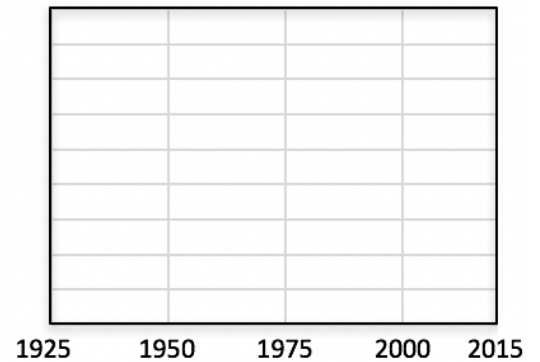


- 1a) What are the *total annual global* CO<sub>2</sub> emissions? \_\_\_\_\_
- b) On the graph, show total annual *national* emissions of CO<sub>2</sub> for both USA and China. Label the two curves, so I can distinguish them. You don't have to put the scale on the y-axis, we can just focus on understanding the general behavior.
- c) Please comment on why the two graphs look different and what this means about each country's development.
- d) What do you see as the role of USA as an international leader in energy development?



- 2) We learned how to calculate the cost of electricity, the cost of conserved energy, and the cost of abated carbon.
  - a) I discovered a way to generate electricity at \$0.10/kWh and I want ***YOU*** to give me your money to build this technology. What things would determine if my invention is going to be a market place success? Possible choices include: duty cycle, dispatchability, and deployment location and size or anything else.
  - b) I invent an automatic switch that turns the lights off in our building when no one moves. The Cost of Conserved Electricity is \$0.10/kWh. Would this be a good investment? Explain why.
  - c) I calculate that the Cost of Abated Carbon is about \$50 / CO<sub>2</sub> Ton for a company. Under what circumstances (if any) would this efficiency investment be cost effective? Explain.



4) Petroleum

a) As we use up the petroleum, the total global reserve has increased... *really?* Does this mean that more petroleum has formed in the earth since the 1970s? Please explain the societal mechanisms that have led to an increase in estimated global reserves of petroleum over the past half century.

b) The economist says, "In order for the petroleum market to work, the decision maker must bear the full cost." Market distortions prevent the market from working. Please list a few market distortions with regard to petroleum and state how these distortions prevent the market from optimally serving society.

c) Identify a command and control mechanism to mitigate one of the distortions above.

d) Identify a market mechanism to mitigate one of the distortions above.

e) Let's say the USA is concerned that Iran is going to build nuclear weapons and decides to boycott Iran's petroleum. Will this boycott effectively apply pressure on Iran's economy? Why or why not?

5) Nuclear Power.

- a) Why is PG&E choosing to close Diablo?
  
- b) I have a friend who thinks we should keep Diablo and other nuclear plants open, but not build new nuclear power plants. You don't have to agree with her, but why would she have differing opinions about old and new plants?
  
- c) What are "delay neutrons"?
  - a. Why are they important to nuclear energy?
  - b. What challenge do they present for nuclear energy?
  
- d) Proliferation concerns: Please describe what we mean by proliferation concerns and the particular role of Plutonium and the reprocessing of spent nuclear fuel.