



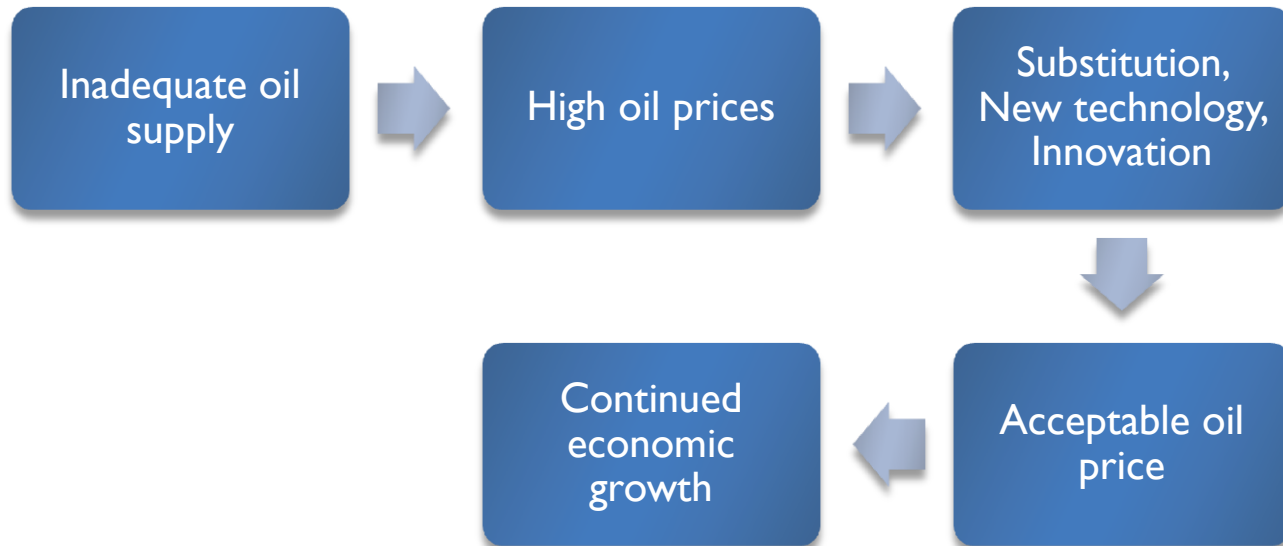
## How limited global oil supply may affect climate change policies

Gail E. Tverberg, FCAS, MAAA

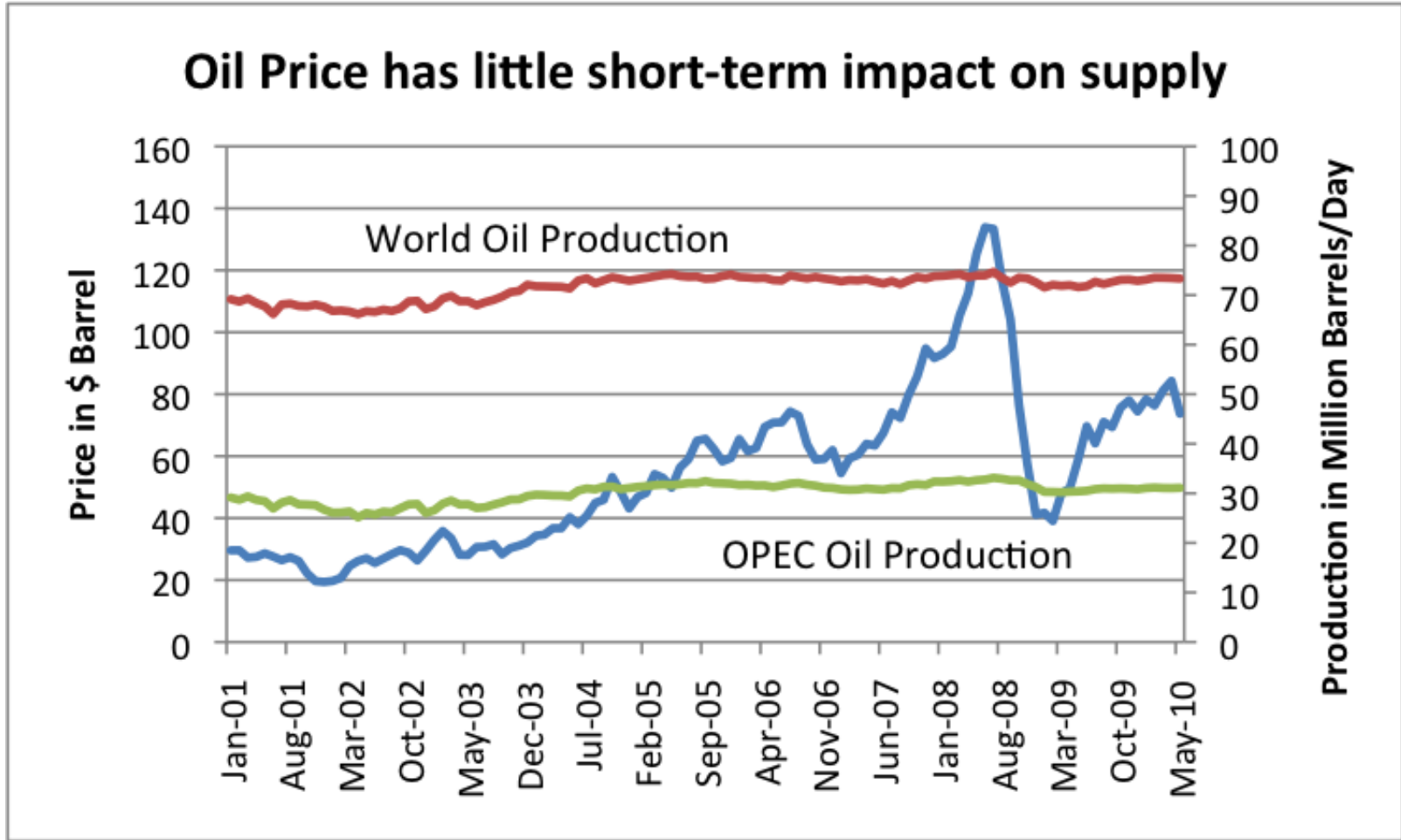
MIT – NESCAUM Symposium, August 25, 2010

# Usual Assumption

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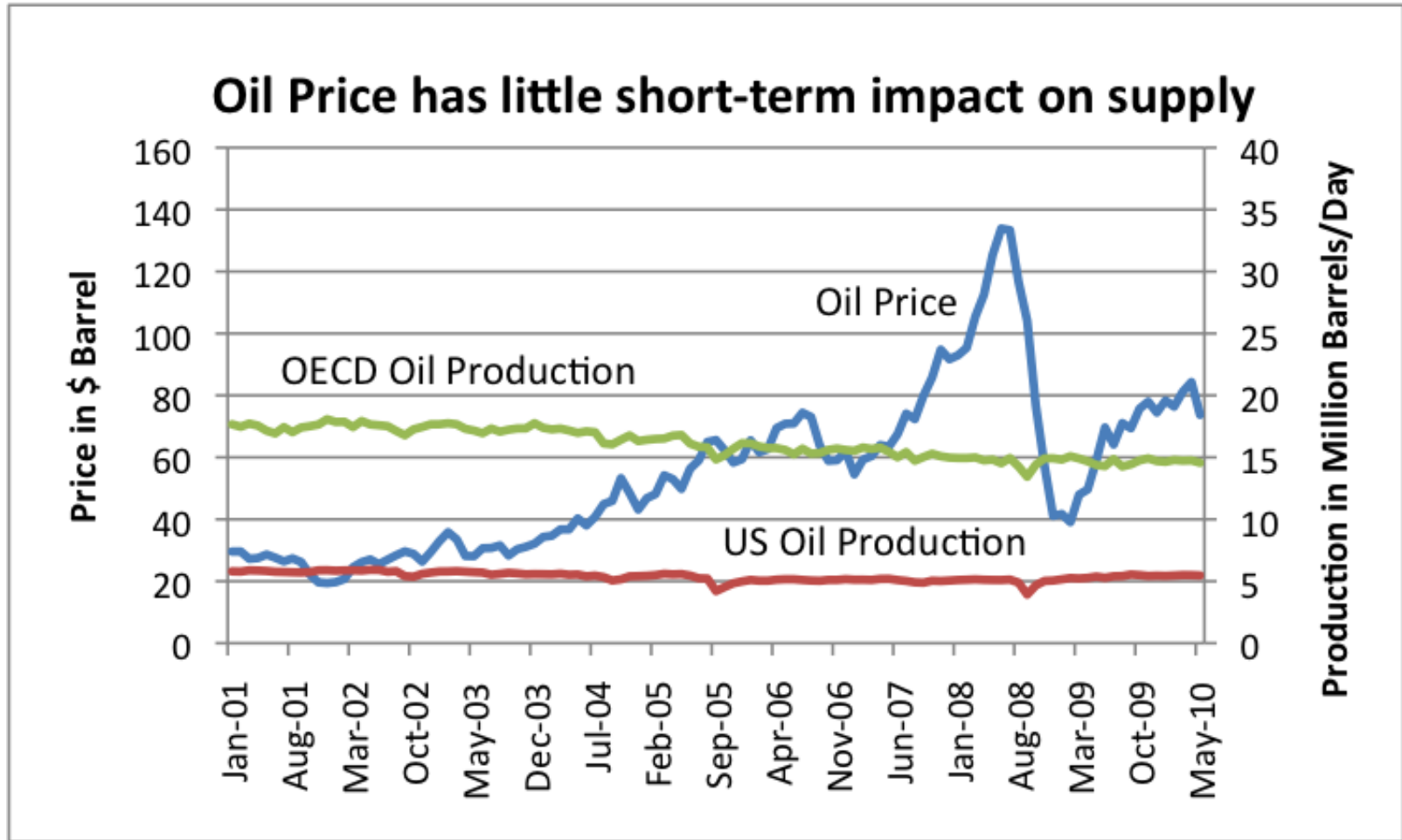


# But how soon do high prices affect supply?



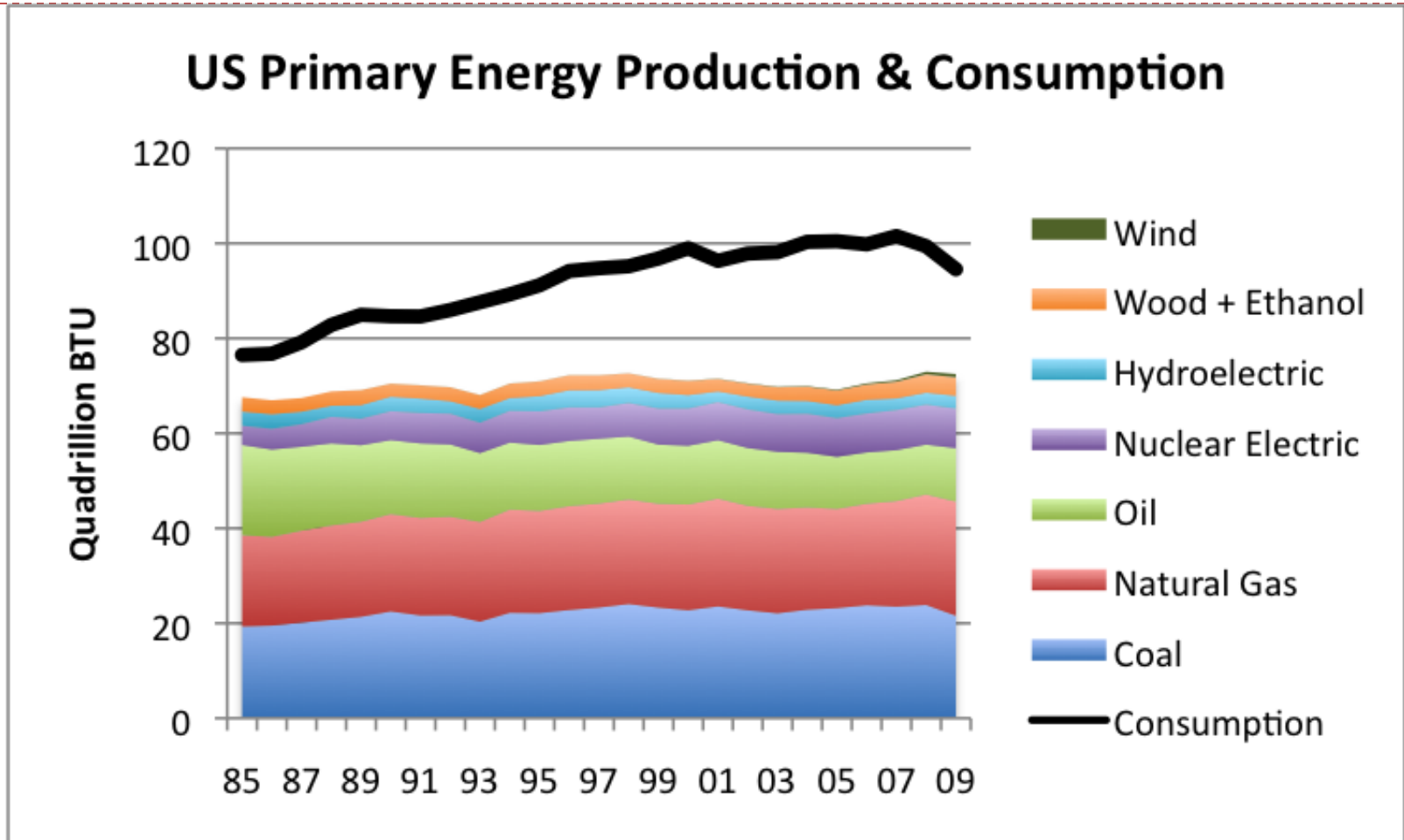
Note: Oil production is crude + condensate from <http://www.eia.doe.gov/ipm/> Oil price is West Texas Intermediate spot price [http://www.eia.gov/dnav/pet/pet\\_pri\\_spt\\_s1\\_m.htm](http://www.eia.gov/dnav/pet/pet_pri_spt_s1_m.htm)

# More on oil supply



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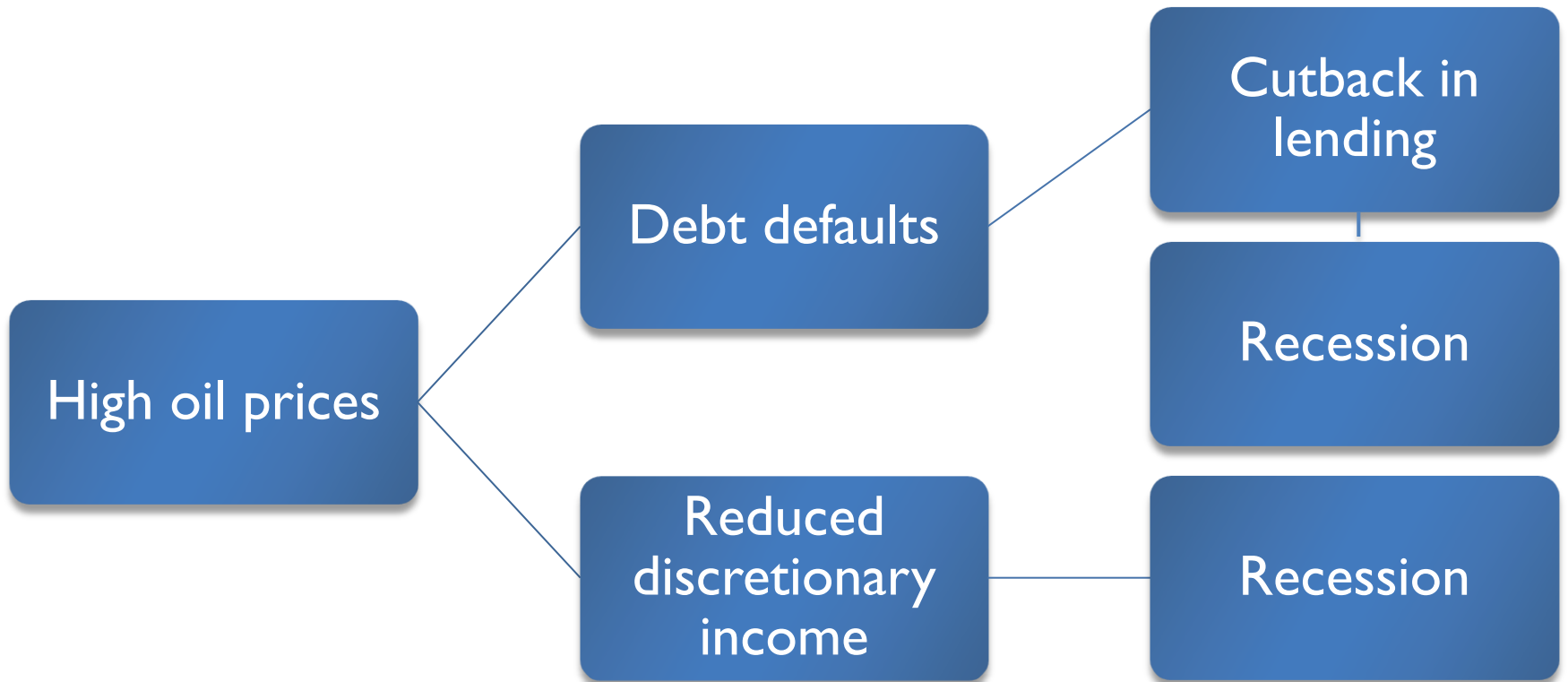
# How fast do substitutes like wind scale up?



Note: Based on EIA data from [http://www.eia.doe.gov/overview\\_hd.html](http://www.eia.doe.gov/overview_hd.html)  
Other bio-fuels (solar, geothermal, etc.) omitted because of tiny quantity.

# Suppose there is a response time lag

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Thus, if there is a lag before new supplies, result becomes:

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# But as the economy picks up

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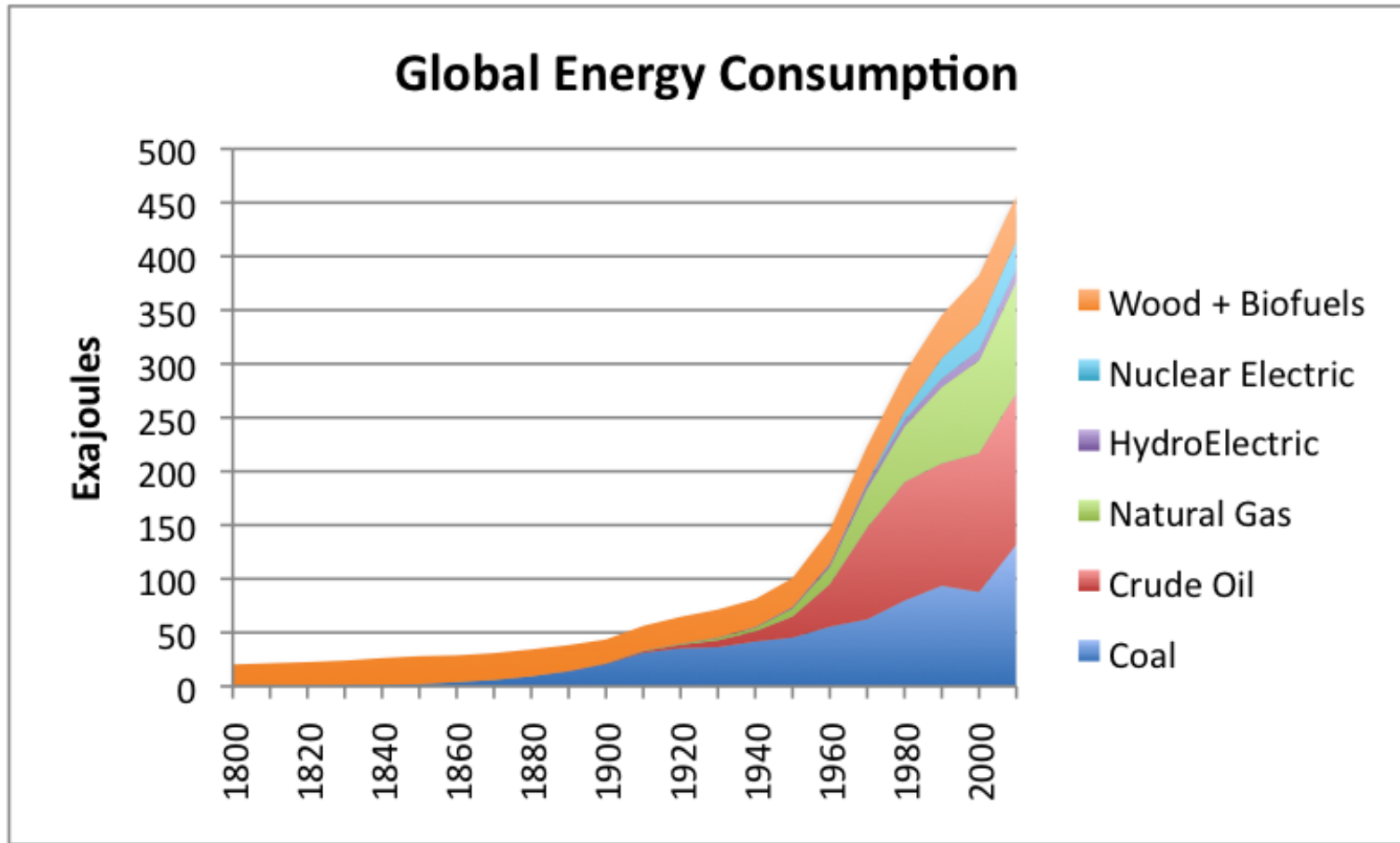
# Oscillating Prices are a Problem

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- ▶ Not high enough to encourage substitutes
- ▶ Not high enough to encourage increased drilling
- ▶ May still be high enough to cause recession; more debt defaults
- ▶ Much of the time situation will look like over-supply of fuel
  - ▶ Issue is affordability
  - ▶ Few will connect issue with lack of cheap oil



# Two problems – Earth is a closed system; energy transitions take decades



Note: Graph created from Appendix A data from *Energy Transitions: History, Requirements, and Prospects* by Vaclav Smil, Praeger, 2010, Santa Barbara, California.

# Implications for GHG

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- ▶ More recessions likely to keep GHG from growing
  - ▶ Fewer businesses making things
  - ▶ More layoffs, so families cut back further
  - ▶ Home prices drop more
  - ▶ Government tax revenues decline
    - ▶ Cut back on road paving
    - ▶ Cut back in universities
    - ▶ Cut back in research funds
- ▶ Greenhouse gasses may even decline significantly
  - ▶ 80% reduction by 2050 seems to relate to one oil decline scenario



# Implications for GHG Strategy

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- ▶ Reduction in oil use takes on new urgency
  - ▶ Not just climate change—oil availability may decline greatly in the not too distant future
- ▶ Usual approaches won't work as well
  - ▶ Carbon taxes likely to seriously impact economy
  - ▶ Technology changes will be more difficult to implement
- ▶ Approaches may need to be more pragmatic
  - ▶ Concentrate on high return, low cost items – carpools, bikes
  - ▶ May not be able to maintain current standard of living



# Implications for GHG strategy (cont.)

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- ▶ Natural gas and coal will decline at some point as well
  - ▶ Oil decline may affect coal and gas
  - ▶ Directly, or through financial system, international trade
- ▶ Likely approach will be to tax oil and gas producers
  - ▶ Impact will be to cut oil and gas production
    - ▶ Likely to cut production, cause more price oscillations
    - ▶ May send economy down further
    - ▶ Make it more difficult to pay for imports
  - ▶ Won't help alternatives
  - ▶ Doesn't seem helpful

