

Confronting Global Warming: Policies for the Reduction of Gasoline Consumption

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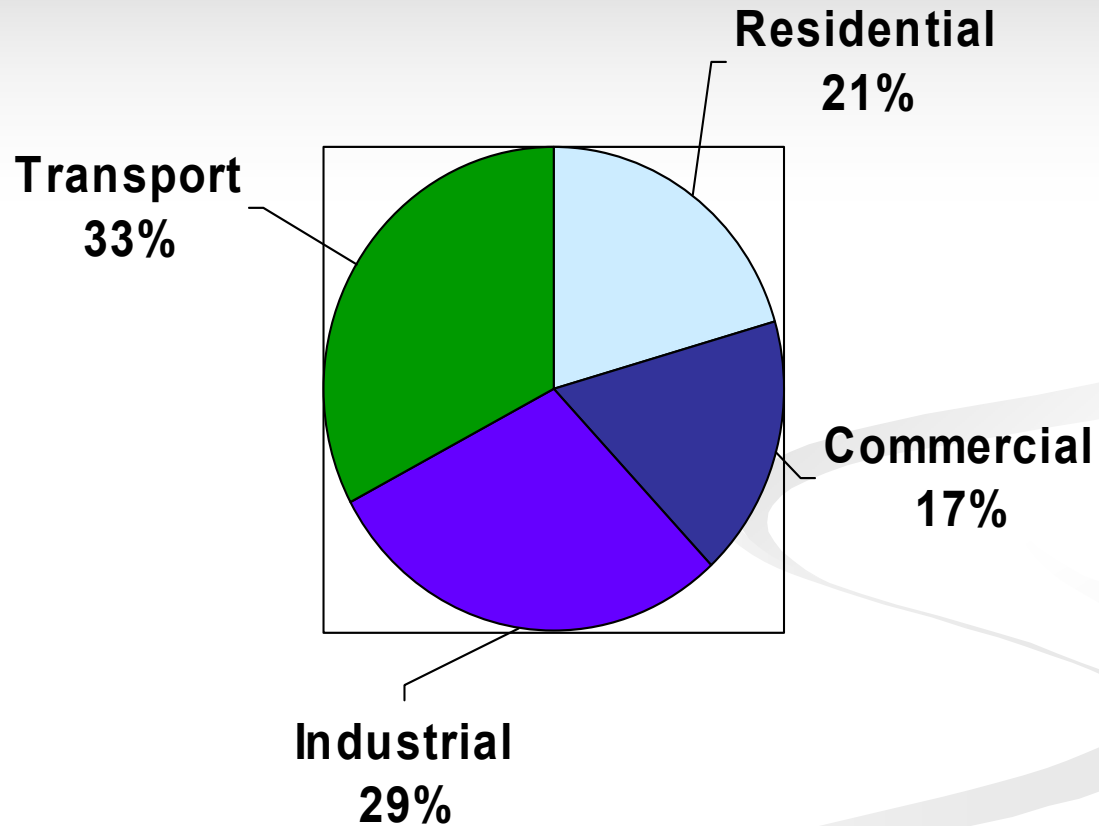
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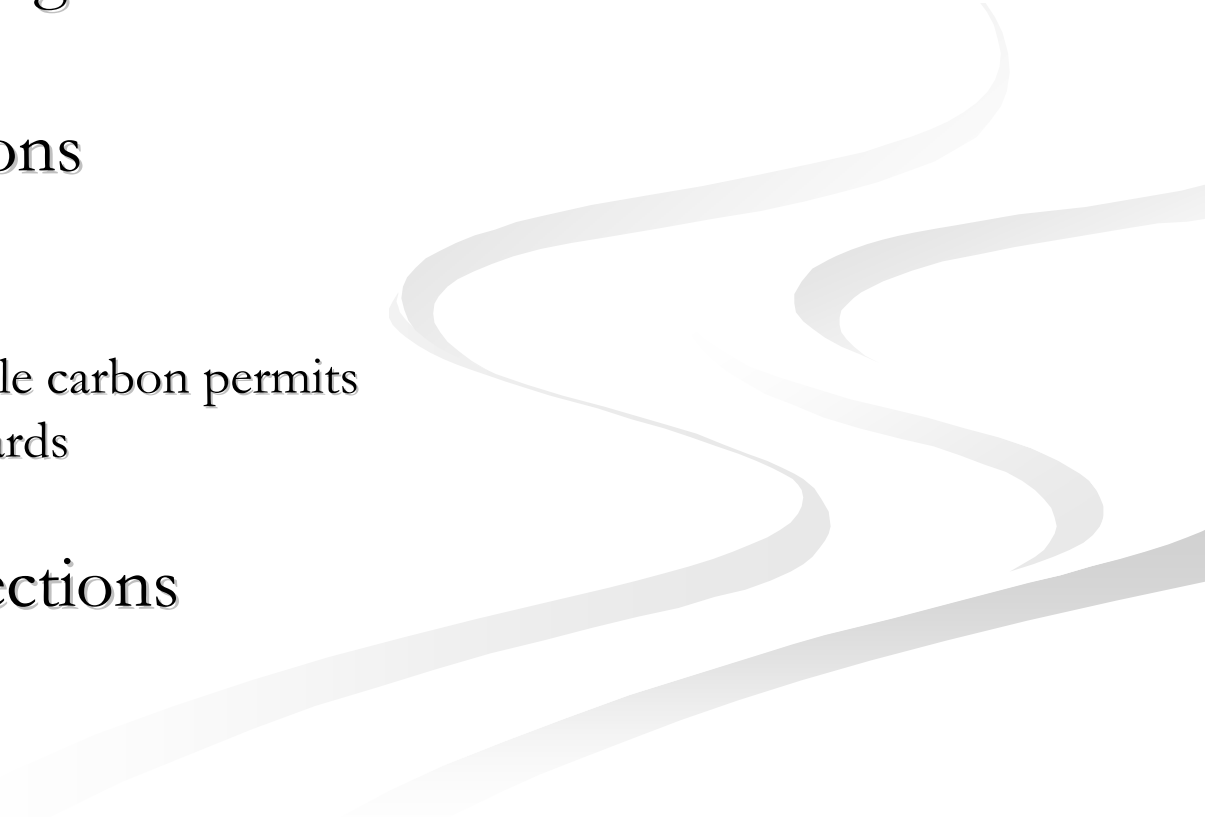
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U.S. Carbon Dioxide by Sector (2005)

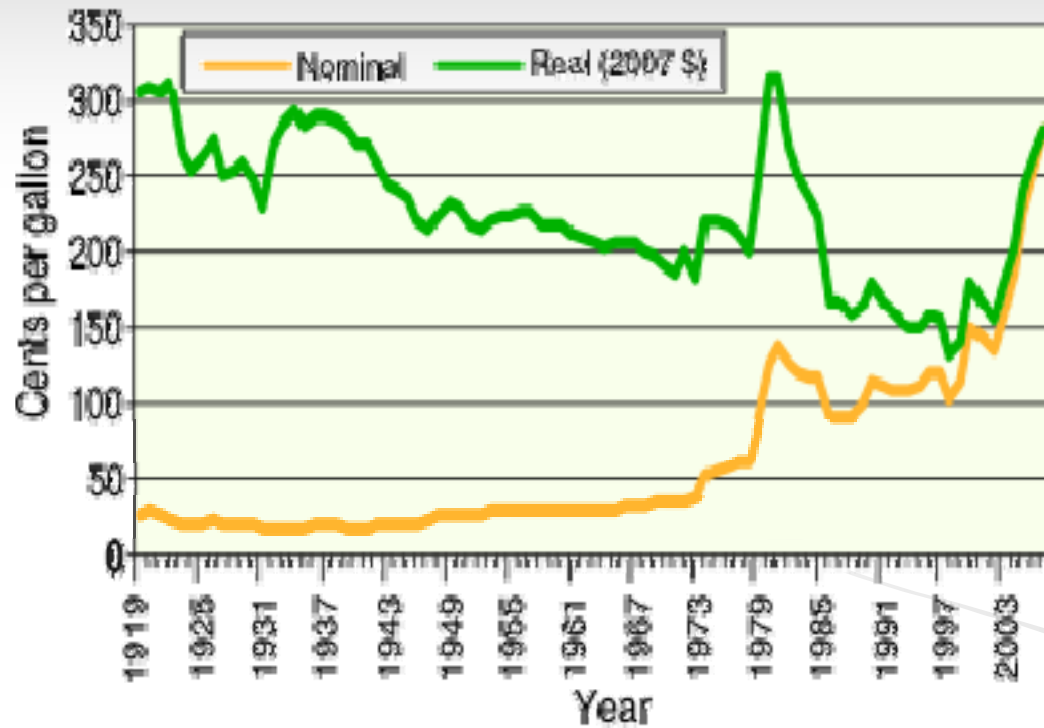
(Data Source: Energy Information Administration)



Outline

- Gasoline, miles driven, fuel efficiency
 - Justifications for regulation
 - A few policy options
 - Gasoline tax
 - Carbon tax or tradable carbon permits
 - Fuel economy standards
 - New research directions
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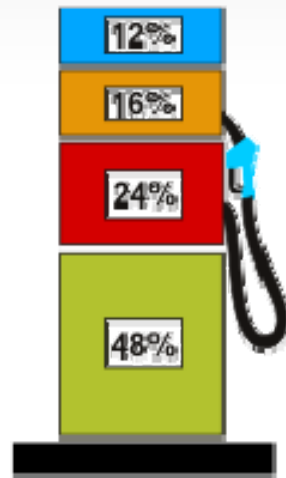
Gasoline Prices



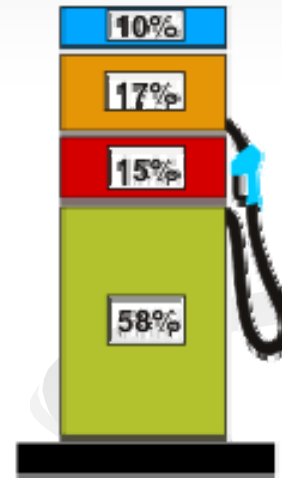
Source: Energy Information Administration, *Short Term Energy Outlook*, January 2007

Components of the price of gasoline

2000 to 2007 Average
Retail Price: \$1.91



2007 Average
Retail Price: \$2.80

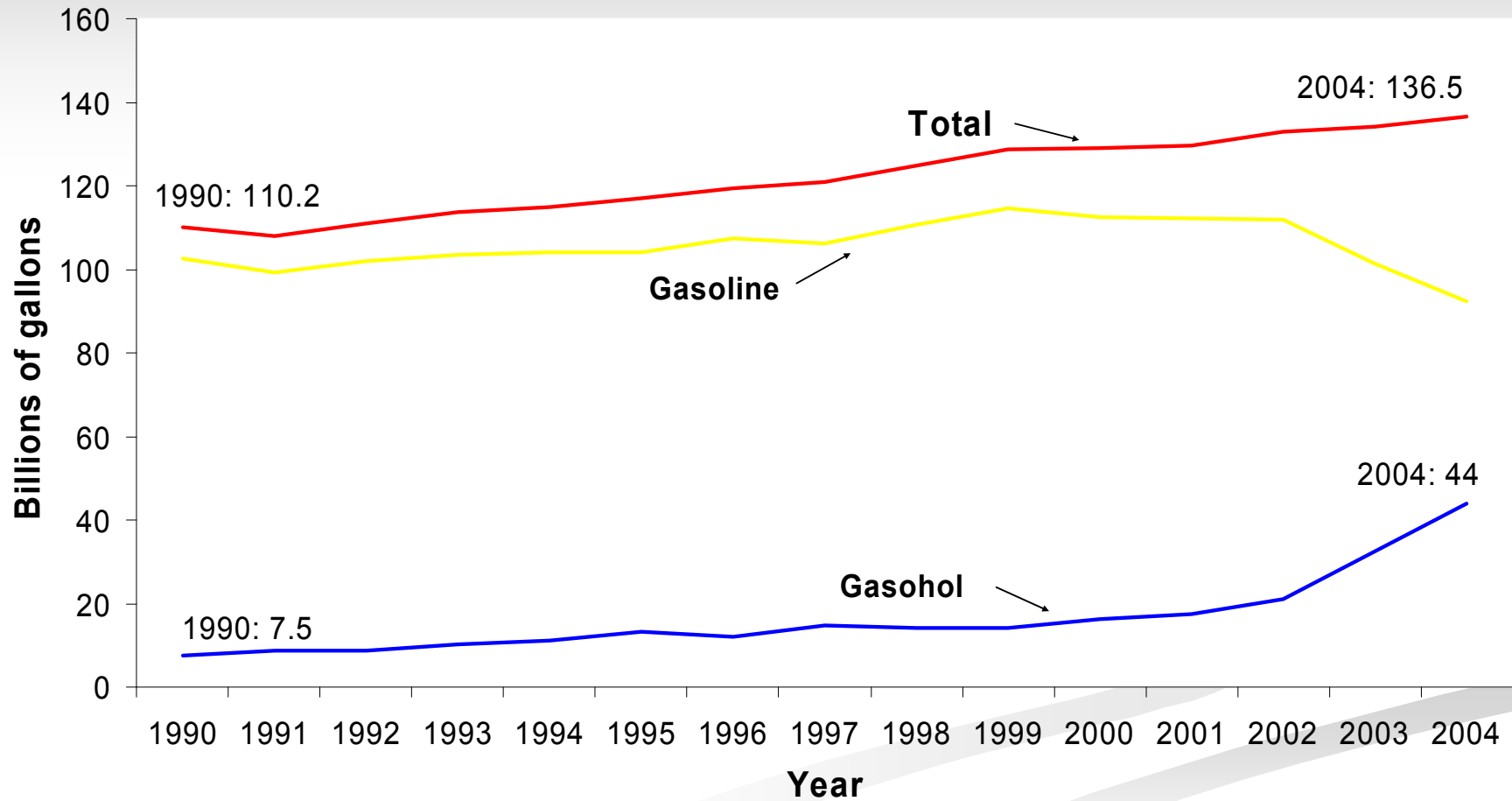


Distribution & Marketing
Refining Costs & Profits
Federal & State Taxes
Crude Oil

Source: Energy Information Administration

Gasoline consumption

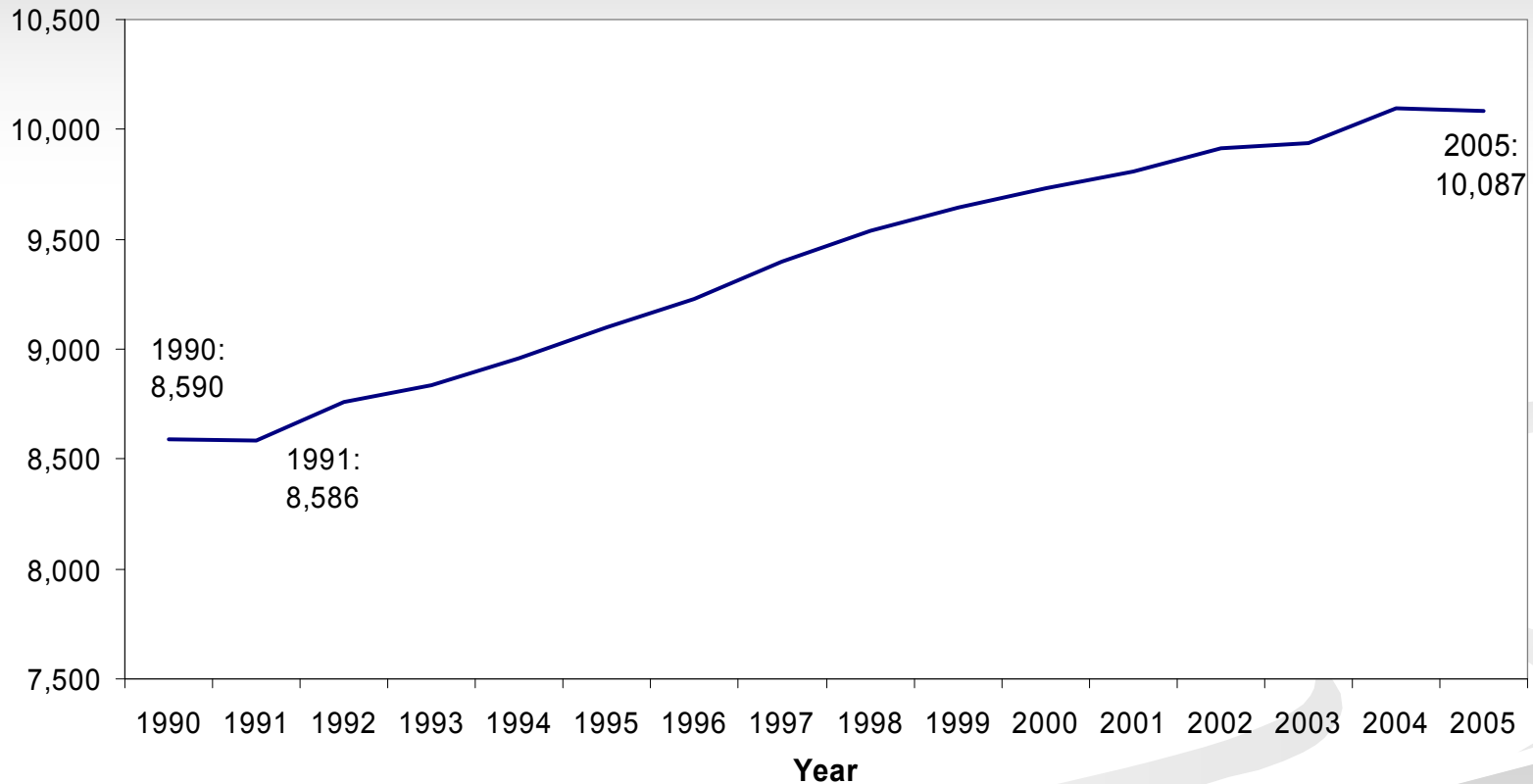
Gasoline and Gasohol Consumption 1990-2004
(Source: FWHA Highway Statistics 2005)



Vehicle miles traveled: 1990-2005

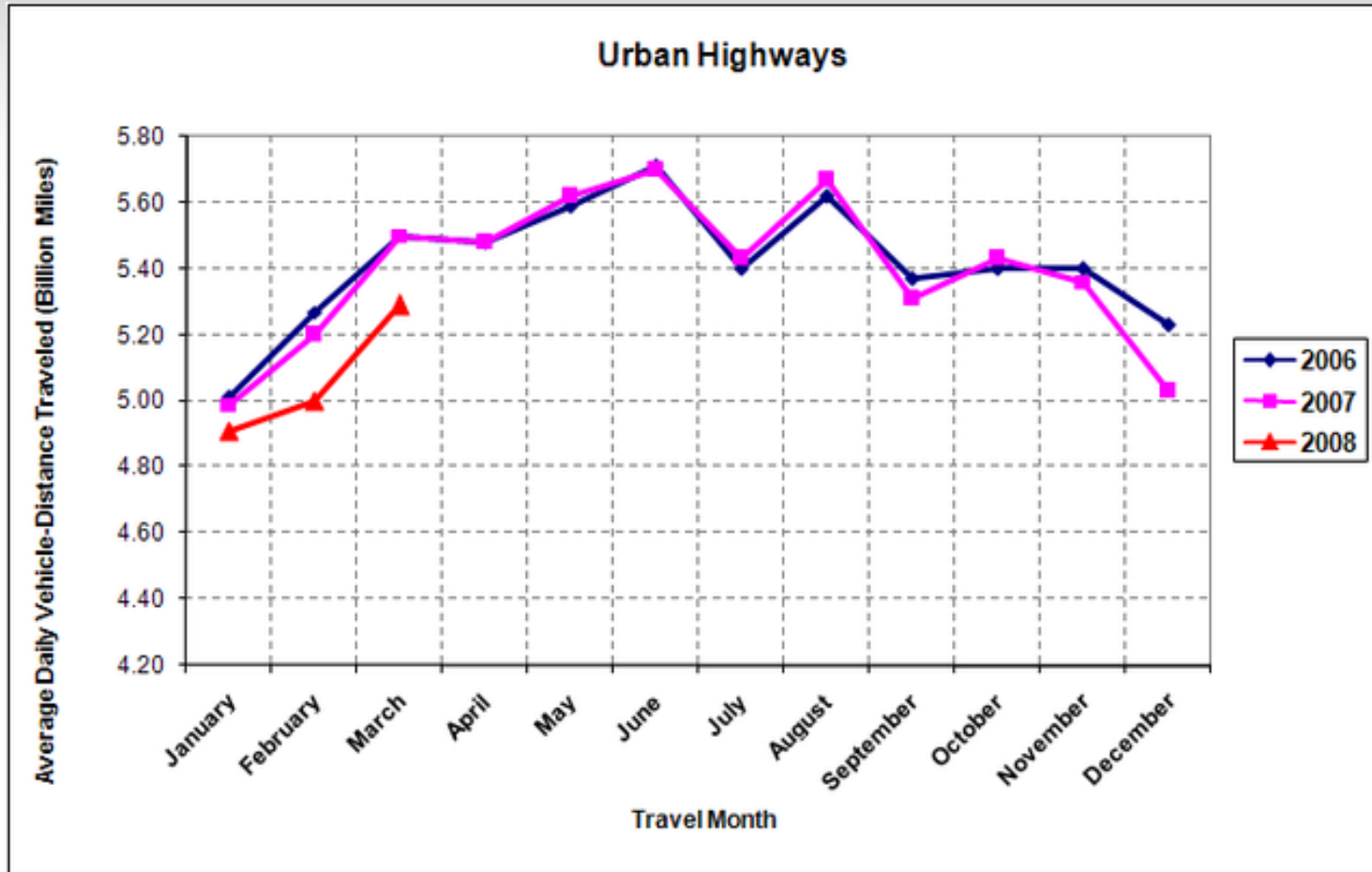
(Source: FHWA *Highway Statistics*)

Vehicle Miles Traveled
(per capita)



Vehicle miles traveled: 2006-2008

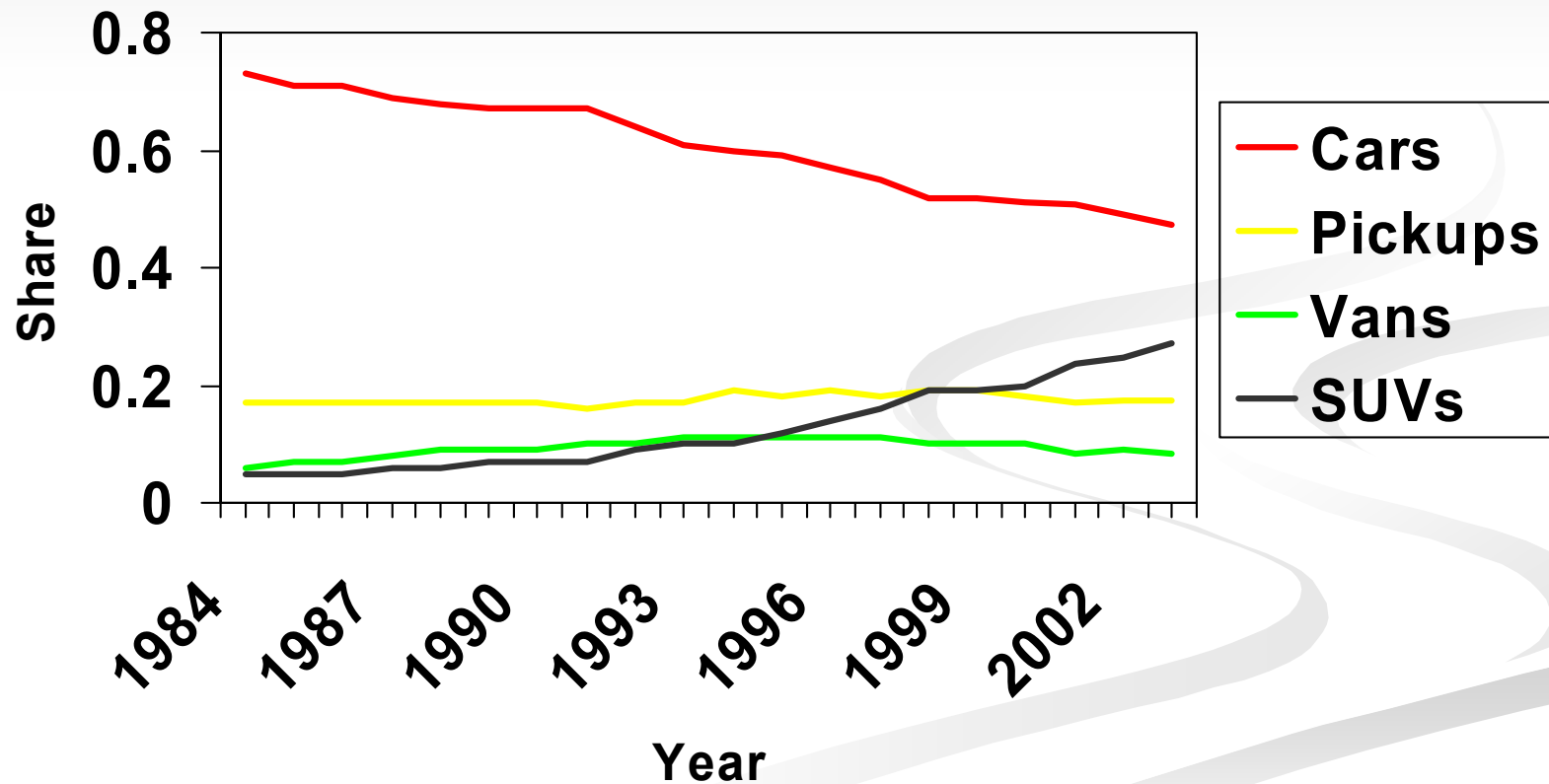
(Source: FHWA *Traffic Volume Trends*)



Changes in the vehicle market

(Data Sources: *Ward's Automotive Yearbook*, *Transportation Energy Data Book*)

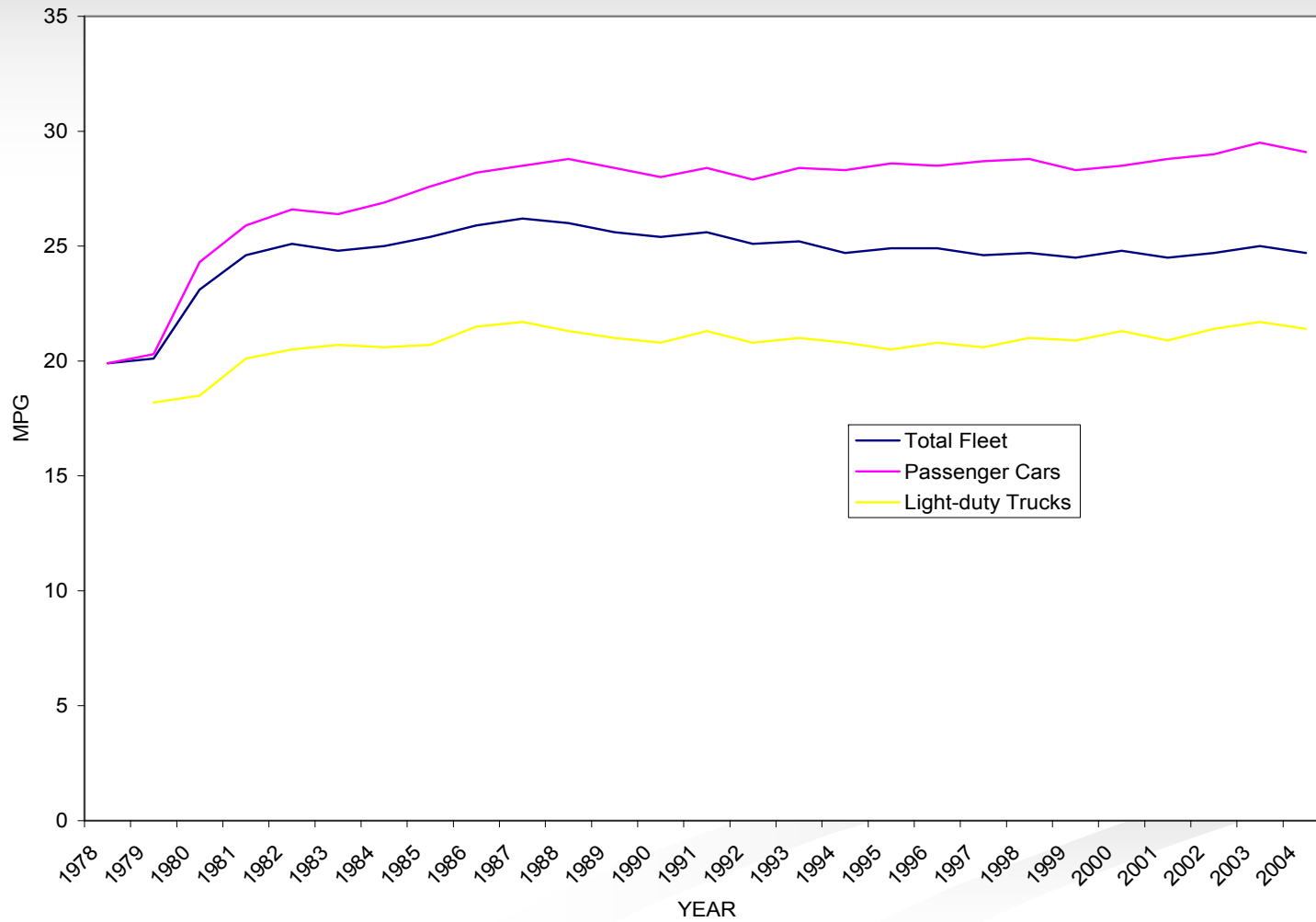
Share of Total Vehicle Sales




Falling fuel economy

(Source: *Transportation Energy Data Book*)

Fleet Fuel Economy

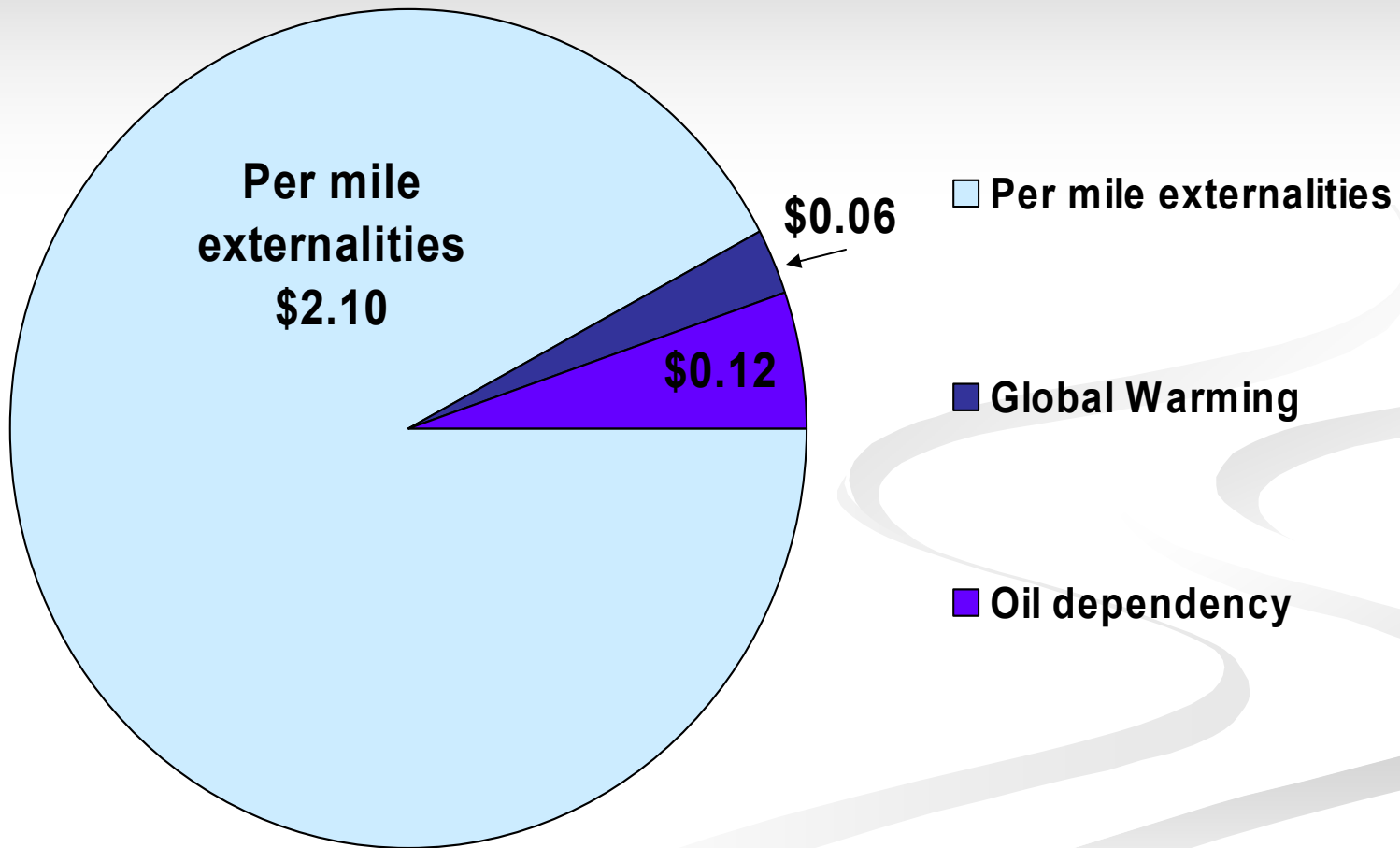


Justifications for regulation

- Per mile externalities
 - Congestion
 - Accidents
 - Local Pollution
 - Per gallon externalities
 - Global warming
 - Oil dependence
 - Interaction with labor market
 - Possible failures in market for fuel economy
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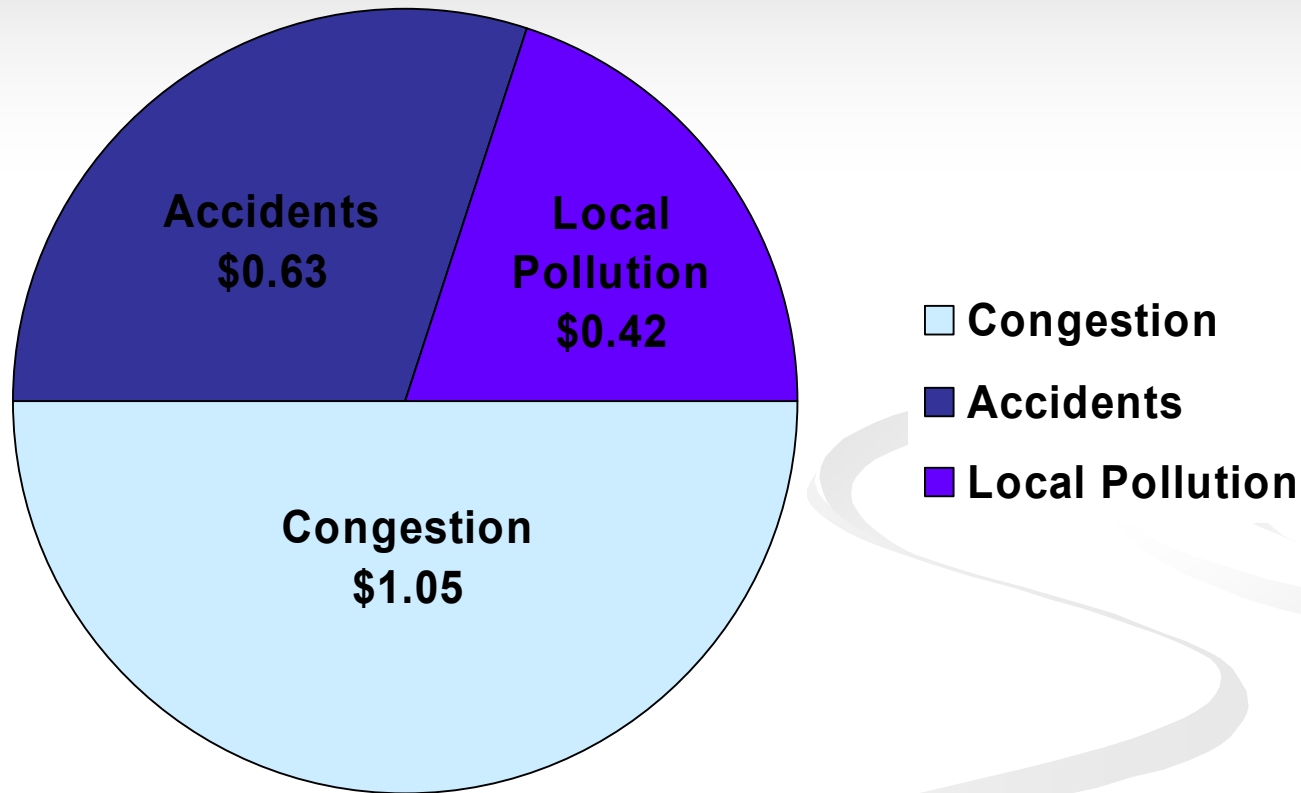
External costs of vehicle use

Source: Parry et al. (*JEL* 2007))



Per mile externalities

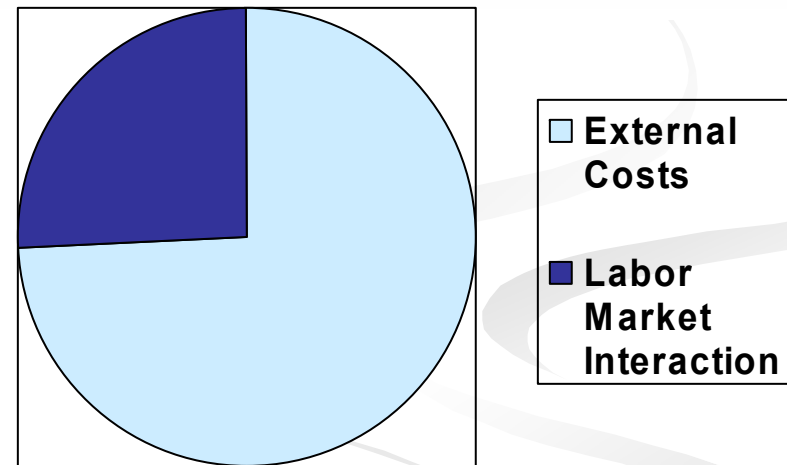
(Source: Parry et al. (*JEL* 2007))



Interactions with labor market

(Source: West and Williams (*JPubE* 2007))

- Taxes on labor are inefficient because they reduce work
- If a gasoline tax:
 - Reduces work, labor markets become even less efficient
 - Increases work, labor markets become more efficient
- Gasoline and leisure are relative complements—a gasoline tax increases work
- Optimal gas tax even higher than external costs



Are there failures in the market for fuel economy?

Do consumers undervalue future fuel costs?

- Greene (1997): small savings, too much information, boundedly rational consumers → undervaluation
- Kleit (*Econ. Inquir.* 2004) speaking of MPG:
“it is difficult to think of an automobile attribute that is better communicated to consumers” (p. 281)
- Dreyfus and Viscusi (*J. Law Econ.* 1995):
“consumers do have a long-term perspective with respect to safety and fuel efficiency...” (p. 103)

Are there failures in the market for fuel economy?

- Surprisingly little work has been done to determine the effect of CAFE on producers' fuel efficiency decisions
 - Greene (1997) “magic of standards”
 - Portney et al. (*JEP* 2003) “manufacturers could undersupply vehicle attributes”—strategic behavior

Policy options

Policies that reduce
gasoline consumption
and miles driven:

- Gas tax
- Carbon tax
- Pay-as-you drive insurance premiums

Policies that reduce
gasoline consumption
but *increase* miles driven:

- Fuel economy standards
- Gas guzzler tax
- Feebates

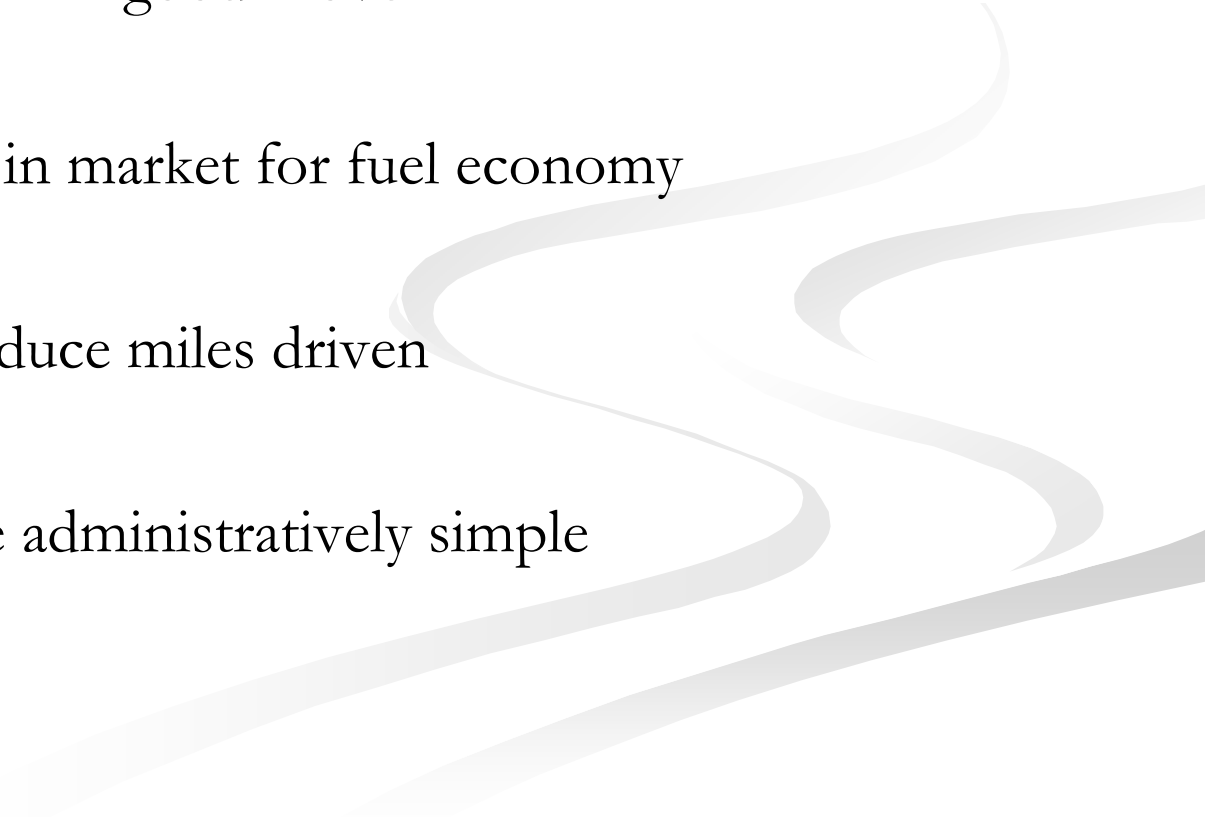
CAFE versus the gas tax

- “Rebound effect” offsets 10 percent of initial fuel reduction from tighter CAFE standards (Small and Van Dender 2006)
- Like gasoline, miles driven are complements to leisure (West and Williams (AER 2005))

Distributional Effects

- Gasoline tax is regressive, but:
 - Behavioral effects make tax significantly less regressive (West (*JPubE* (2004)), West and Williams (*JEEM* (2005)))
 - Simple revenue rebate scheme can entirely offset regressivity (West and Williams (*JEEM* (2005)))
- CAFE standards
 - Likely to be progressive on consumer side
 - Effect on workers?

CAFE versus gas tax

- CAFE standard has major downside
 - Recent changes in CAFE good move
 - Potential for failures in market for fuel economy
 - Need policies that reduce miles driven
 - Gasoline tax increase administratively simple
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- A decorative graphic consisting of several thick, light gray wavy lines that flow from the bottom left towards the top right, partially overlapping the bottom of the text area.

Carbon tax or tradable permits

- Carbon tax or cap-and-trade alone do not internalize all externalities from driving
- Carbon tax or cap-and-trade plus congestion pricing attractive
 - Regional variation in external costs of driving means gas tax should also vary
 - Carbon tax everywhere, congestion pricing only where congestion is present

New research directions

- The effect of gasoline price on fuel economy
 - West (working paper 2007)
 - Effect of gas price on probability of buying SUV, truck, van, car
 - Using only contemporaneous price significantly underestimates effect of gas price on vehicle choice
 - Sallee and West (work in progress)
 - Effect of gasoline prices on new vehicles' prices
 - Threshold and duration effects, asymmetries
 - Dealer-level new vehicle transactions, weekly gas prices by city

New research directions

- Ethanol demand: Anderson (2007)

<http://www-personal.umich.edu/~sorenta/>

- Data from Minnesota
- Consumers substitute very easy between fuels
- Simulates adoption of national ethanol standard:
 - Average consumer is willing to pay a small premium for ethanol
 - This reduces cost of a moderate ethanol content standard
 - Policy remains quite expensive: Implied cost per gallon of gasoline saved or ton of carbon emissions avoided far in excess of marginal external damages.