



Honors Seminar Basics (“Must Know”)

Fall 2009:Somalwar

How does the greenhouse effect work?

Greenhouse Effect vs Ozone layer depletion

Carbon vs Hydrocarbons

Natural gas and gasoline are x2 cleaner than coal,
Diesel is 15% efficient than gasoline

Energy units

kwhr – Ten 100W (old) bulbs lit for one hour. A typical hairdryer for 45 min or so.

CO2 emission

A gallon of gasoline emits 20 lbs CO2 when burnt (in a car or in a lawn mower or anywhere else).
One kwhr of electricity results in 2.5lbs of CO2 emission at a typical coal electric plant (natural gas – x2 less)

Carbon tax (“Polluter Pays”)

Best way to reduce the emissions is to increase the price of fossil fuels. Carbon tax is a direct method.
A tax of xxx dollars for emitting a ton of CO2. (ton=2000lbs), collected from electricity, fuel etc manufacturers.
Presumably, they pass it down to the consumers in the form of higher prices.
Example: \$25/ton carbon tax means ??cents/gal on gasoline, ?cents/kwhr for coal electricity, ?cents/kwhr for natural gas electricity, solar electricity, nuclear electricity.....
carbon tax is regressive (hits the poor hardest), but see next

Refunded carbon tax

Instead of using the billions of dollars of collected carbon tax to expand the government, refund it to people on an equal basis, say a check every holiday season.



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Refunded carbon tax (contd)

It is tax-neutral and progressive.

Carbon emissions and living standards: Europe and Japan maintain similar living standards as US and Canada but emit only half as much carbon per person

(Most transportation emissions happen locally: size of the country not relevant)

Vehicle efficiency: Miles per gallon, passenger-miles per gallon

Cars vs buses vs trains : buses are most efficient . Calculate emissions per person for an NYC-DC trip.

Cap and Trade with and without auctions

Units of energy and power (kW vs kw-hr)

How much carbon is there in the atmosphere? 3500 billion tons CO₂ equivalent. How much is that per every person on earth? How does the per-person number compare to CO₂ emissions from driving a 20 mpg SUV for a lifetime of 50 years at 12000 miles/year?

What is cogeneration? (CHP – Combined Heat and Power)

Finally, listen to the Public Radio’s Marketplace special series “Climate Race” (about 30 min on mp3)