Energy and the Economy
Bumping against the Growth Ceiling

Gail Tverberg, August 13, 2011

We have all been taught that economic growth can continue forever

- What if economic growth really can't continue forever?
- What if we really are growth hitting limits now?
- Where do we go from here, if we are hitting limits now?

Brief statement of problem:

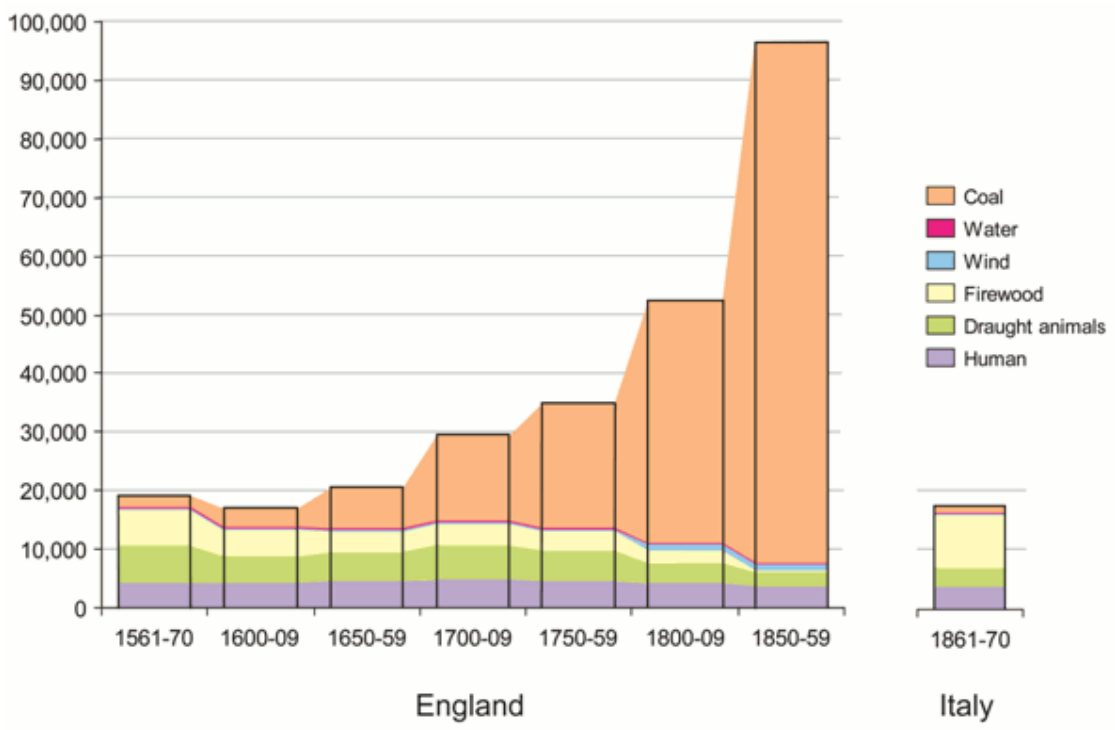
1) We have an economy that needs growth

2) We have limited oil supply that constricts growth

Our Economy Needs Growth

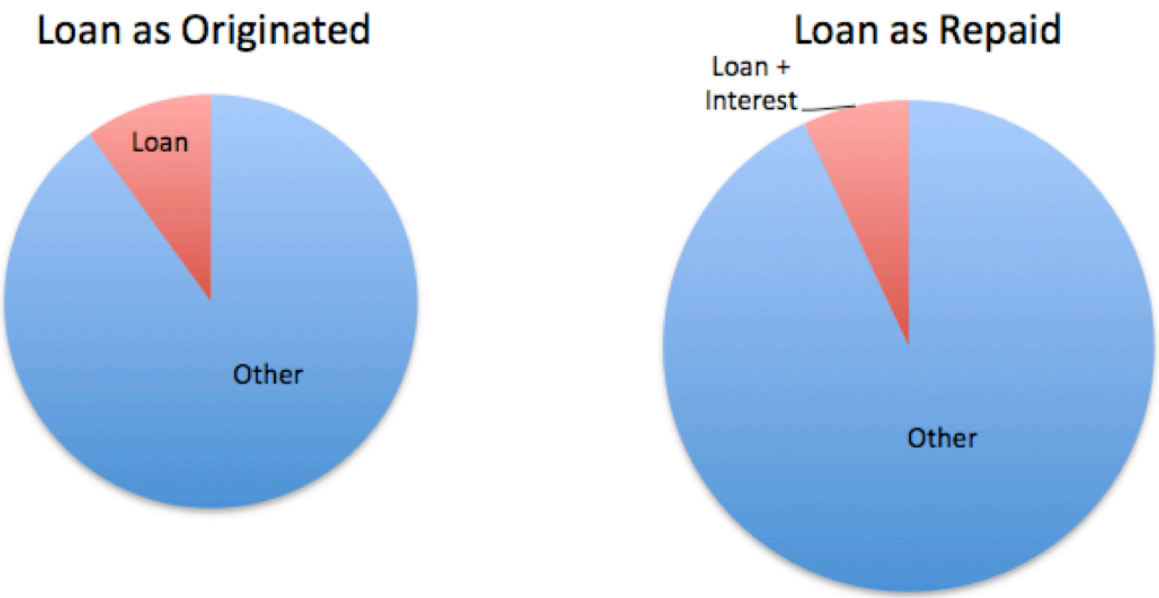
World has used fossil fuels for 450 years

- Helped create economic growth
- Helped create belief that economic growth will always continue

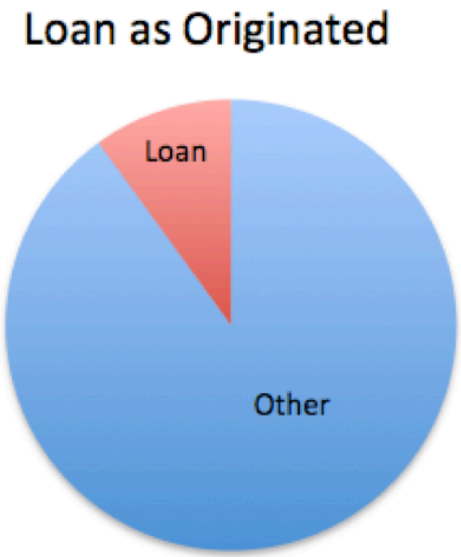


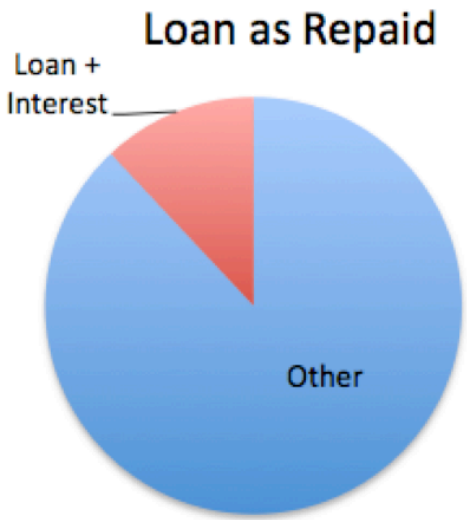
Our financial system depends on growth

Repaying loans is easy in a growing economy



Repaying loans is much more difficult in a shrinking – or flat - economy





Reinhart and Rogoff looked at 800 years of repayment of sovereign debt

- They report --
- "It is notable that the non-defaulters, by and large, are all hugely successful growth stories."
- Countries that were growing could repay debt!

Growth provides many benefits

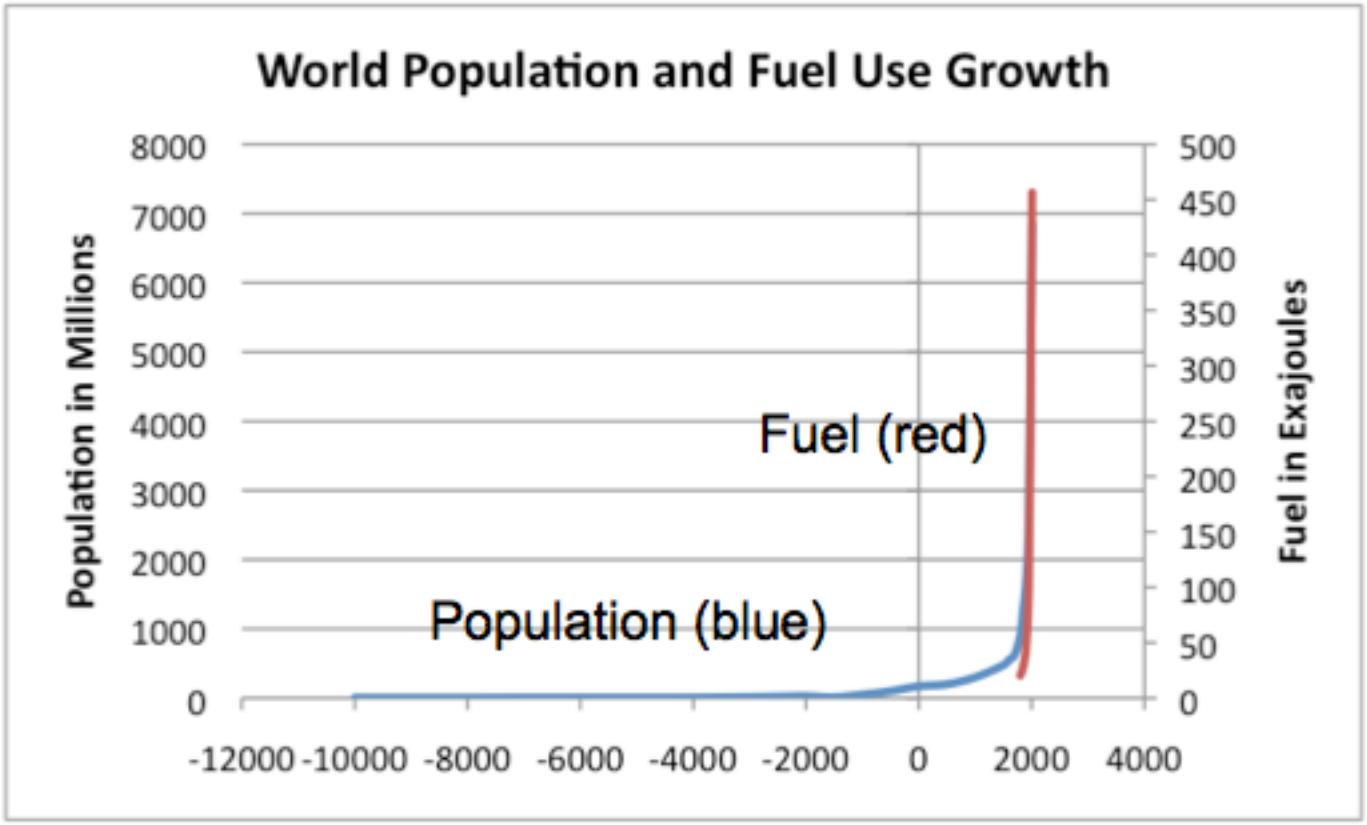
Rising home prices

Rising stock prices

Rising employment

Rising taxes;
Rising church contributions

Use of fossil fuels allowed population to expand greatly



Note: Population from US Census Bureau website; fuel use from Energy Transitions: History, Requirements, Prospects, Appendix A by Vaclav Smil; Praeger, 2010.

A few of oil's many uses

Food Uses

- Fertilizer
- Pesticides
- Herbicides
- Diesel for tractors
- Fast transport to market
- Diesel for irrigation
- Fuel for refrigeration
- Asphalt for roads

Other Uses

- Medicines
- Plastics
- Gasoline
- Synthetic cloth
- Building materials
- Easier metal extraction and working
- Diesel for earth movers

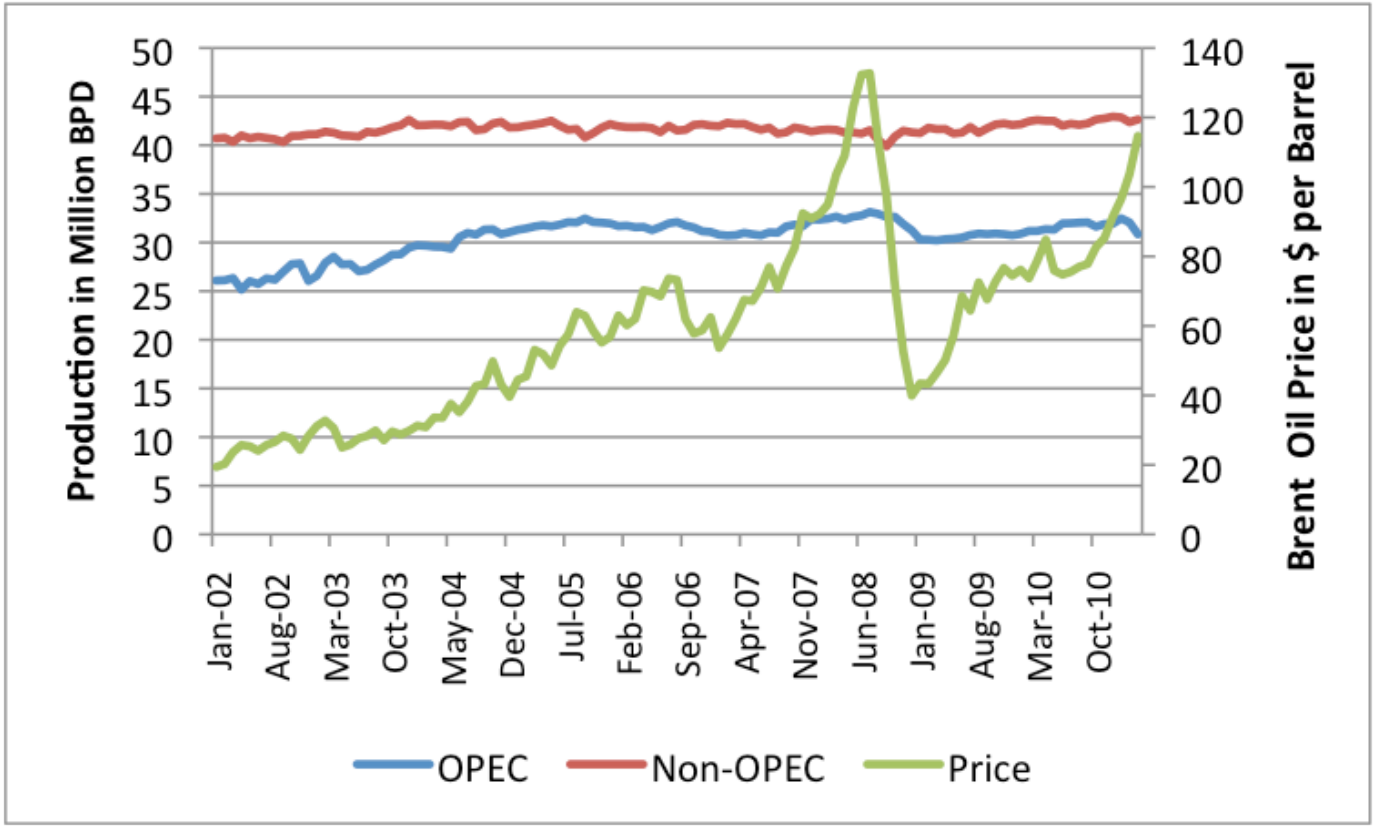
Economic decline leads to many bad outcomes

- Many debt defaults
- Declining home prices
- Fewer people employed
- Declining tax revenue; rising unemployment claims
- Declining stock market
- Declining church contributions

Limited oil supply is constricting economic growth

Oil production is no longer responsive to rising price

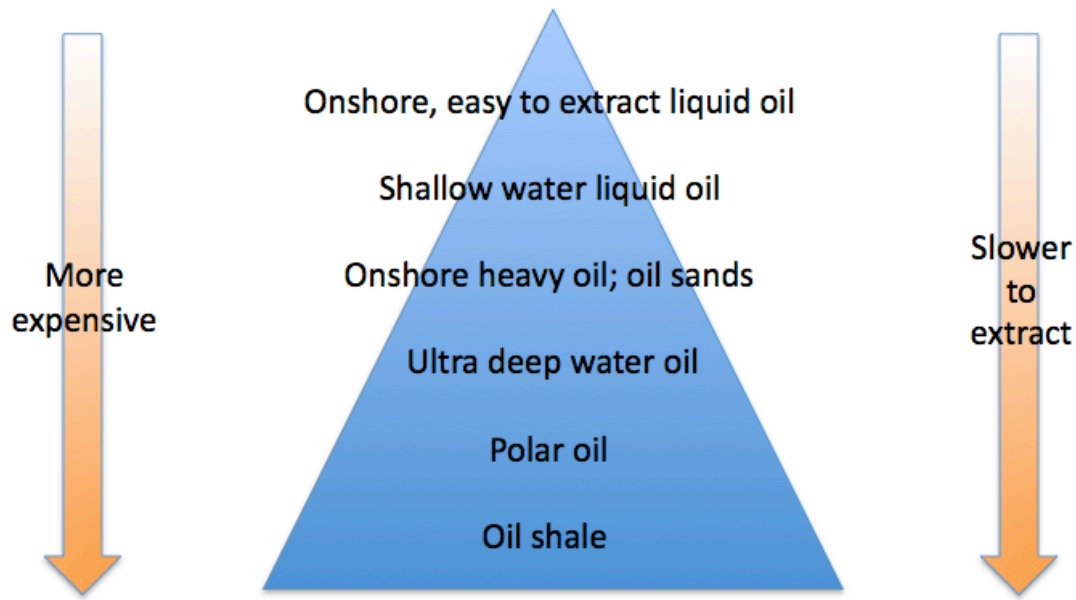
World oil production has been pretty much level since 2005!



Note: "Crude and Condensate" oil amounts. Based on EIA data.

How can this happen?

A huge amount of oil is available

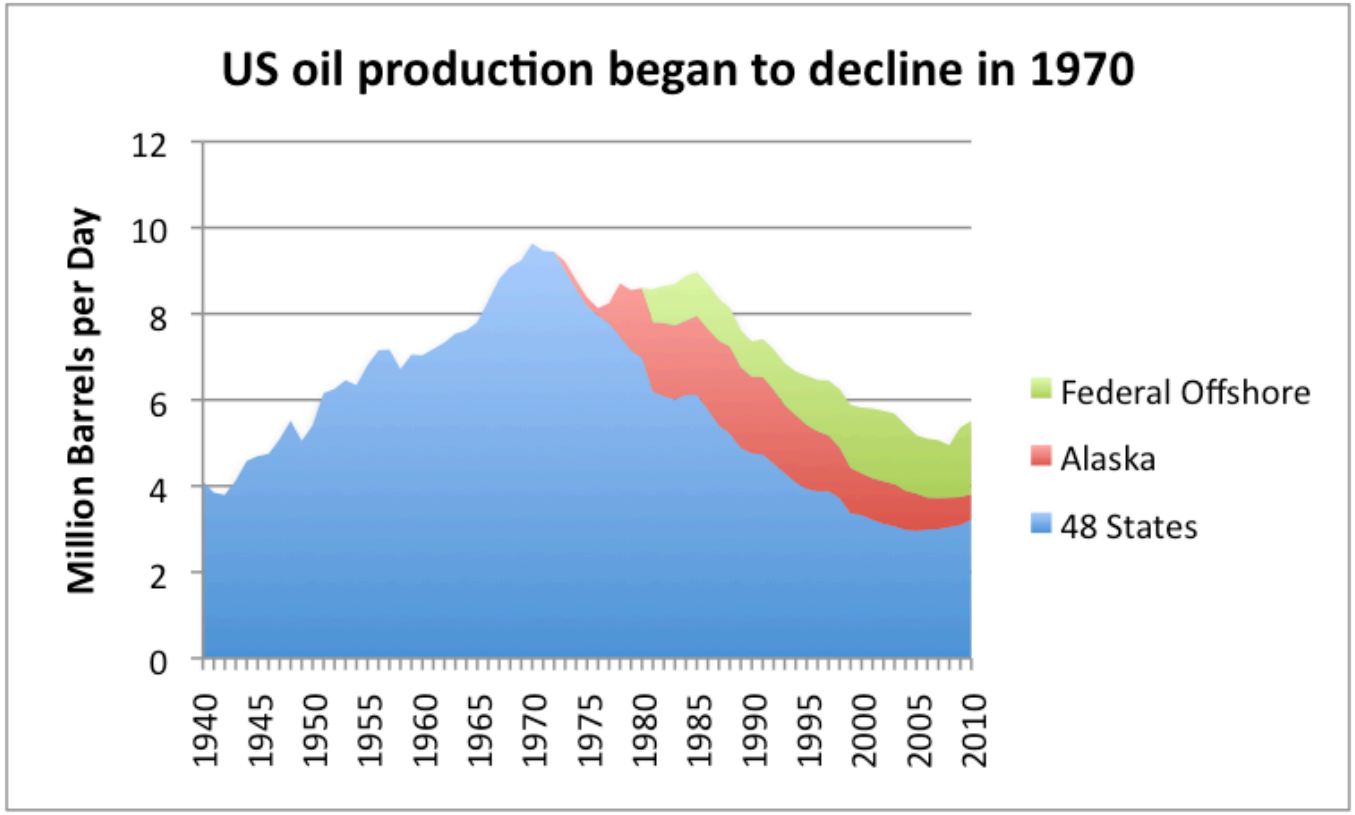


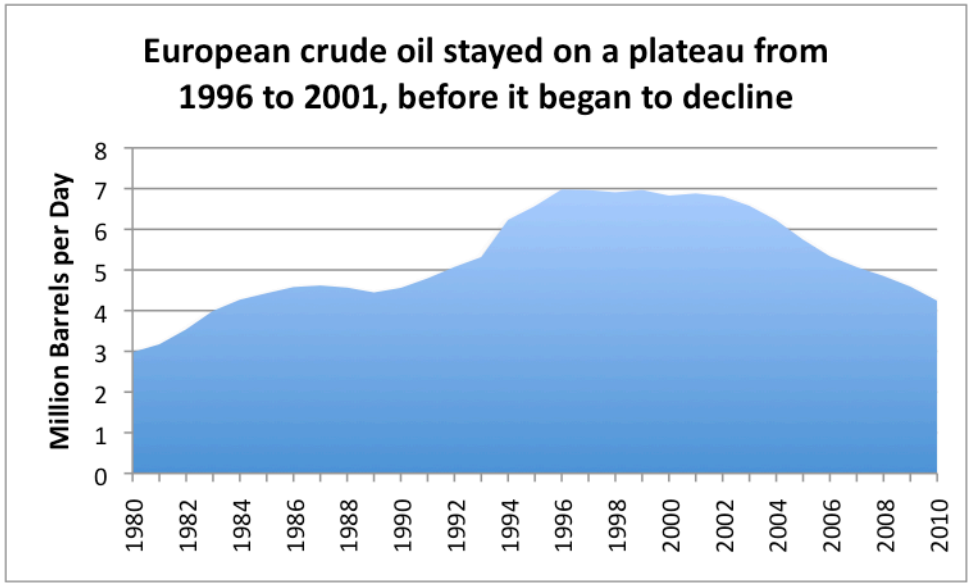
But in practice there are huge obstacles

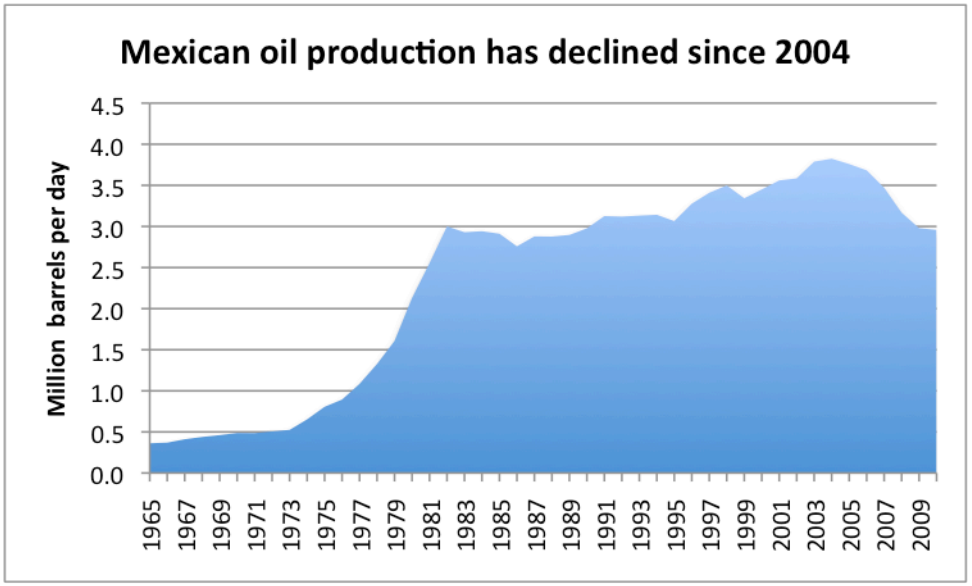
- Cheap oil is mostly gone
- Expensive oil seems to cause recession
  - James Hamilton: 10 out of 11 most recent recessions followed oil price spikes
- Major investment needs to be made, well in advance of when oil is needed
- Prices haven't been high enough, long enough, to support huge investment needed

Leveling of world oil supply is not entirely unexpected

- Oil production in many countries has started to decline




European crude oil stayed on a plateau from 1996 to 2001, before it began to decline
Million Barrels per Day
0
1
2
3
4
5
6
7
8
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010


Mexican oil production has declined since 2004
Million barrels per day
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
1965
1967
1969
1971
1973
1975
1977
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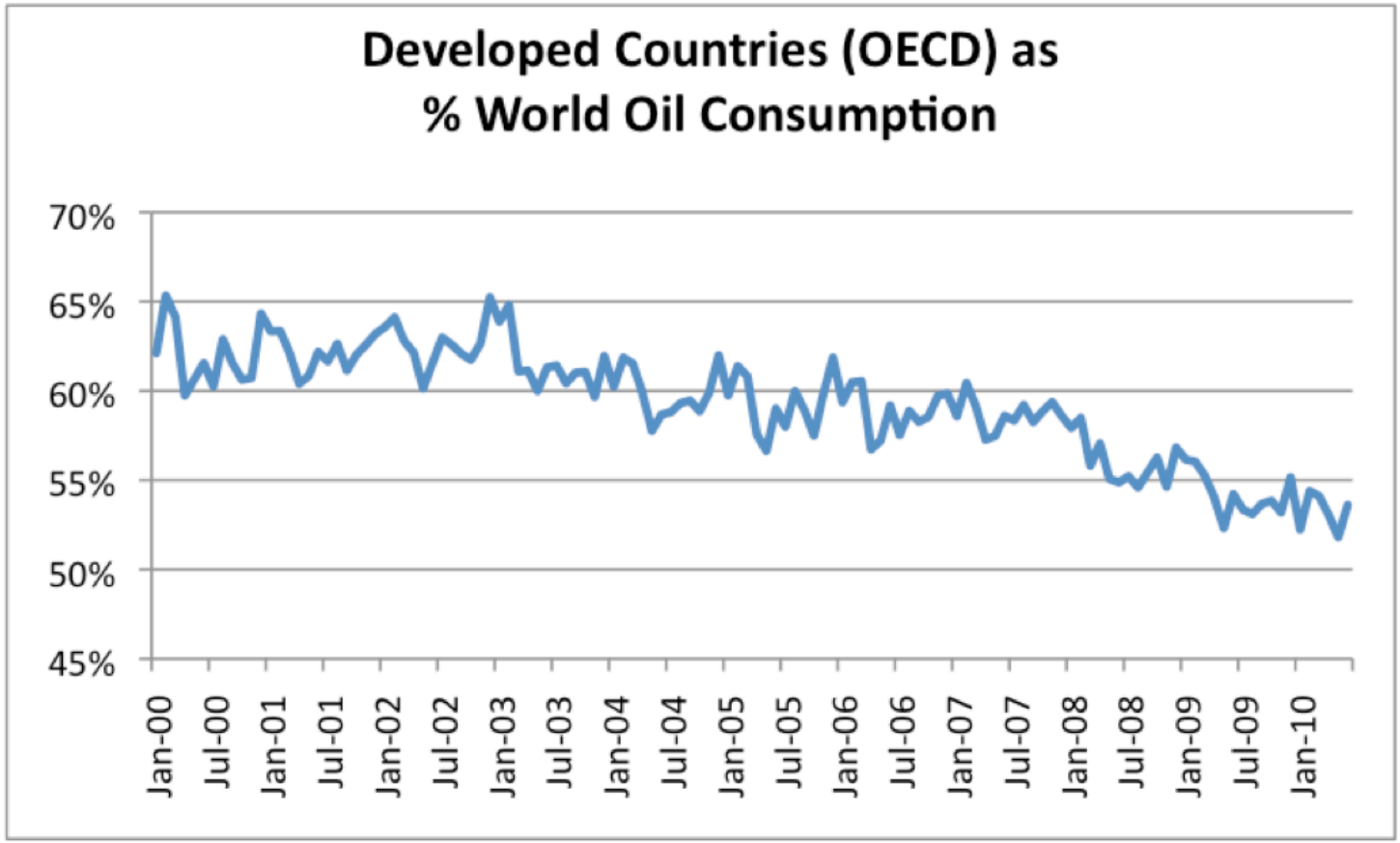
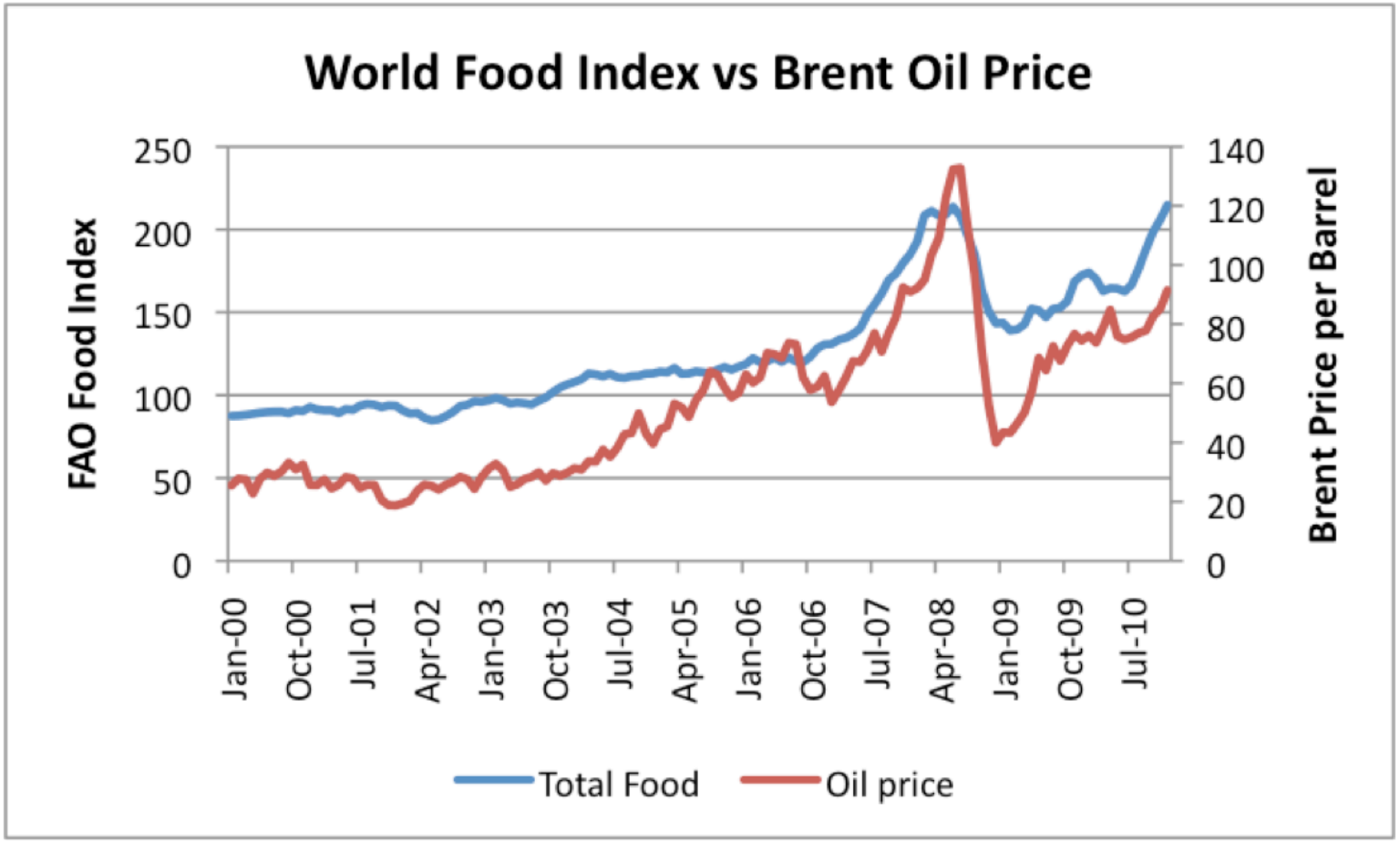
2003
2005
2007
2009

Part of our problem is that China, India, etc. are consuming more of the oil

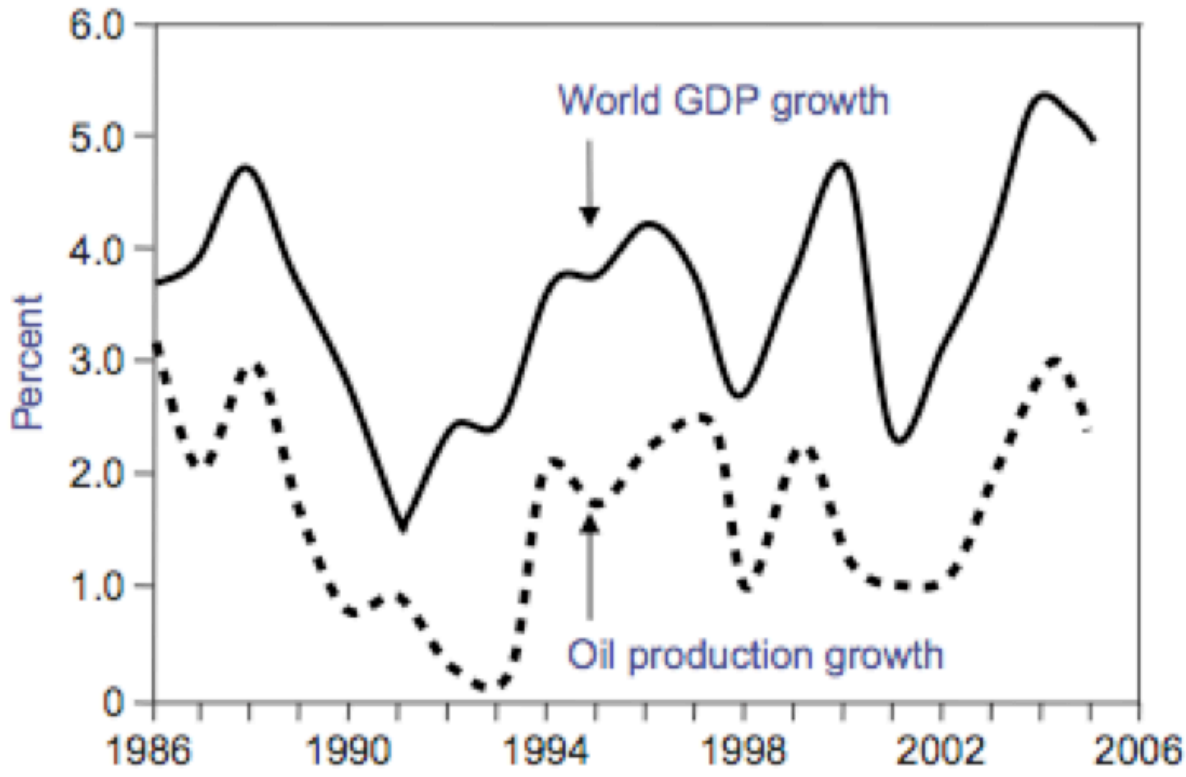


An economy without enough oil stops growing

Food prices tend to rise with oil prices



History shows a close tie between world economic growth and oil growth

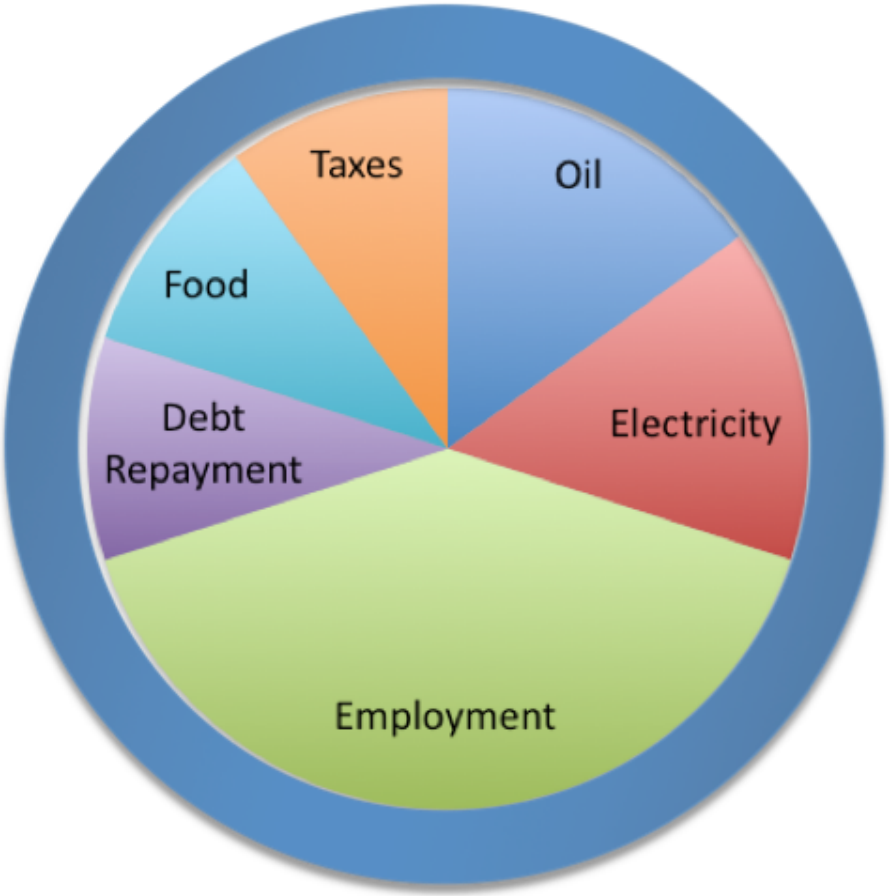


Source: Robert L Hirsch. Mitigation of maximum world oil production: Shortage scenarios. Energy Policy 2008

If oil shortage

- Food and oil prices rise
- People's incomes don't rise
- People cut back on discretionary goods
- Debt defaults rise
- Result: Recession

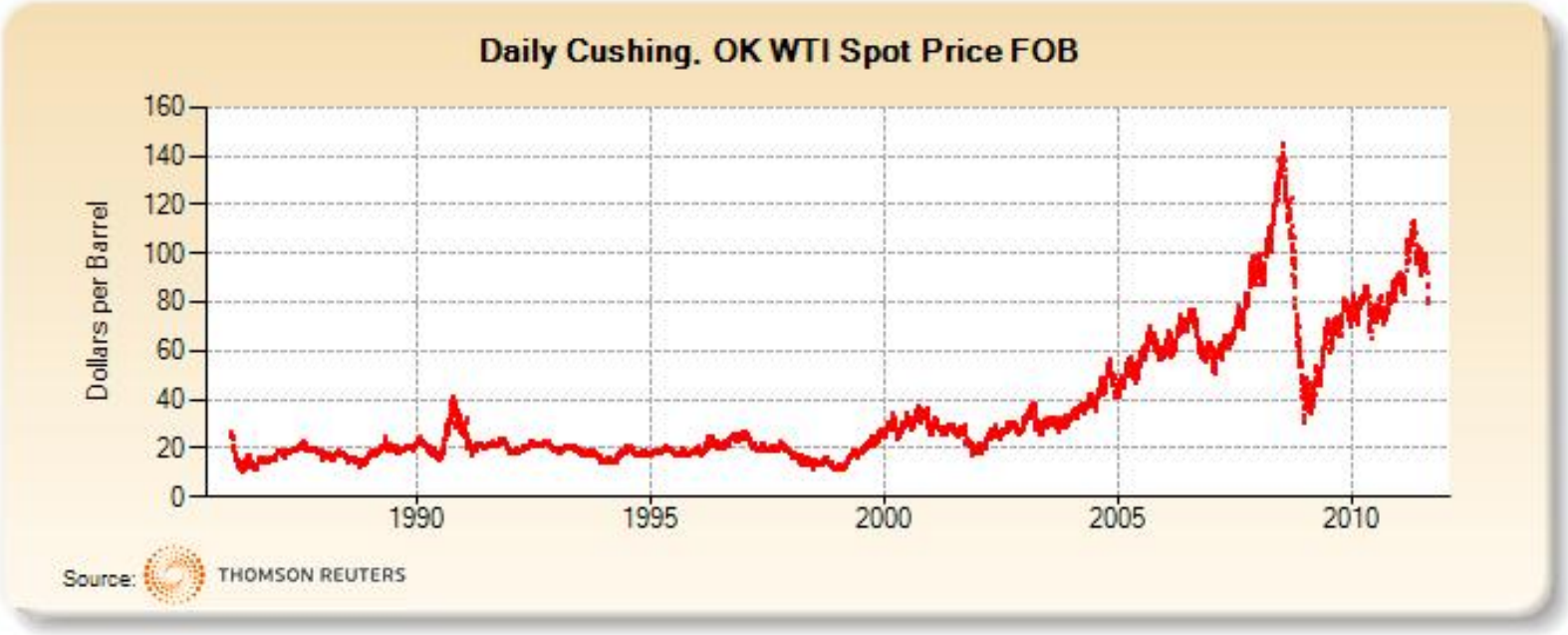
Shrinkage of economy is like making a smaller recipe batch



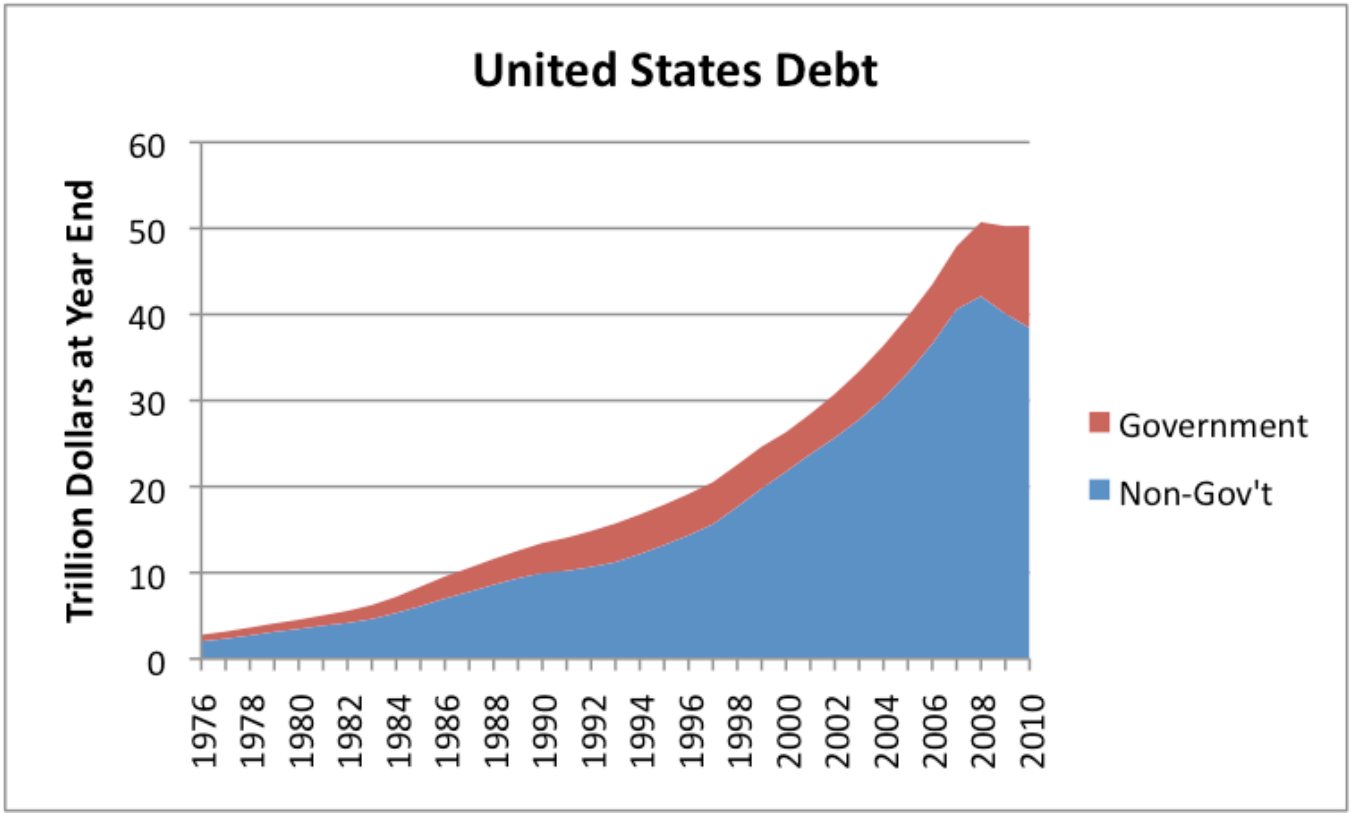
What happens after an economy hits the ceiling?

For one thing, oil prices keep spiking up

- Recession hits and continues on the down slope
- Looks like we are heading into a recession again

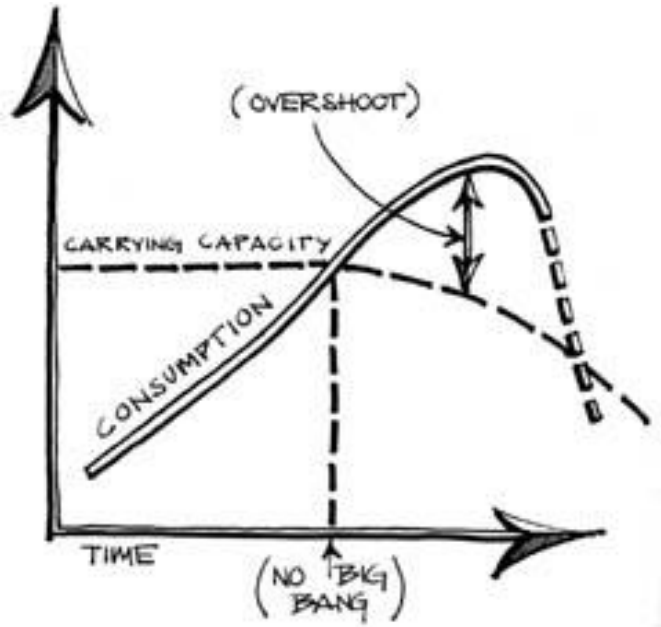


For another, non-government debt starts to decline, and governmental debt soars!



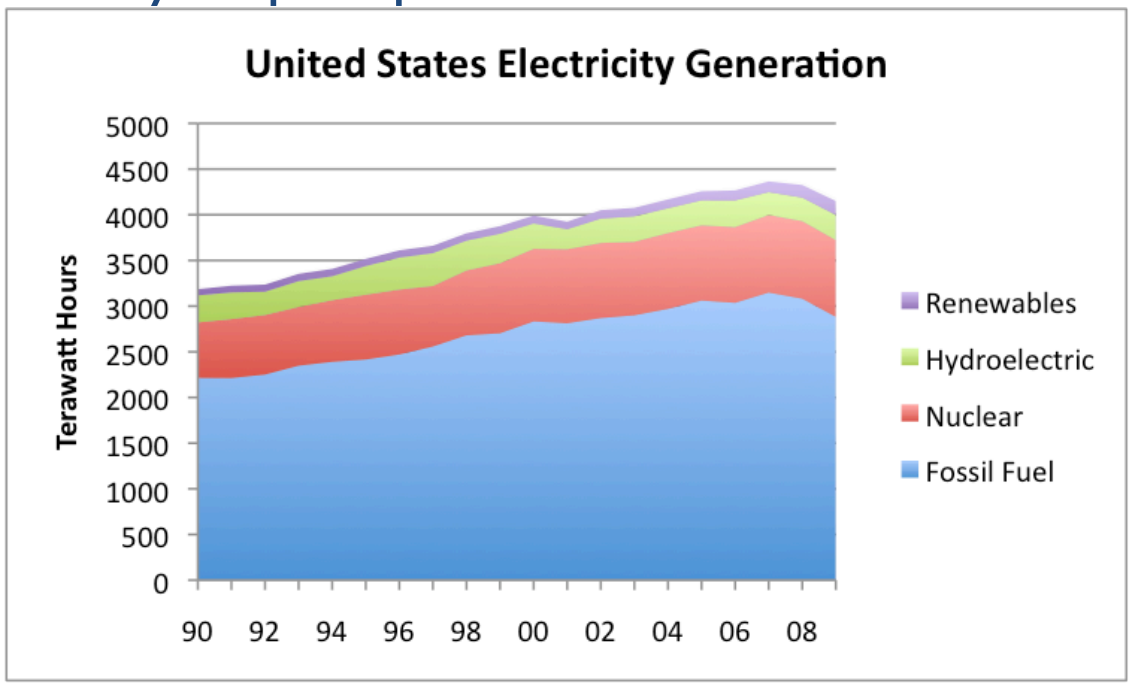
We don't know for sure how this all ends

- Some views are that this will end badly
- Not too different from throwing a ball up and hitting the ceiling



Alternate energy sources are too little, too late

- Biofuels amounted to 4.4% of US petroleum consumption in 2009
- Most mitigations are electric
  - Don't directly help oil problem – also small in total



Where do we go from here?

Take one day at a time

- What to expect
  - Another recession, probably severe
  - More layoffs
  - Huge governmental problems
  - Possible cutback in government programs
    - More hungry people
    - Possibly even nearby riots
  - Most every congregation will have similar circumstances
    - Many will need to choose between debt repayment and staff
    - Long-term health of banks/insurance companies holding debt is doubtful

A few thoughts

- Do what we can today
  - Count our blessings!
- No real solutions
  - Keep some water and food on hand
  - Don't count on always having electricity
  - Gardening makes people feel like they are doing something
- Don't count on paper investments
- High population is an issue – smaller families?
- Need help finding the right way