Where has all the carbon gone?

James D. Hamilton
UCSD
U.S. CO2 emissions (millions of metric tons over preceding 12 months)

Last 12 months = 10,800 million tons
Lowest since 1995 (from EIA Monthly Energy Review)
Optimal carbon tax:

- $25 / ton CO2 = 25¢/ gallon gasoline
- $100 / ton CO2 = $1.00 / gallon gasoline
Average weekly U.S. retail gasoline price ($/gallon)

Data source: www.eia.gov/dnav/pet/pet_pri_spt_s1_w.htm
World crude oil field production (millions of barrels per day)

Data source: www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=50&pid=53&aid=1
U.S. CO2 emissions (millions of metric tons over preceding 12 months)
Natural gas production has climbed significantly.
Operating cost per kilowatt hour for fossil steam versus gas turbine

Source: www.eia.gov/electricity/annual/html/epa_08_04.html
Natural gas is replacing coal for electricity generation

Price of crude oil and natural gas on equivalent BTU basis

Source: www.econbrowser.com/archives/2012/10/natural_gas_for.html
America’s Natural Gas Highway
LNG truck fueling coast-to-coast and border-to-border

Source: www.cleanenergyfuels.com/buildingamerica.html
Locations and prices for compressed natural gas stations in L.A.

Source: www.cngprices.com/
• March 5, 2013: BNSF Railway announces plan to test locomotives powered by liquified natural gas
• March 5, 2013: Shell announces plan to develop infrastructure to provide liquified natural gas to ships operating in Great Lakes and Gulf of Mexico
Policy suggestions

Don’t pick winners, but make playing field even

• renewable fuels standard: why not satisfied by natural-gas-based products?
Proposal for amending Corporate Average Fuel Economy (CAFE)

- $x_i =$ gallons of petroleum-based gasoline that vehicle $i$ uses to travel 1 mile ($= 0$ for alternative-fuel vehicles)
- $N_i =$ number of vehicles of type $i$ sold by company
- $CAFE = \frac{\sum N_i}{\sum N_i x_i}$