PHYS-310: Energy, Society, and the Environment

Move to 180-262 or 180-265?

Pete:
1) Discuss Video / Reading
2) Start Problem Set

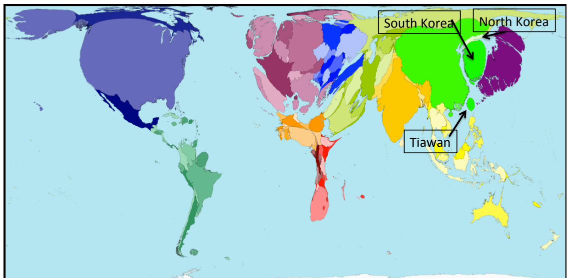
DH:
3) Exponential Growth

DH on the Iraq War:
1) If there was no oil there, it would have been different.
2) "He's a bad guy"..

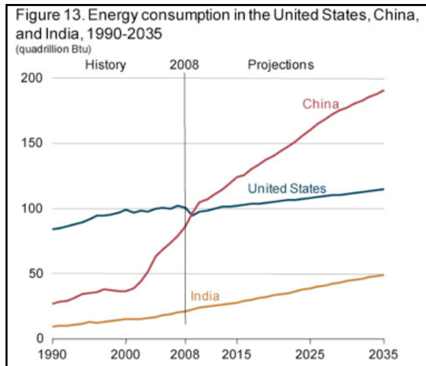
$dE/E = dGDP/GDP - d\eta/\eta = dProd/prod + dL/L - d\eta/\eta$

Grey Tsunami, Grey Panthers

Figure 10.14 is relative population versus age?

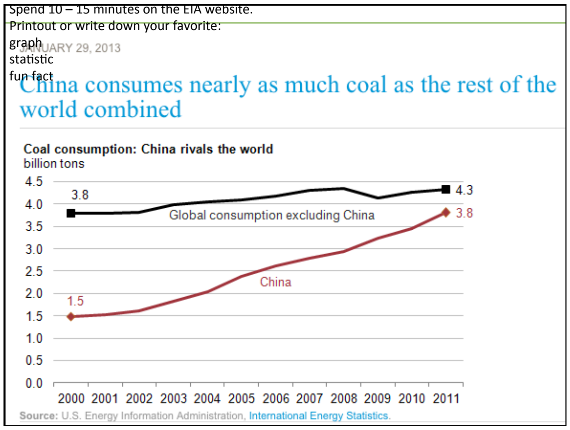


WorldMapper.org (year 2001)



EIA Forcast: http://instituteforenergyresearch.org/

Spend 10 – 15 minutes on the EIA website.
Printout or write down your favorite:
graph
statistic
fun fact



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4) Let's say we did the equitable thing and split up the earth's surface area equally among all people. Start with the earth's radius (which you remember because of how the meter is defined) and calculate how much surface area each of us gets!

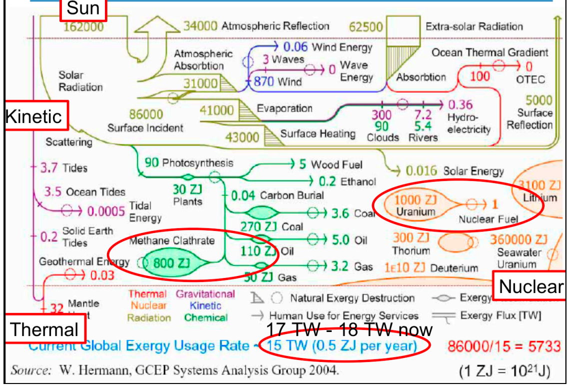
5) Let's say you covered your portion of the earth with a solar heat absorber. Remember the earth is round and turns.

a) At noon on a sunny day, how much power would you absorb? Please put this in terms of Watts and tons (of ice per day).

b) In a year, how much energy would you absorb? Please put your answer in Joules and Barrels of Oil Equivalent. What is the financial value of this oil?

c) If instead of a thermal solar panel, I put a PV panel on my surface area with a conversion efficiency of 15%. What is the financial value of the electricity I would generate in a year?

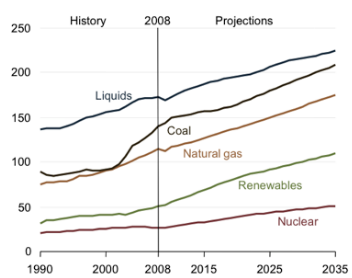
Energy Stocks and Flows for the Earth



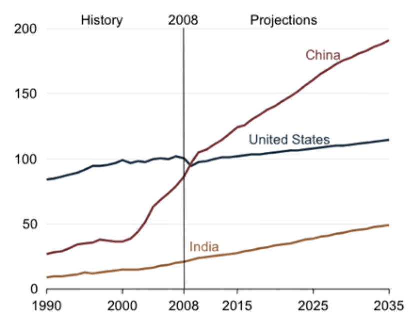
1.2 Growth and population

April 1, 2014

Global Energy (2011), Quad/yr



E(PRC > USA)



Garret Hardin
Tragedy of the Commons

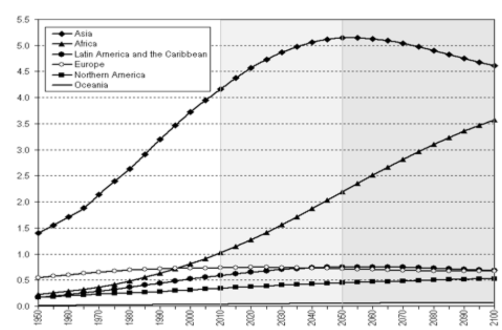
As a rational being each herdsman stocks to maximize his gain. Explicitly or implicitly, more or less consciously asks 'What is the utility to me of adding one more animal to my herd.' This utility has one negative and one positive component.

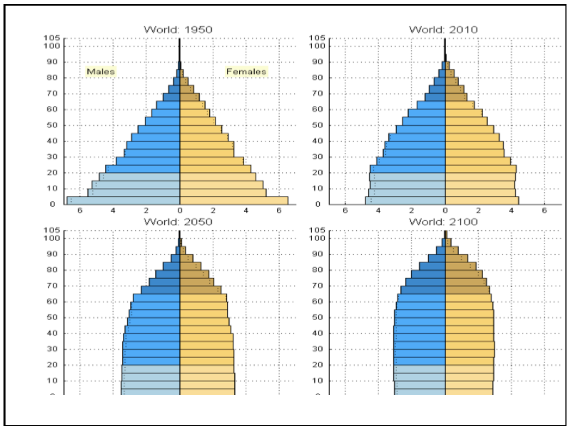
1. The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of one additional animal, the positive utility is nearly +1.

2. The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all herdsmen, the negative utility for any particular decision-making herdsmen is only a fraction of -1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd.

UN(2010)




World: 1950
Males
Females
World: 2010
World: 2050
World: 2100