

U.S. Energy Problems

Lecture 3

In 1970, President Nixon(!) Signs the Clean Air Act, Creating EPA

- **Why are we discussing this anti-pollution policy in a class on energy?**
- Interesting NAS estimates of 2005 “unpriced consequences” of energy use (*externalities*):
 - coal-fired power plants: \$62 billion (0.2¢-12¢/kwh)
 - gas-fired power plants: \$749 million (0.05¢-1.0¢/kwh)
 - GHG emissions: coal roughly 2x gas/kwh
 - transportation: \$56 billion (\$36 billion light-duty, \$20 billion other)
 - electric vehicles (coal) worse than diesel worse than gasoline or corn ethanol
- **Is it sensible to estimate, ethical to use such \$ values of (statistical) lives, sickness?**

Was the 1970 Clean Air Act Necessary? Sensible?

- **Why not just give property rights?**
Example in Viscusi et al: mill does \$500 damages, could stop for \$100, town could undo for \$300. Mill stops if either has property rights
- **Why can't assignment of property rights work in general? Why involve government?**
- **Why not leave it to the states to decide whether/how to regulate?**
- **Should EPA have been told to set the NAAQS using benefit/cost analysis (\$/life)?**

Why not just charge for damages?

Viscusi et al: in theory can use a (Pigouvian) tax to get optimal pollution at lowest cost...

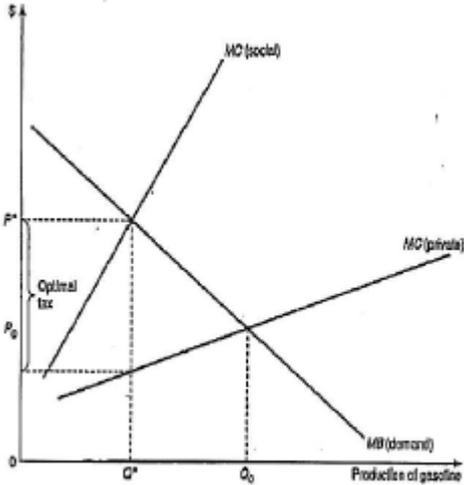


Figure 21.3
Market Equilibrium versus Social Optimum

Any reasons why it might nonetheless sometimes be sensible to set standards instead?

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Now it is November, 1974

- **What has recently happened to put energy policy on the Washington agenda?**
- **President Nixon is considering announcing “Project Independence,” an effort to make the US self-sufficient in energy by 1980**
 - **How important is energy independence, and why? Does it guarantee “energy security?”**
 - **How much should the nation be willing to pay for it – in dollars per gallon of gasoline, say?**
 - **Would you advise Nixon to announce “Project Independence”? Why or why not?**

It is 1975, Gerald Ford is the Post-Watergate President

- **What has happened to oil prices lately?**
- **President Ford is considering supporting either a motor fuels tax or regulation of average new car and light truck mileage – the CAFE program**
 - **Would you have advised him to support the tax, the CAFE program, or neither – and why?**
 - **How else might the US have reduced its use of petroleum?**

It is late 1980, and President Carter is packing his bags

- **What has happened to oil prices since 1975?**
- **Some of Carter's advisors are advocating building a synthetic fuels industry that could turn enough US coal into motor fuel to eliminate the need to import oil.**
 - **What would you like to know to decide whether such an effort would be in the public interest?**
 - **Based on what you do know (and what Carter might have known in 1980), would you advise him to support this effort and establish the Synthetic Fuels Corporation?**

It is 1986; Ronald Reagan is President

- **What has happened to oil prices since 1980?**
- **How well has the Synthetic Fuels Corporation (SFC) performed?**
- **Would you advise President Reagan to abolish the SFC? Why or why not?**
- **What facts would you like to have had in order to be confident in your advice?**
- **Suppose the SFC had built enough capacity to be able to eliminate the need for oil imports, but at *twice* the cost of conventional motor fuels. What would you have advised then?**

It is February 2012, and Barack Obama is President

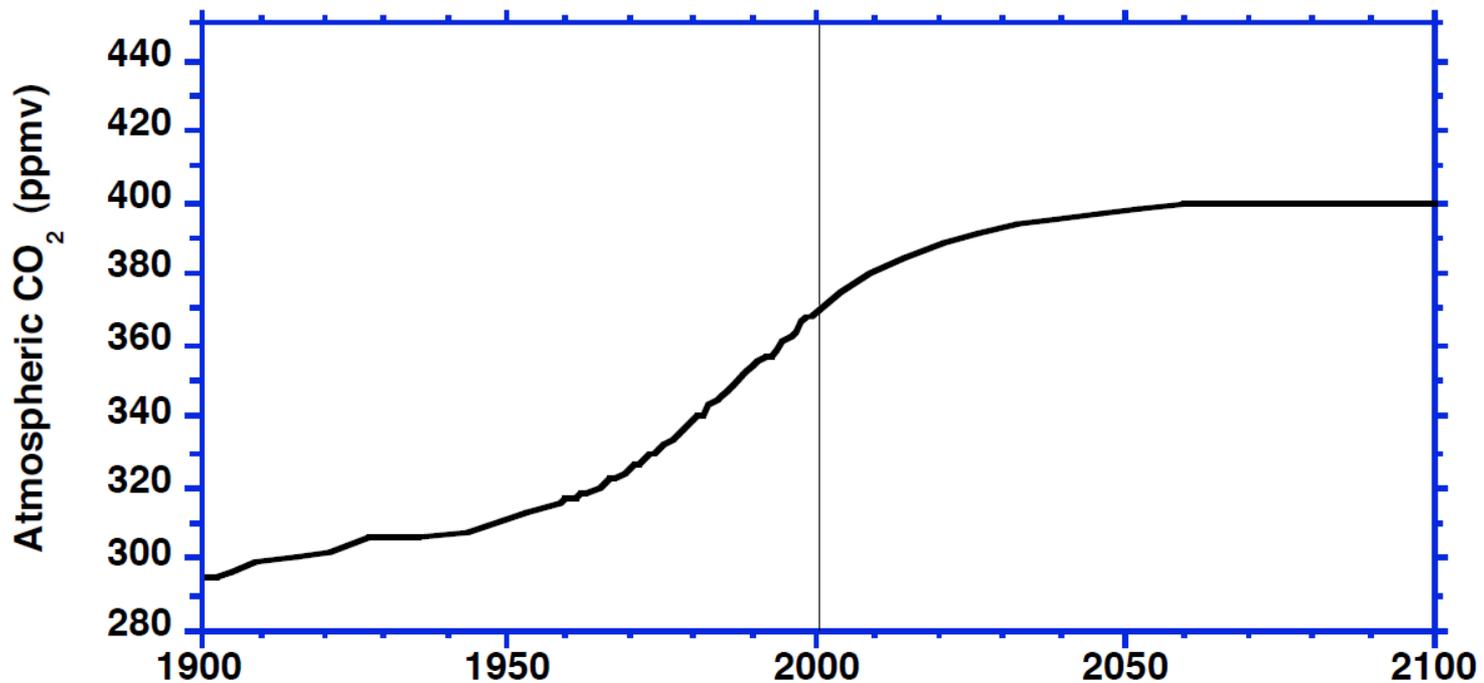
- **What has happened to US dependence on imported oil since 1986? Overall? Recently?**
- **What happened to CAFE standards from the mid-1980s until the late 2000s? Can you explain this pattern?**
 - **Case doesn't mention 2007 law calling for major increases, proposed in 2008, finalized in 2009**
- **What new environmental concern, not on the radar in the mid-1980s, is complicating energy policy decisions?**

A Few (Preliminary) Words about Climate

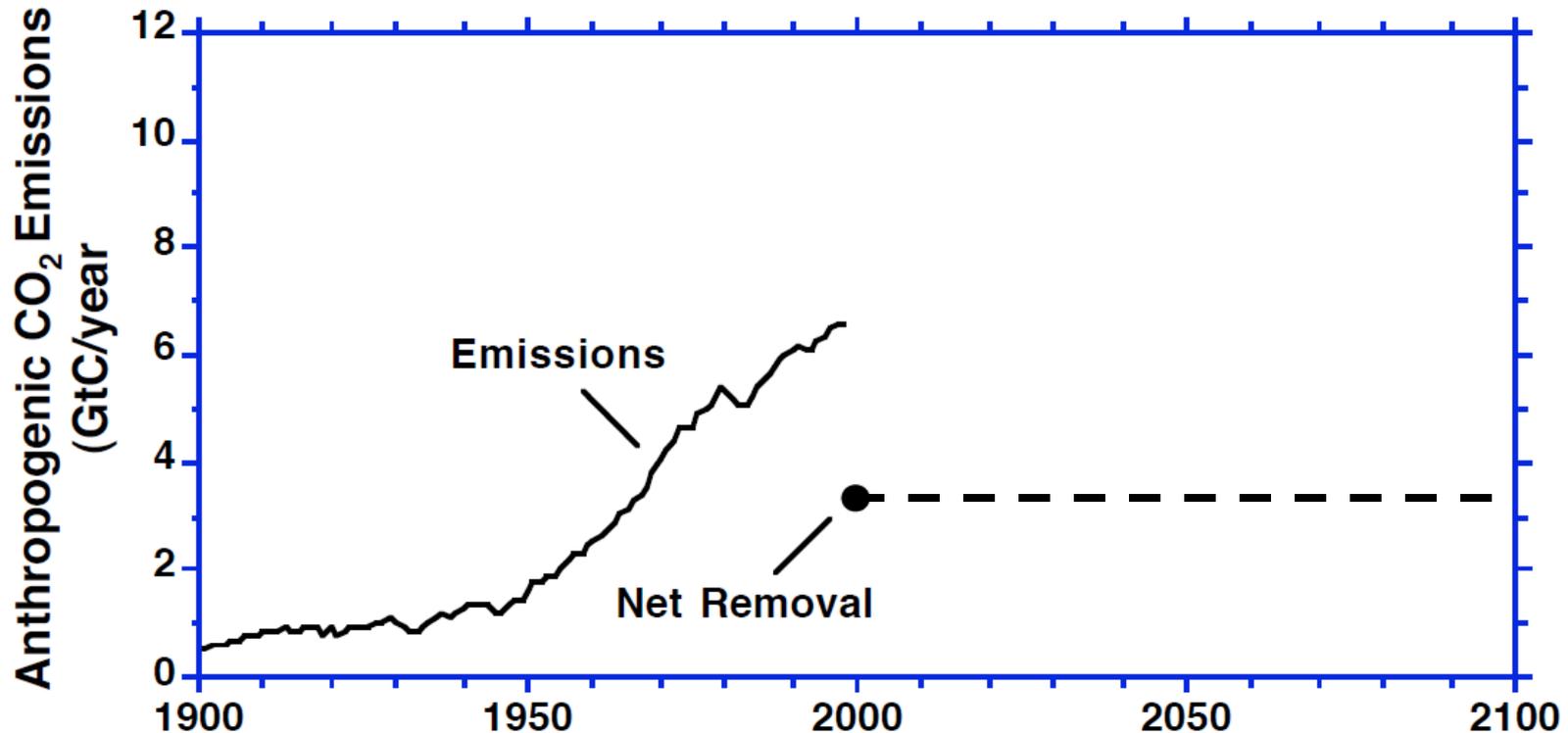
- Even though essentially all nations have signed the 1992 UN Framework Convention on Climate Change, which calls for stabilizing GHG concentrations “at a level that would prevent dangerous anthropogenic interference with the climate system”, little has been done to solve this **hard** problem:
 - Stabilizing concentrations would require serious actions by many nations, rich & poor, with very different energy systems, and there is no world government to make or enforce rules
 - This problem involves future generations, since emissions of the main anthropogenic GHG, CO₂ (mainly from fossil fuels & land use change), have a half-life around a century; it is politically tough to get people to bear costs today for uncertain benefits in a century or more
 - Because CO₂ is removed from the atmosphere slowly and current emission levels are raising its concentration, global emissions must be CUT drastically to stabilize its concentration

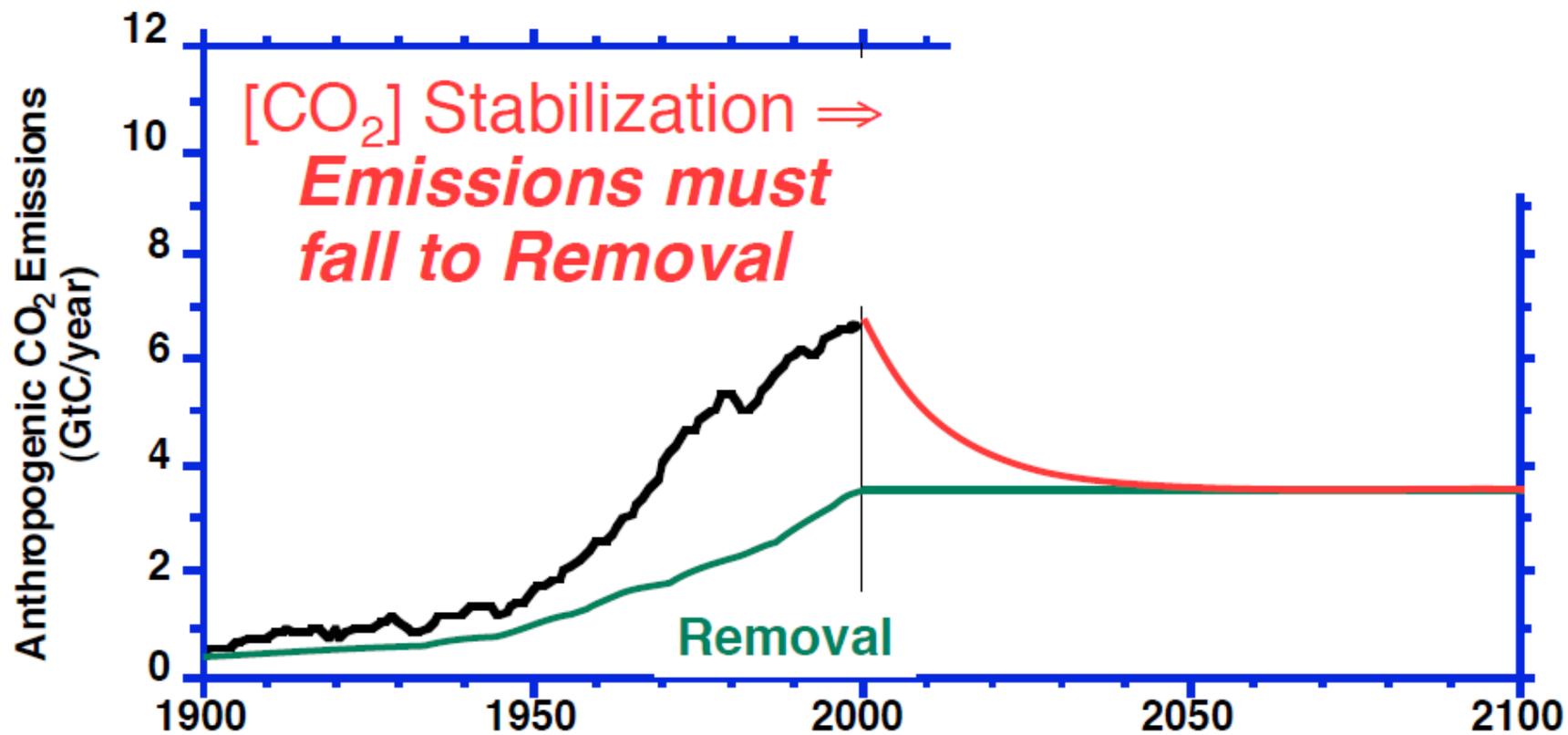
The last point is critical & hard to grasp intuitively (Will explore later with a simple computer model.)

Consider a scenario in which the concentration of CO₂ in the atmosphere gradually rises to 400 ppm, about 8% higher than the level in 2000, then stabilizes by the year 2100, as shown here:



Suppose net removals are roughly constant. Visualize or sketch a path of future anthropogenic emissions consistent with the preceding scenario: a gradual near-term rise, then stabilization by 2100.





Even smart people miss this

- **84%** violate conservation of mass
- **75%** violate equilibrium condition that stable atmospheric $\text{CO}_2 \rightarrow e = r$
- **63%** assert atmospheric CO_2 can be stabilized while $e > r$

Subjects: MIT/Harvard Graduate Students

Sterman, J. (2008) *Science* 322: 532-533 (24 Oct).

Down a risky path

- Since 1992, there have been 17 conferences of the parties to the UNFCCC (COPs), most recently in Durban, South Africa
- COP 3 in 1997 produced the Kyoto Protocol, calling for rich countries (only!) to make reductions in 2008-12
- The EU & others ratified; the US did not, and President George W. Bush formally rejected the Protocol in 2001
- Subsequent COPs have failed to produce a global agreement on emissions, and the US has been not likely to pass emissions-limiting legislation any time soon
- Your COP, beginning 2/29, may be the last chance, since there is growing evidence that damages from climate change may be severe & contain nasty surprises...

Back to 2012 & President Obama

- **Would you advise the President to favor or disfavor electricity generation from coal? What are the issues?**
- **What about production of synthetic motor fuels from coal? What are the issues?**
- **What about subsidies for EVs and PHEVs? What are the issues?**
- **Are there any other policies you would advocate to solve “the energy problem”?**
- **Is US coal part of the solution to the US energy problem – or part of the problem?**

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