Despite advanced technology and a desire to be independent of foreign oil, the production of oil in the U.S. peaked and moved to a state of decline.

Is anything being done?

• There is very little awareness of “Peak Oil” in this country
  – even on Wall Street, and on Capitol Hill
• But the Department of Energy commissioned a study (the Hirsch Report), published Feb. 2005 that concluded:
  – peak is inevitable
  – a problem unlike any ever faced by the world
  – must start mitigation decades ahead of peak
  – options for liquid fuels replacement are limited, and mostly still fossil-fuel-derived

A look at the Hirsch Report

• Google: peak oil
  – go to Wikipedia link (near top of list)
  – under “Possible Effects…” heading, see reference to Hirsch Report
  – clicking the link for the Hirsch report main article, find summary (PDF) link near top
  – alternatively, full report available in link at bottom
• Let’s spend some time looking at this report…
So the DoE knows: who else?

- Roscoe Bartlett (R-MD) and Tom Udall (D-NM) have formed a Congressional Peak Oil Caucus
  - commissioned a GAO (General Accountability Office) study on peak oil
    - Google search: bartlett gao peak
    - try: coverage of GAO… link
  - GAO study concluded essentially the same thing as the Hirsch Report: we need to act now to be assured we mitigate disaster

Lack of Awareness

- Quote from Adam Cohen (www.peakoil.org):
  “In my personal experience working with energy companies on stock and bond offerings during the last 3 years, I never heard any energy company employee or energy investment banker use the phrase "Peak Oil." The few times I mentioned the phrase privately to bankers, the response was "What’s that?"

- Another quote from same source, referring to the assumed “market wisdom” of Wall Street:
  “Put another way, how can so many smart people in suits be so wrong?”

- Look how long it took global warming to get on our radar screens
  - ironic that this one could be worse, but make global warming not as bad!

So what are the alternatives?

- The Hirsch Report discusses five mitigation strategies:
  - Increased fuel efficiency in transportation
  - Heavy oil, tar sands
  - Liquefaction of coal
  - Enhanced oil recovery
  - Gas-to-Liquids (nat. gas)

- All fossil fuels; all needed in parallel
  - even then, need to start 10–20 years before peak

- Hydrogen, corn ethanol considered non-viable
Do we even have enough coal?

- Recent work by Dave Rutledge at Caltech hints that we may not have as much world coal as is assumed
  - Rutledge estimates 240 Gtoe (gigatons oil-equivalent) of coal left in the world (90 Gtoe in the U.S.)
  - “Official” estimates are 460 Gtoe in world, 146 Gtoe in U.S.
  - For comparison, the estimated 1 trillion bbl of oil left amounts to 140 Gtoe
  - So coal isn’t even twice as abundant as the remaining oil, if this is right
  - The U.K. down-revised their coal estimates by 99% from 1970 to 2005: they’re basically out

Recall rate plots from lecture 7

This shows perfect execution of logistic behavior

COURTESY D. RUTLEDGE
Energy use is directly correlated with economic prosperity.

Chicken-and-Egg Problem

- Is energy use just keeping pace with economic growth?
- Or is economic growth possible only if energy is available?
  - related issue: indefinite growth means unbounded exponential behavior—incompatible with a world containing finite land, water, resources
- The world changed with the industrial revolution, and this was only possible because energy (coal) was cheap and abundant.

What happens after world oil peaks?

- Worldwide oil production will inevitably peak
  - the speed with which we can extract oil from the ground is limited, and will diminish
  - the U.S. experience (plus 33 of 48 major oil-producing countries that are in decline) is a good example
- What happens then?
  - gas prices go way up (even more!)
  - transportation becomes expensive
  - all sectors of our economy impacted
    - all consumer goods, agriculture, etc. depend heavily on liquid petroleum
What can/should you do?

- Understand that we don’t know what the future holds
  - I may be over-reacting to the potential threat
- Raise your awareness of energy issues
- Make life plans that allow flexibility
  - have a plan B, or pick a direction that will be valuable in any eventuality
- Adjust yourself to a world with less stuff/goodies
  - less jarring if hard times hit, and easy to please if hard times don’t hit
- Lower your own demand: best way to buy time for problem

Announcements/Assignments

- This is a “supplemental” lecture, breeze through in class
- Can find Hirsch Report via Google
  - executive summary is good start
  - also full text available
- Optional reading
  - Do the Math: Peak Oil Perspective