Current Event

- In the Christian Science Monitor 's (10/15) Bright Green blog, Eoin O'Carroll wrote that, last week, "European Union energy ministers agreed to ban filament light bulbs across all 27 member states." The news "comes just a few days before the EU will lift duties on energy-efficient bulbs imported from China, a move that is expected to bring down their prices." Last year, Australia became "the first country to enact an outright ban on incandescents, which will take effect in 2010," while a number of countries have taken steps in that direction. According to the Bright Green blog, "the most common types of energy-efficient bulbs, known as compact fluorescent lamps or CFLs, use between one-fifth and one-third of the power of equivalent incandescent bulbs." Yet, "CFLs are not without their critics. Many complain that the light is harsher and more flickery than that emitted by incandescent bulbs, that they take longer to turn on, and that they don't work well with dimmer switches." But "most troubling for green-minded consumers" is the fact that "the bulbs contain five milligrams of mercury, a toxic substance that can escape from the bulb if it is broken."

Gasoline Tax

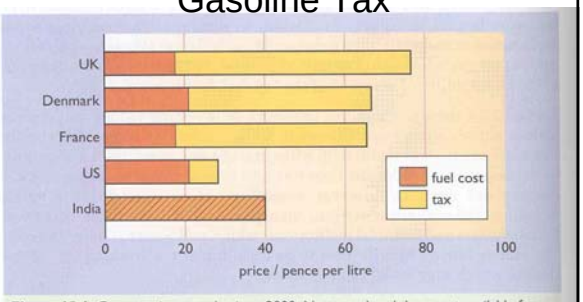
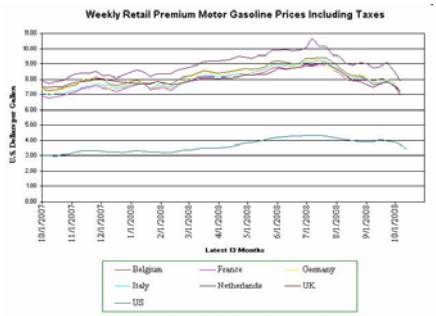


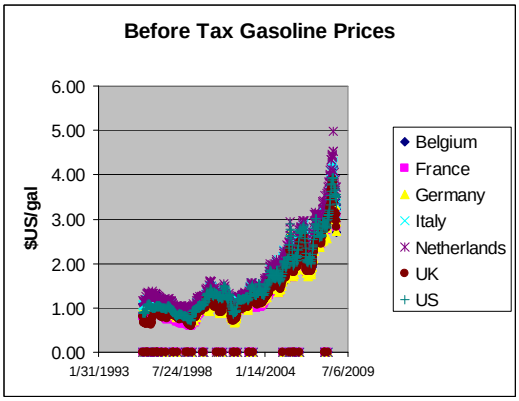
Figure 12.1 Comparative petrol prices, 2000. Note: tax breakdown not available for India (sources: IEA, 2000a and TERI, 2002)

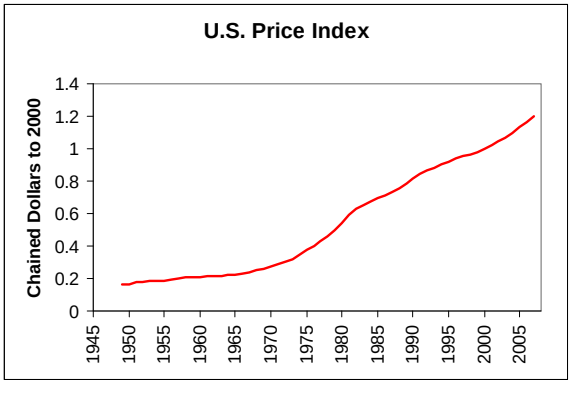
60 pence/litre = $1.65/gallon, 90 pence/litre = $2.48/gal

Average Gasoline Prices ($/gal)



Data as of 10/1/2008 (http://www.eia.doe.gov/emeu/international/prices.html#Motor)

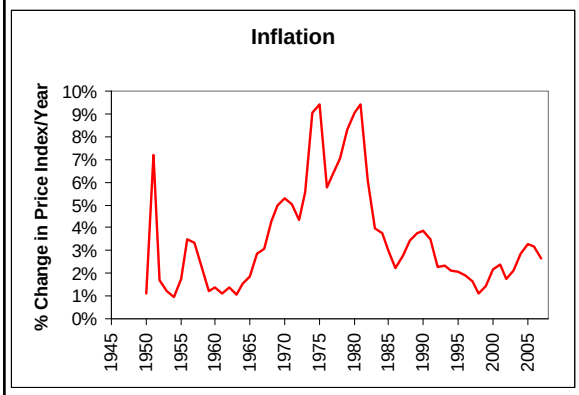




http://www.eia.doe.gov/aer/append_d.html

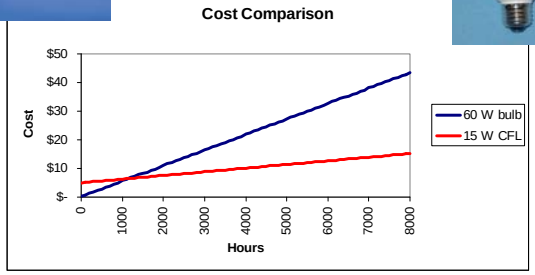
From 2003 DOE
Annual Energy Review
Glossary (i.e., Definitions)

Chained Dollars: A measure used to express **real prices**. Real prices are those that have been adjusted to remove the effect of changes in the purchasing power of the dollar; they usually reflect buying power relative to a reference year. Prior to 1996, real prices were expressed in constant dollars, a measure based on the weights of goods and services in a single year, usually a recent year. In 1996, the U.S. Department of Commerce introduced the chained-dollar measure. The new measure is based on the average weights of goods and services in successive pairs of years. It is "chained" because the second year in each pair, with its weights, becomes the first year of the next pair. The advantage of using the chained-dollar measure is that it is more closely related to any given period covered and is therefore subject to less distortion over time.



Incandescent Bulb vs Compact Fluorescent

8.5 ¢/kW-hr, 24 ¢/light bulb, $1.58/CFL



8000 hours = 9 hours use/day for 2.4 years!

Of course, none of this cost analysis means as much…

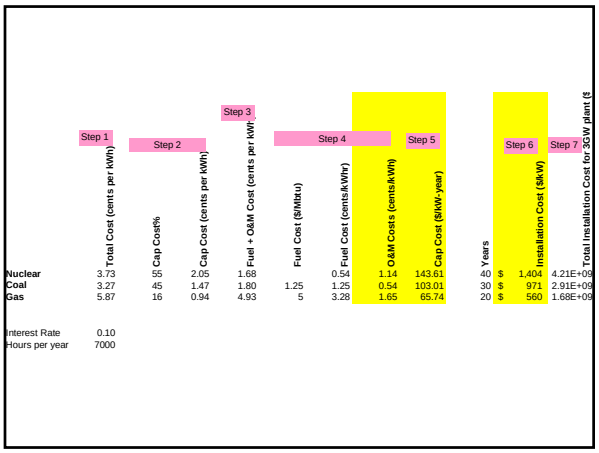
if you have kids breaking things!

Hg in CFLs

- Each CFL contains about 5 mg of Hg, which is necessary for it to work
- This is about the size of a period "."
- Your watch battery contains 25 mg Hg
- Coal combustion releases Hg
  - Using CFL is more efficient
  - Result: lower Hg emissions overall with CFLs
- Recycling CFLs is best
  - Place in two baggies to dispose

Hints on Question #6, for Class #14

- The total costs are given in the caption of the figure. This includes capital, operating and maintenance, and fuel.
- The percentage of the total that goes for capital is also given in the caption, so find the cents per kWh that goes towards capital.
- By difference, find the cents per kWh that goes towards the combination of O&M and fuel.
- Since the fuel costs are given in the problem, find the O&M costs.
- Put the costs on a yearly basis.
- Use the amortization formula in the book to get the installed cost over the number of years specified (you have calculated the final cost above, now find the initial cost). This number should be in $/kW.
- Calculate the installation cost of a 3 GW plant.



	Step 1	Step 2		Step 3	Step 4		Step 5		Step 6	Step 7
	Total Cost (cents per kWh)	Cap Cost%	Cap Cost (cents per kWh)	Fuel + O&M Cost (cents per kWh)	Fuel Cost ($/Mbtu)	Fuel Cost (cents/kWhr)	O&M Costs (cents/kWh)	Cap Cost ($/kW-year)	Years	Installation Cost ($/kW)	Total Installation Cost for 3GW plant ($
Nuclear	3.73	55	2.05	1.68		0.54	1.14	143.61	40	$ 1,404	4.21E+09
Coal	3.27	45	1.47	1.80	1.25	1.25	0.54	103.01	30	$ 971	2.91E+09
Gas	5.87	16	0.94	4.93	5	3.28	1.65	65.74	20	$ 560	1.68E+09
Interest Rate	0.10										
Hours per year	7000										