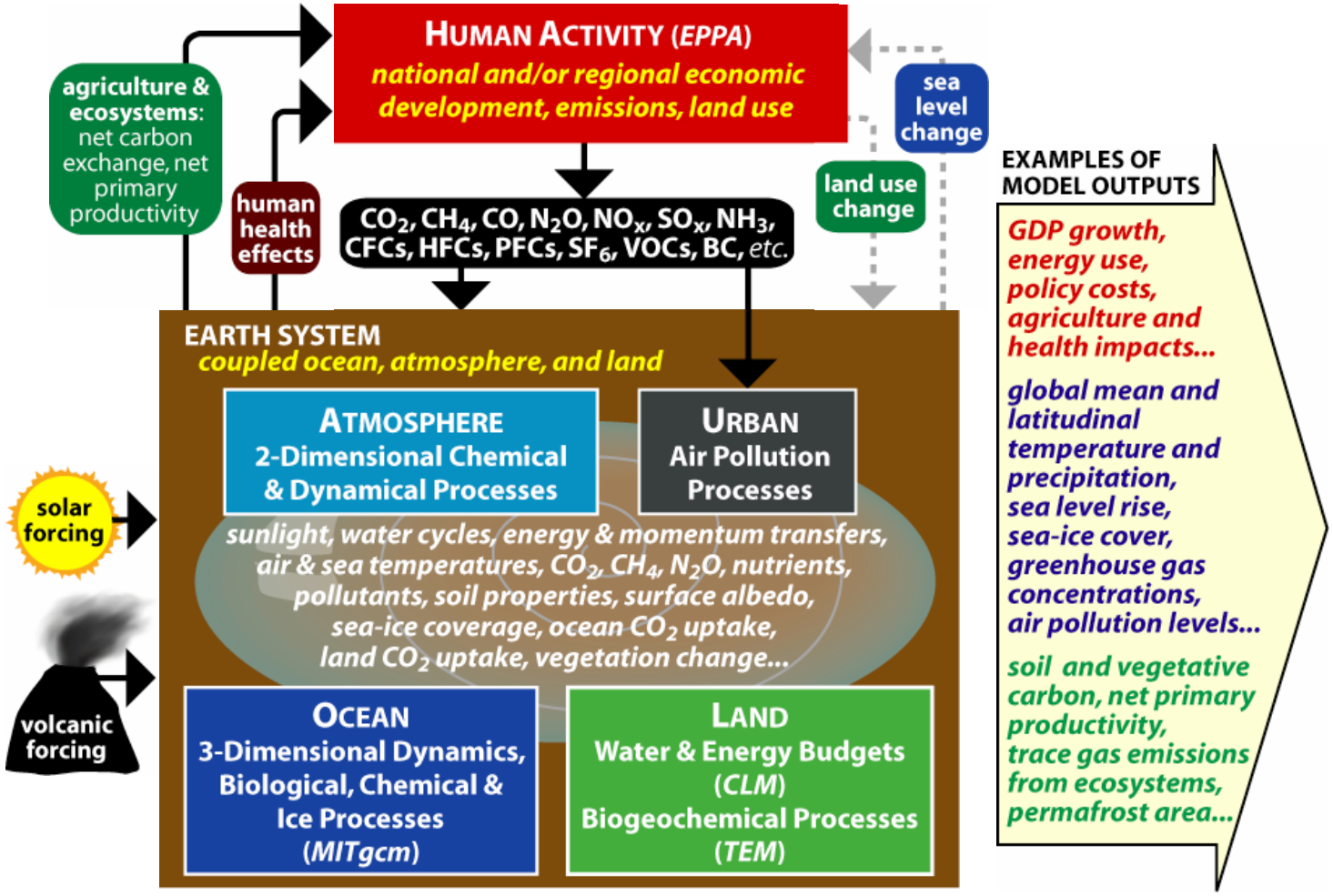
Understanding What Needs to Be Done

Henry D. Jacoby

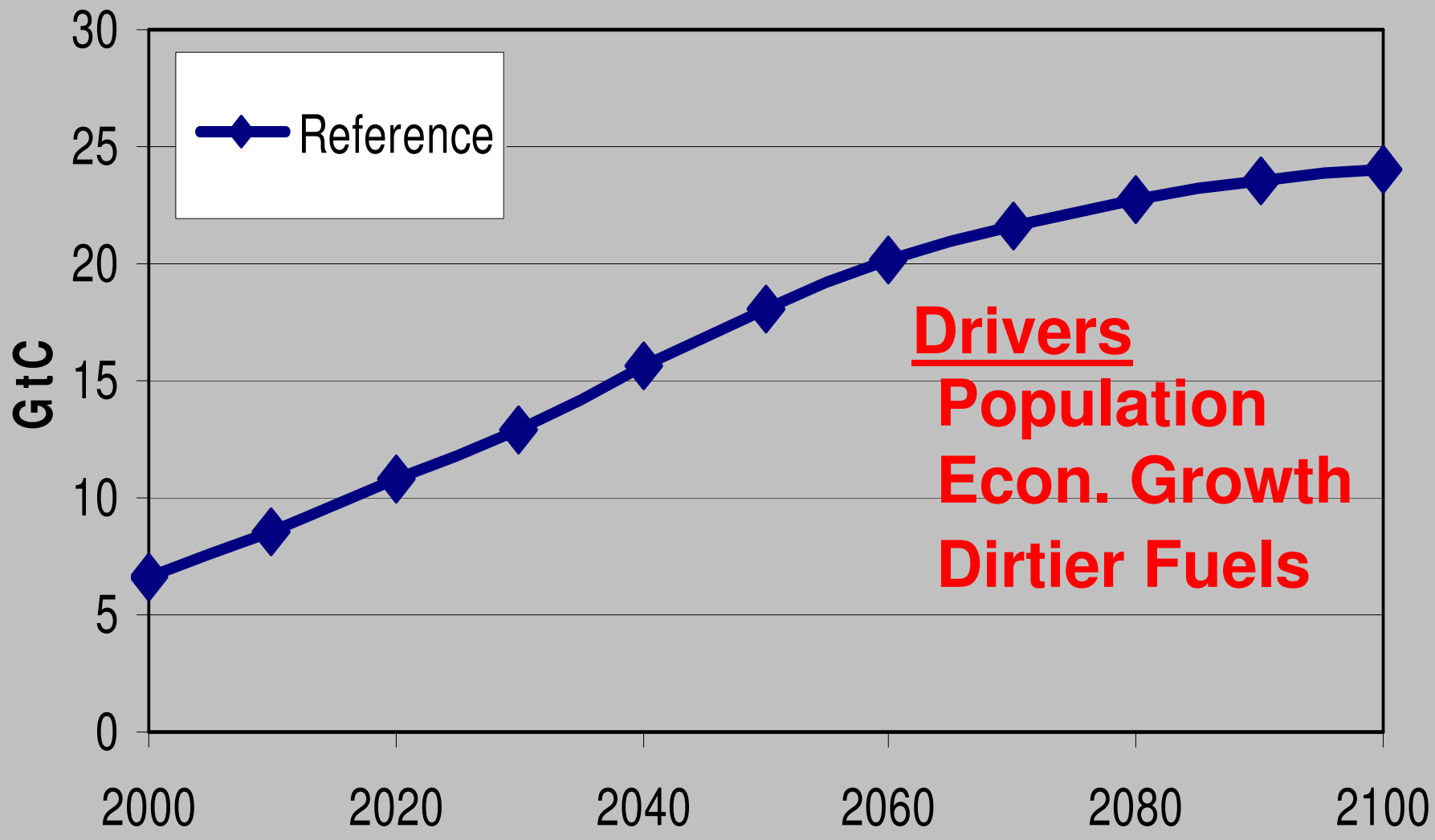
Joint Program on the Science and Policy of Global Change
Massachusetts Institute of Technology

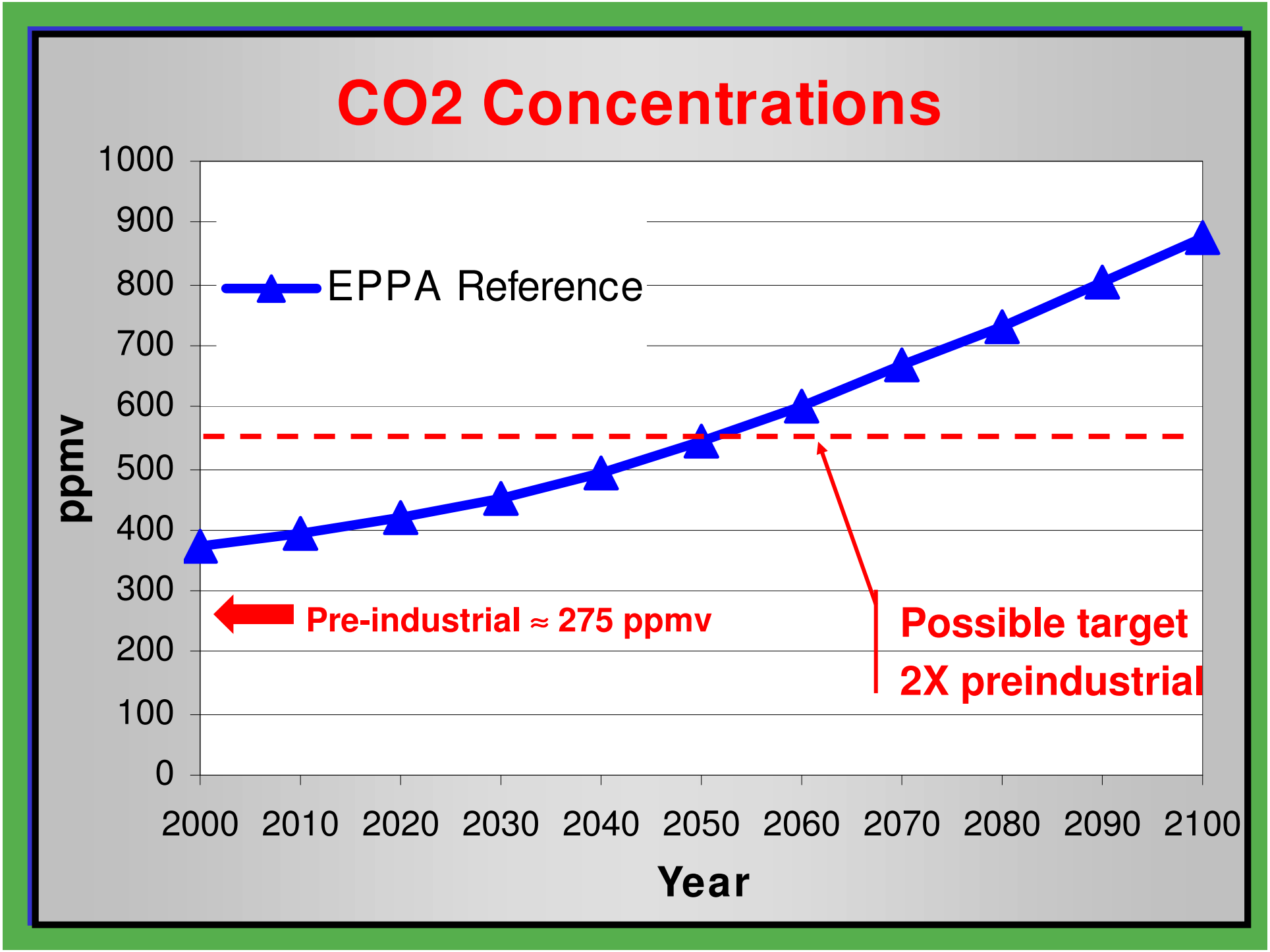
EBC Global Climate Change Seminar
12 September 2006

MIT Integrated Global System Model (IGSM) Version 2

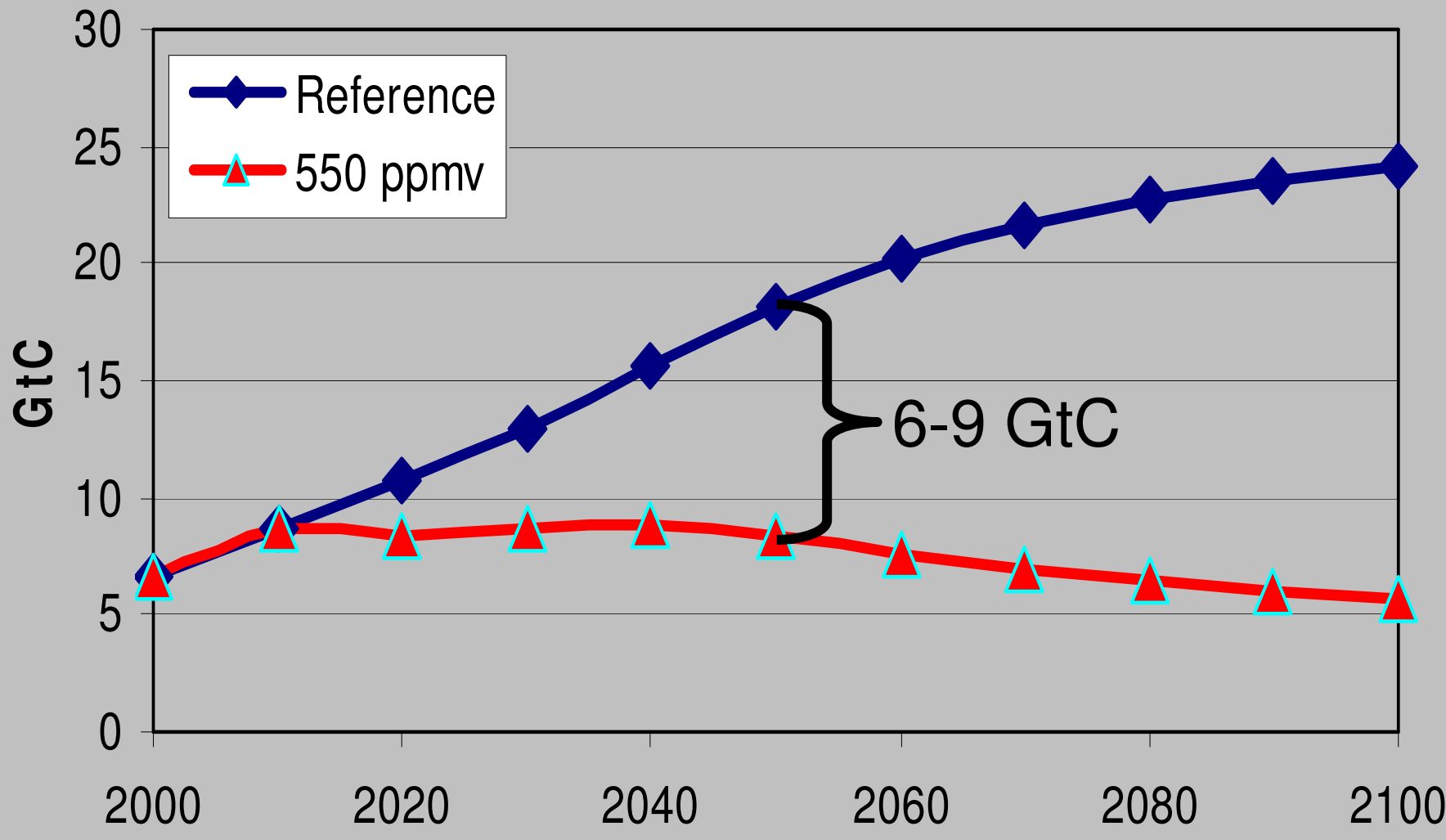


CO2 Emissions, No Policy




CO2 Concentrations
1000
900
800
700
600
500
400
300
200
100
0
ppmv
EPPA Reference
Pre-industrial ≈ 275 ppmv
Possible target
2X preindustrial
2000
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
Year

CO2 Emissions, 550 ppmv



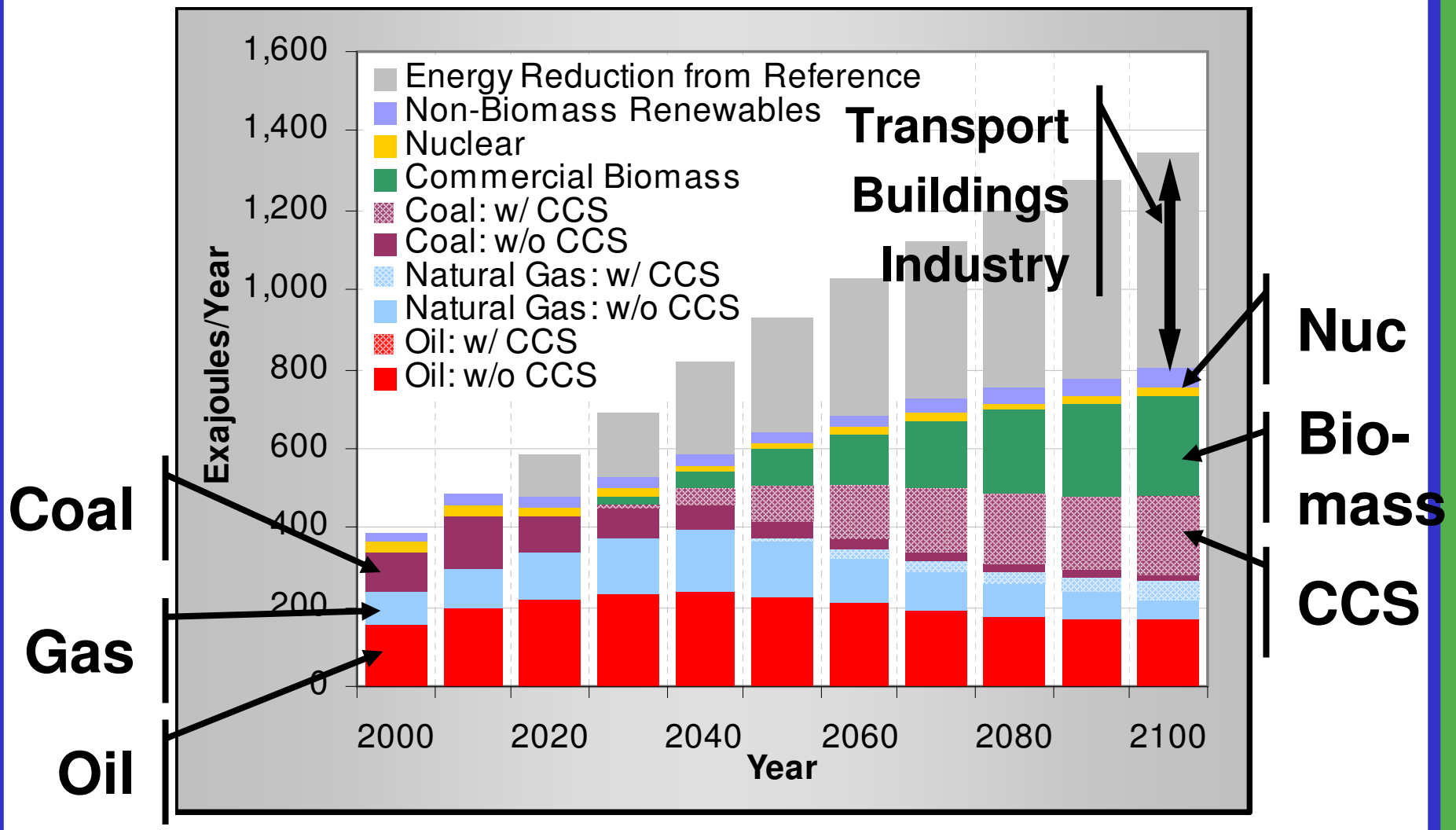
Scale of The Challenge

- For 1 GtC reduction in 2050
  - 1000 MW electrics with CO_2 capture (800)
  - 1000 MW nuclear stations (700)
  - 1 MW wind turbines (1 million)
  - Double fuel economy of cars (2 billion)

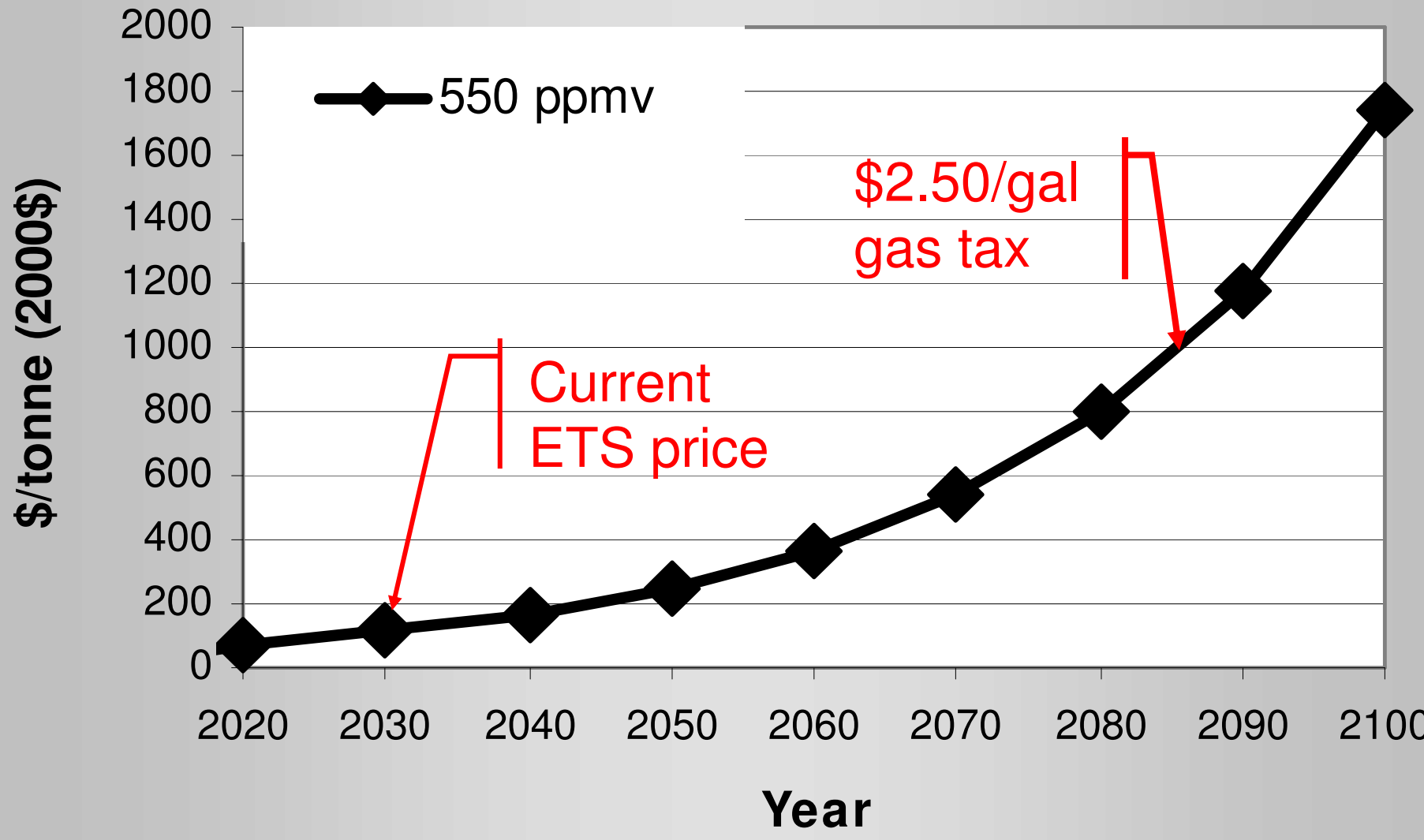
  . . . None economic & accepted today . . .
- To achieve any target now discussed
  - Price (& regulatory) penalty on CO_2 emissions
  - Technology advance to lower the cost of low-CO_2 energy supply and use of energy services

  . . . Only policy involving BOTH will work . . .

Global Primary Energy: 550 ppmv



Penalty on Carbon Emissions



Can We Afford to Take Stabilization Seriously?

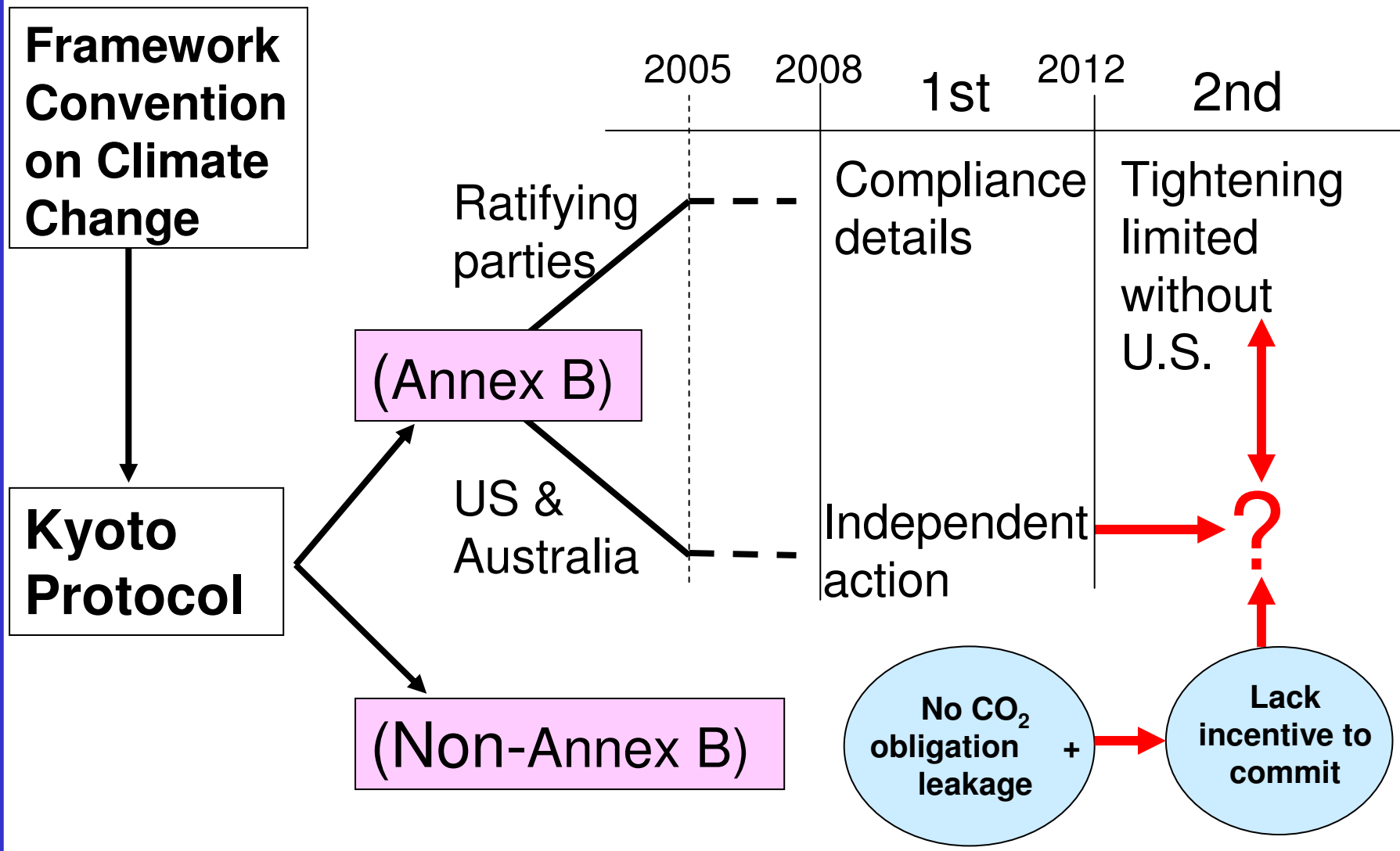
Not

- Could rich nations afford it?
  - GDP loss
  - Jobs (aggregate employment)
- Could poor nations?
- Winners & losers
  - Coal industry & regions, and railroads (lose)
  - Forestry and agriculture (win)
  - Wind, biomass, solar, efficient tech'n (win)
  - Domestic oil & gas (depends), OPEC (lose)
  - Auto manufacturers (depends)

Progress To a Global Regime

- Need a regime architecture: a unifying structure to guide potential agreement
  - The metaphor
  - Examples in environment, trade, etc.
- Complexities of this “commons” problem
  - 20 or so rich AND poor countries matter
  - An economic as well as environmental issue
  - Many emissions & land use contribute
  - Continuity over century and more
  - Parties are sovereign nations

The Climate Regime



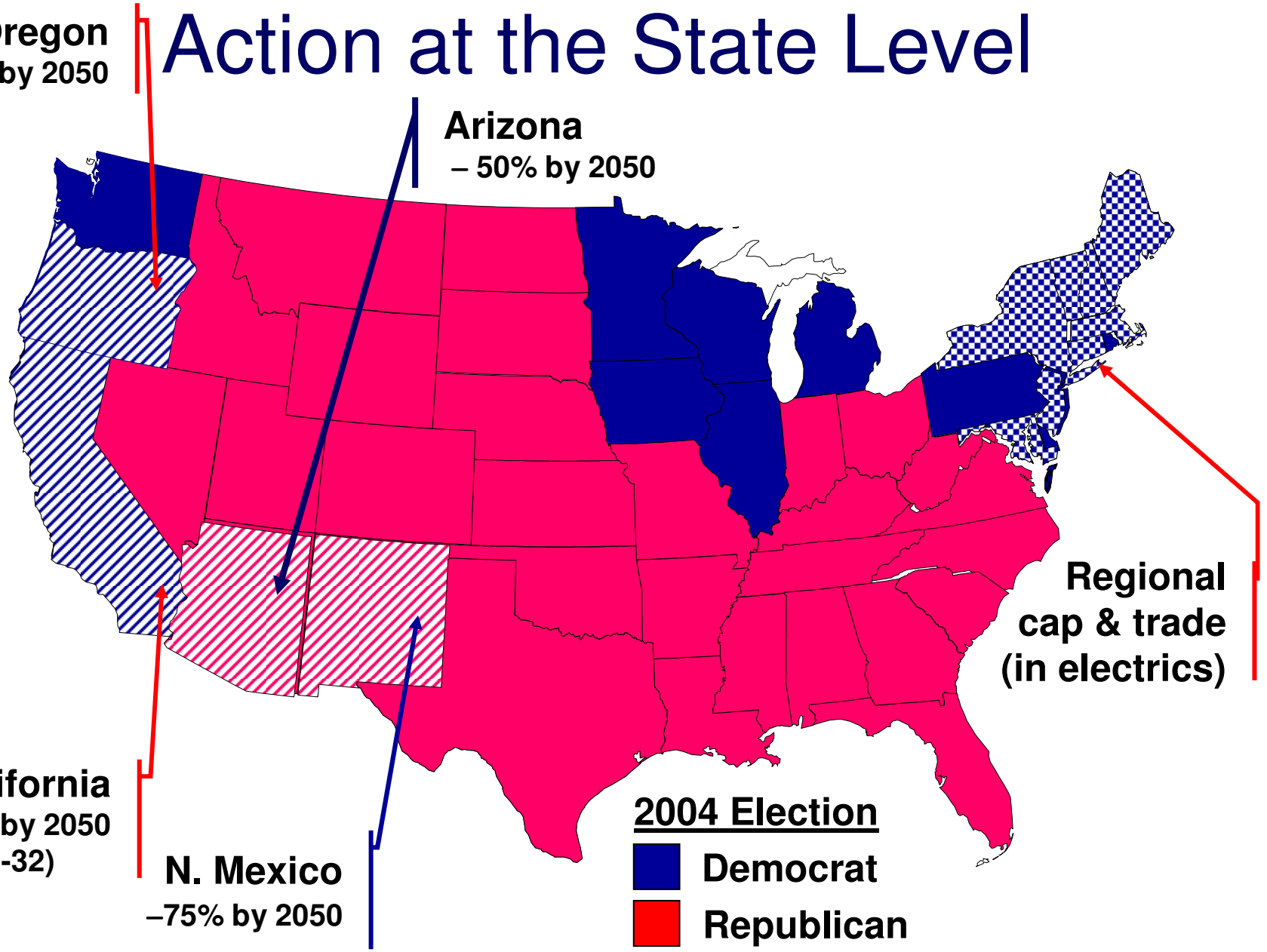
Lessons Learned the Hard Way

- A common view of international process
  (1) Agree on the structure for negotiations
  (2) Negotiate commitment levels & measures
  (3) Nations implement control measures
- For an issue like climate change the process begins the other way around
  - Nations only agree to a potentially costly commitment if confident they can meet it
  - Binding agreements follow (not lead) domestic commitment

U.S. Federal Picture

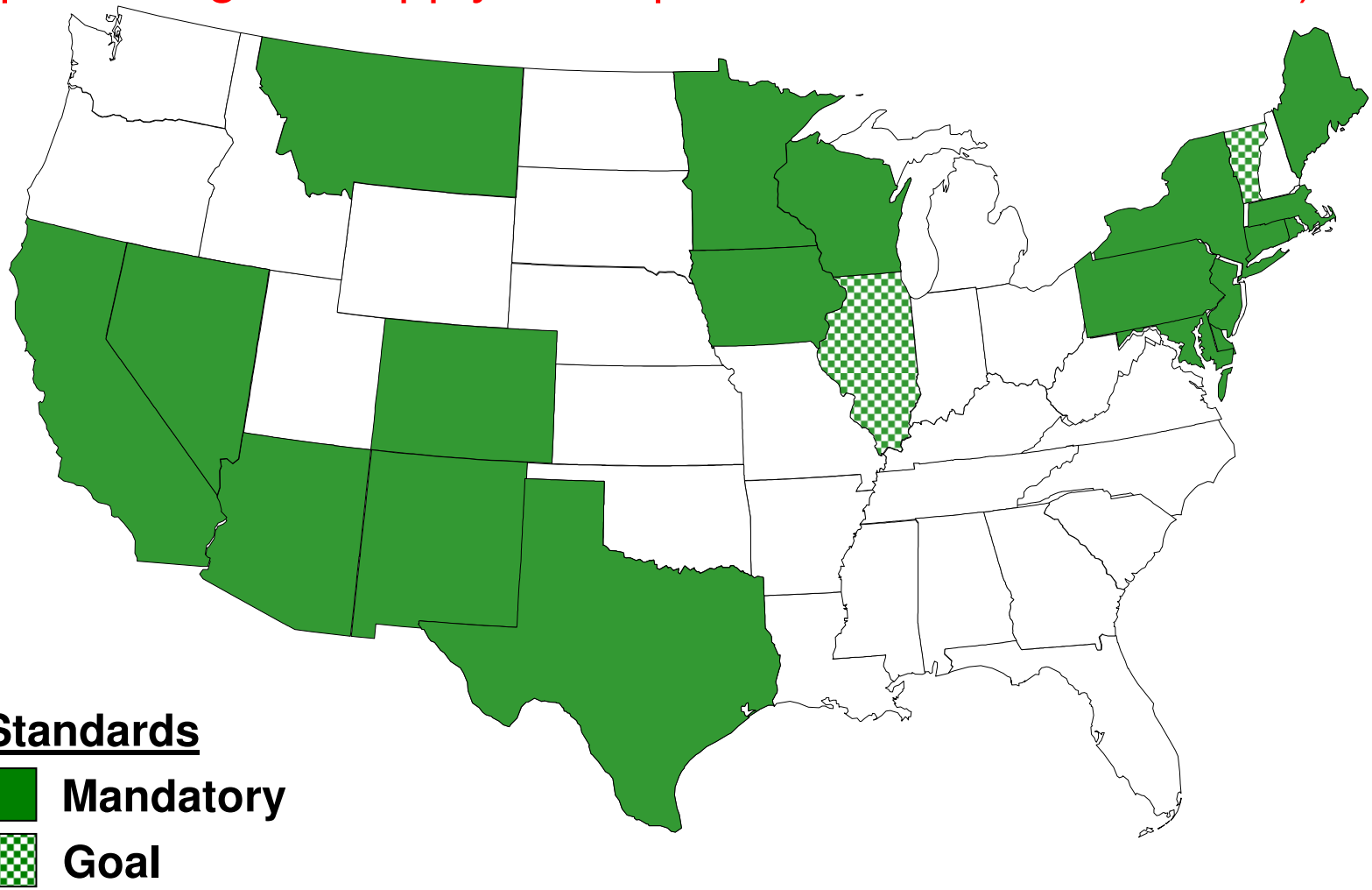
- No direct action on greenhouse gases
  - Keep climate off the political agenda
- Support of indirect measures
  - Voluntary programs
  - Subsidies (e.g., biomass, solar, hybrid cars)
  - R&D and commercial demonstration
  - Regulatory reform (e.g., nuclear)
  - International technology cooperation
- Proposals in Congress, but no action yet

Action at the State Level



Renewable Portfolio Standards

(Requirement that generators purchase a minimum percentage of supply from qualified renewable sources)



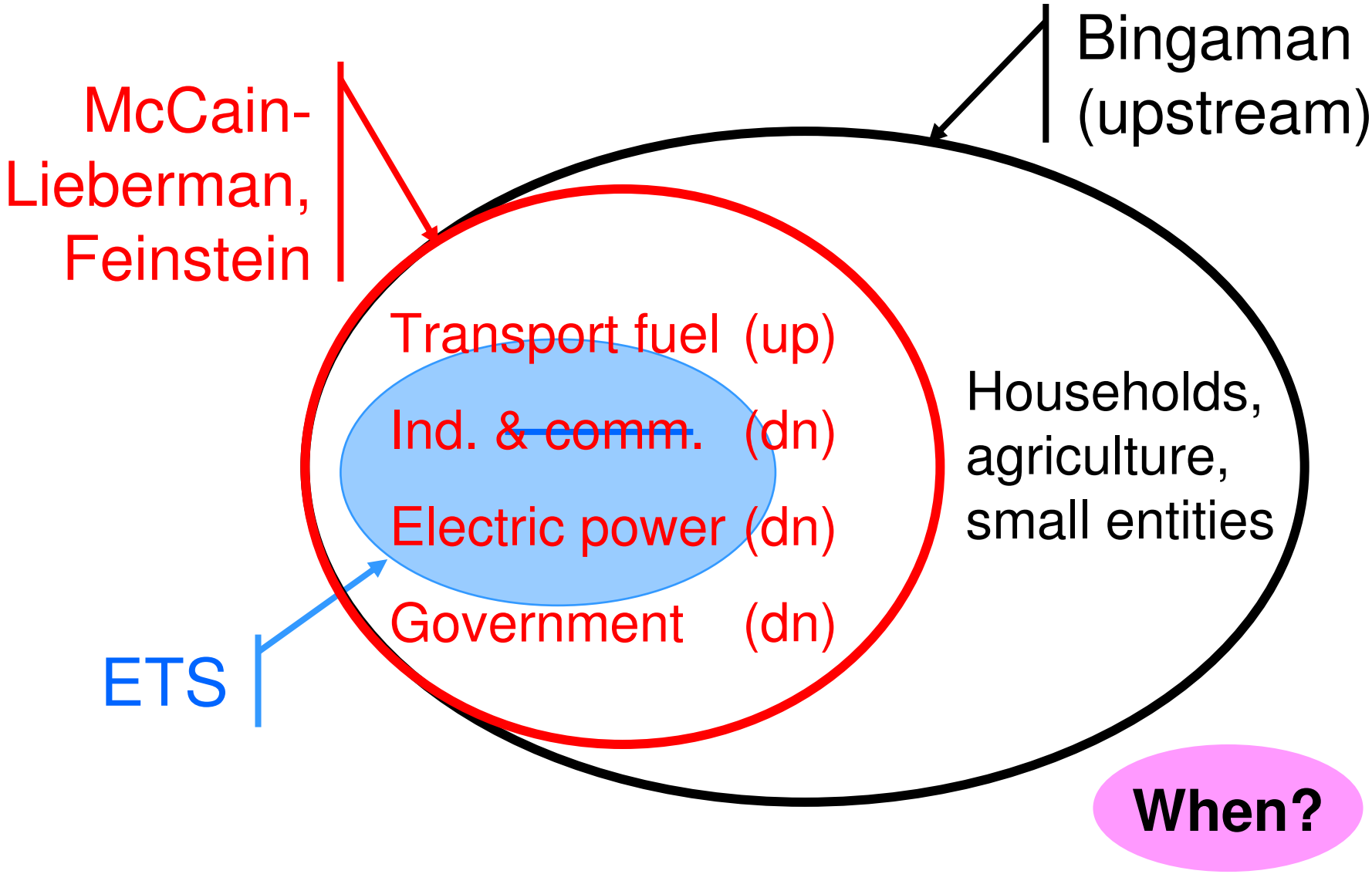
Possible Developments by 2012

- Federal
  - Cap-&-trade system — Likely
  - Carbon tax — Not likely
  - Put CO_2 under the Clean Air Act — ?
  - Tighter CAFE standards — Likely
  - Portfolio standards — Unlikely
  - Subsidies to renewables — Continued
  - Subsidy to capture and storage — Likely
- States and cities
  - Actions — In some
  - Pressures on federal measures — Definitely

Senate Cap-&-Trade Proposals

- Now being formulated
  - McCain Lieberman
  - Bingaman
  - Feinstein
  - Jeffords, Kerry, others
- Alternative designs
  - Transport fuel included, or not
  - Electrics and heavy industry
  - Electric utilities only
- Issues of permit allocation

Cap-&-Trade Designs



What Next? A Personal View

- For years to come: a climate "favela"
- Serious discussions only after two nations start *independent, domestic* action
  - The US
    - Beyond R&D, subsidies and voluntary measures
    - Processes are under way . . . And the timing?
  - China
    - Some action and contingent commitments
    - Are processes under way? . . . And the timing?
- The timing is bad for achievement of 450 or 550 ppm stabilization levels

How to Get Up In the Morning

- A century-scale problem
- Understanding risks and policy effects is important
- Public knowledge is ratcheting up slowly
- Lesser achievements in GHG control do matter

2000-2100 CHANGE	WITHOUT POLICY	750 ppm STABILIZATION	550 ppm STABILIZATION
>6.8 °F (3.8 °C) global warming	1 in 10	1 in 29	< 1 in 250
>10 °F (5.6 °C) Alaska warming	1 in 3	1 in 4	< 1 in 250
>2 feet (0.6 meter) sea level rise	1 in 6	1 in 20	< 1 in 250

NOTE: Values are preliminary and for illustration purposes only

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