

- Focus on transport sector – 1/3 of CO<sub>2</sub>.
- Use of (very simple) analytical models and computational models to measure effects of fuel taxes.
- Measuring cost effectiveness.

# Federal Taxes

- Gasoline: 18.4 cents/gallon (passenger vehicles).
- Diesel: 24.4 cents/gallon (heavy-duty trucks).
- Fixed since 1993.

# Other Tax Provisions May be Redundant

*With binding CAFE standards....*

Gas guzzler tax and hybrid subsidies have minimal effect on emissions.

*With binding biofuel mandates...*

Ethanol tax credits have no effect.

*Fuel taxes reduce CO<sub>2</sub> through*

- reducing vehicle miles travelled
- increasing fuel economy

*Disentangling effects tricky—baseline  
fuel use varies with*

- volatile oil prices
- fuel economy standards for  
passenger vehicles

# Analytical Approach

--specify fuel demand function

$$F = F_0 \left( \frac{p_0 + t}{p_0 + t_0} \right)^\eta$$

$F$  = fuel use

$p$  = fuel price w/o federal tax

$t$  = federal tax

$0$  = current value

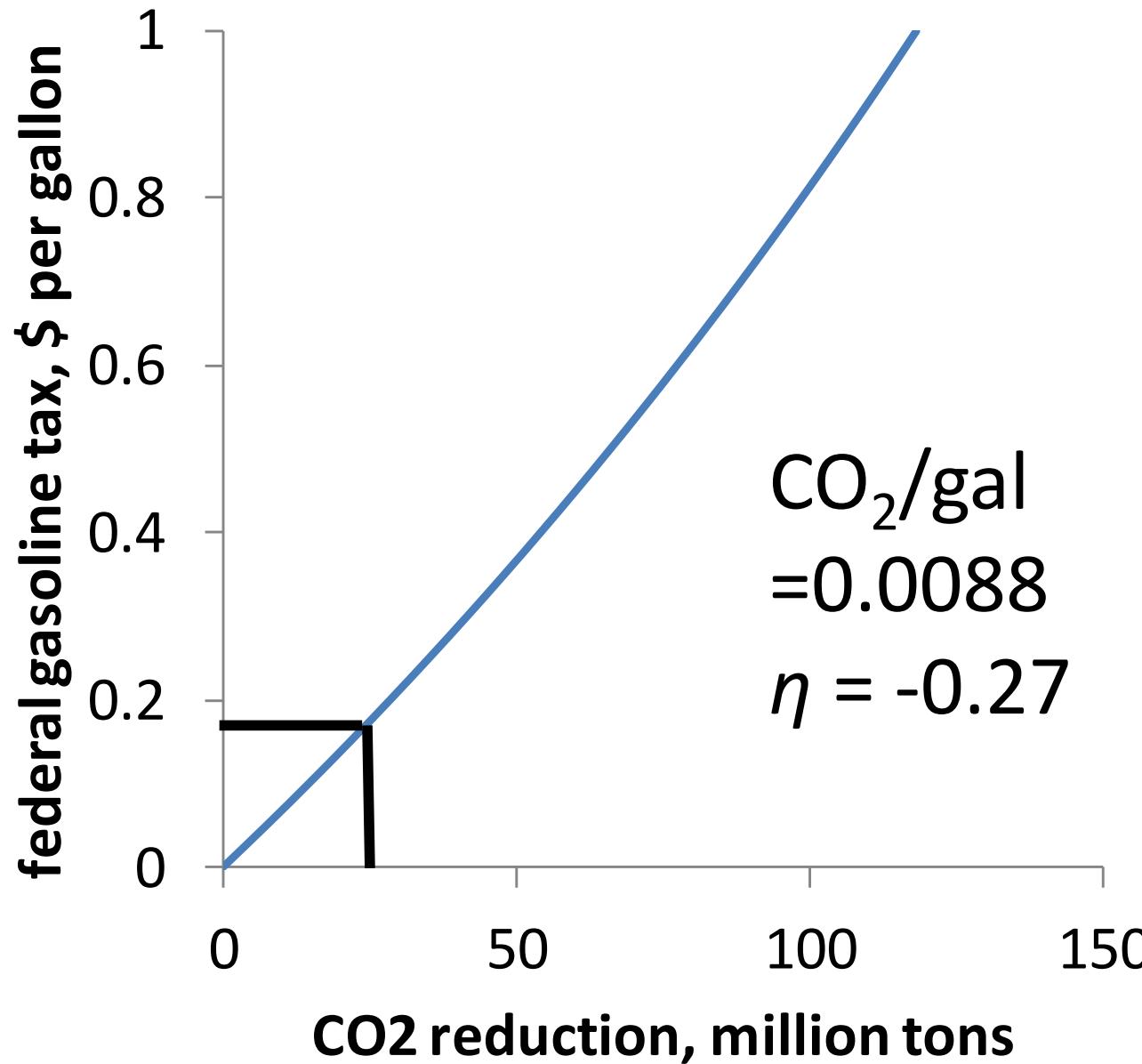
$\eta$  = fuel demand elasticity

# Gasoline Demand Elasticity

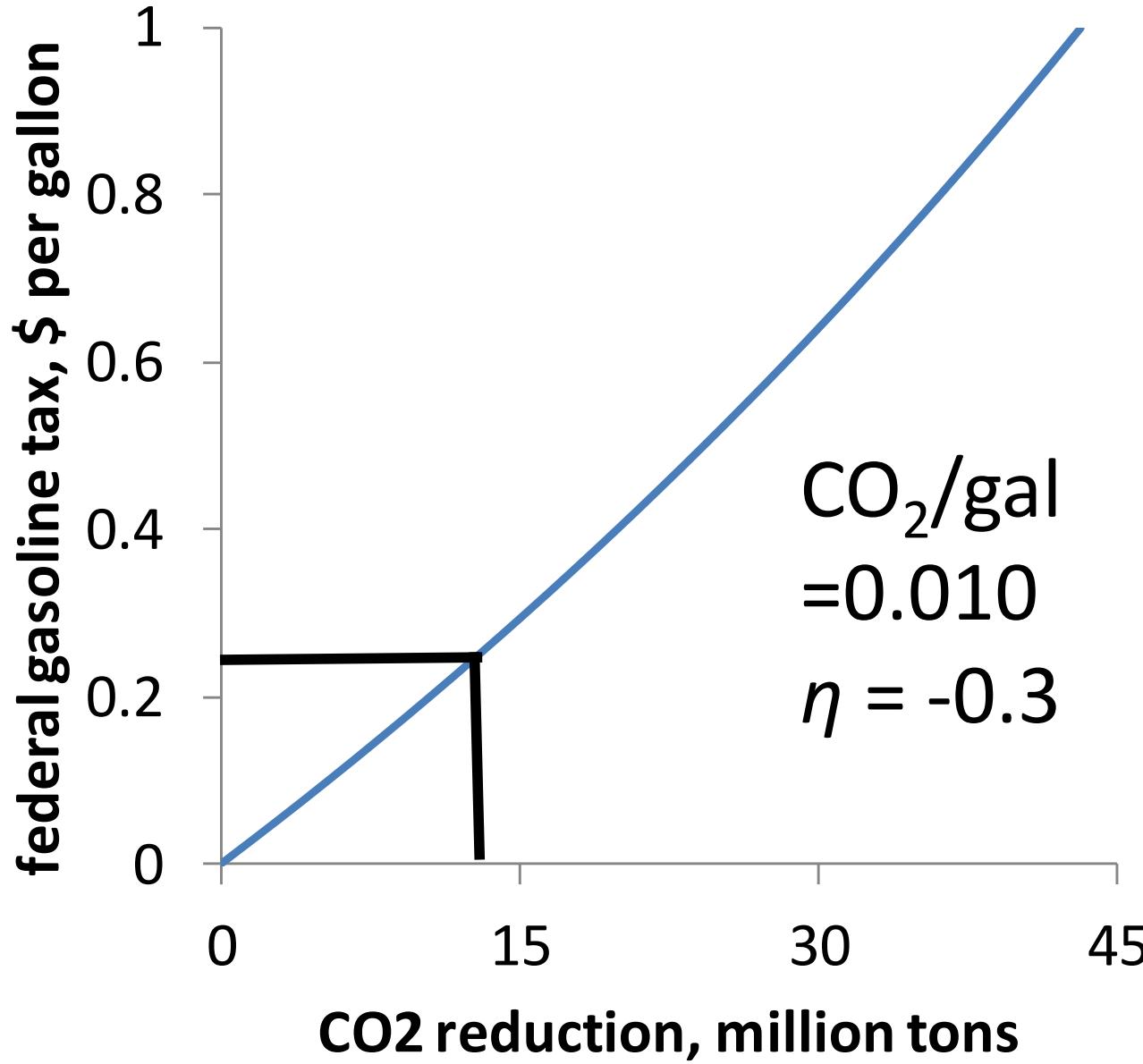
Prior to new CAFE:  $\approx -0.4$   
(Small/van Dender 2006)

With new CAFE:  $\approx -0.27??$

# Effect of Gasoline Tax on CO<sub>2</sub>



# Effect of Diesel Tax on CO<sub>2</sub>



# Simulation Models: NEMS

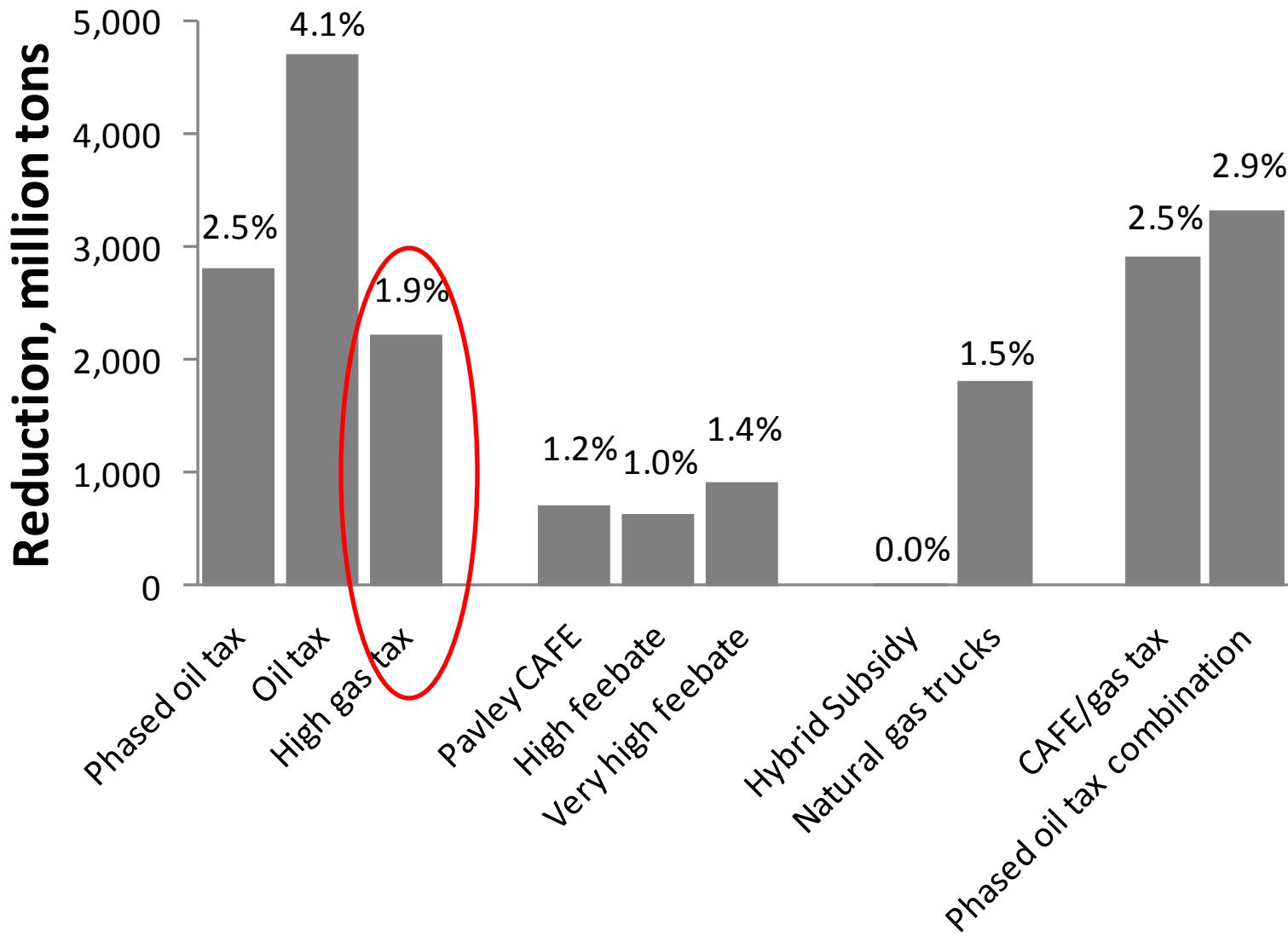
## *Captures*

- transitional dynamics
- “state of the art” costs and emissions effects of emerging fuel-saving technologies
- Detailed representation of pre-existing policies—e.g., CAFE
- Changing fuel prices in the future

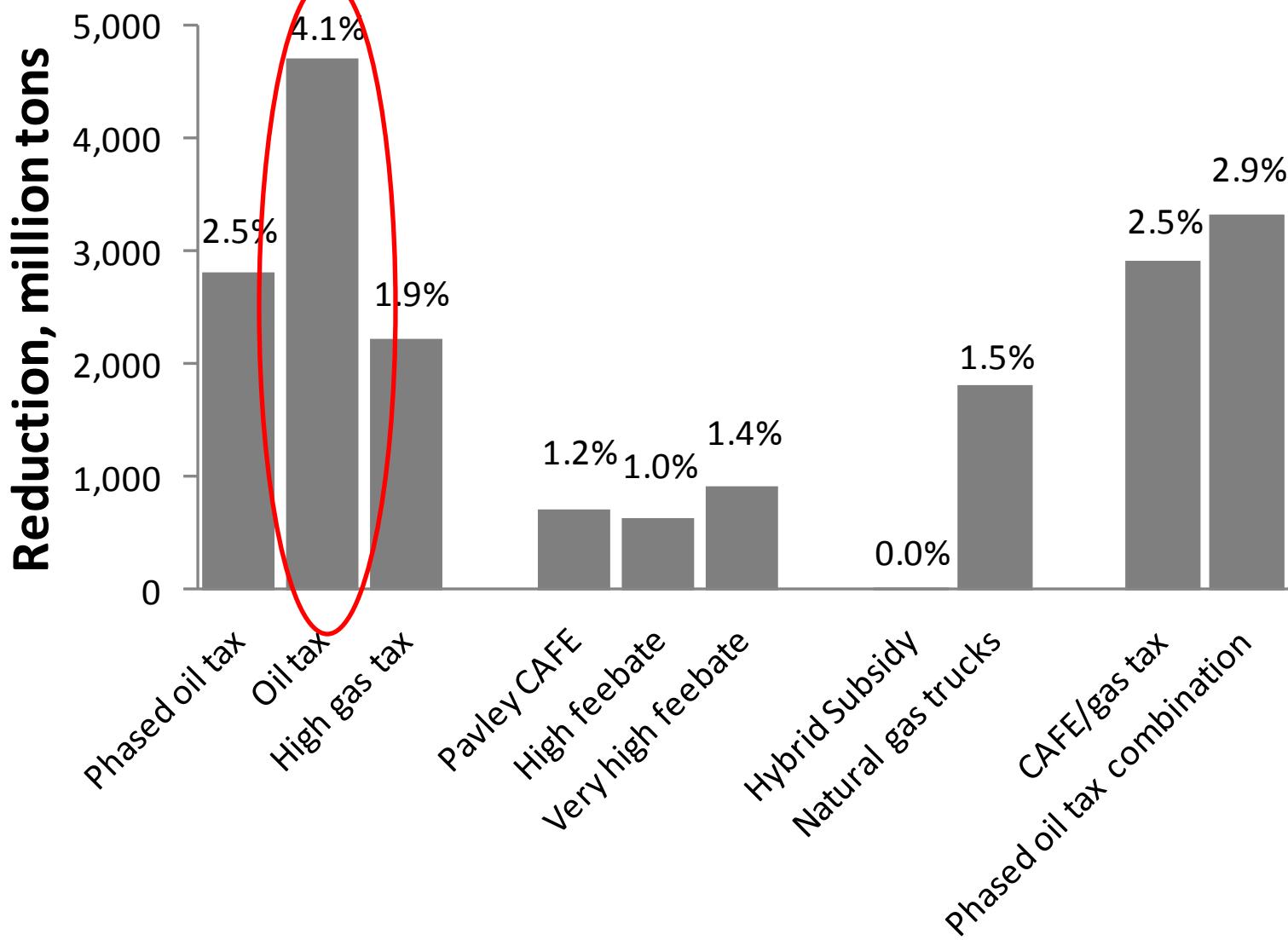
## *One drawback*

- Unrealistically limited responsiveness to diesel taxes.

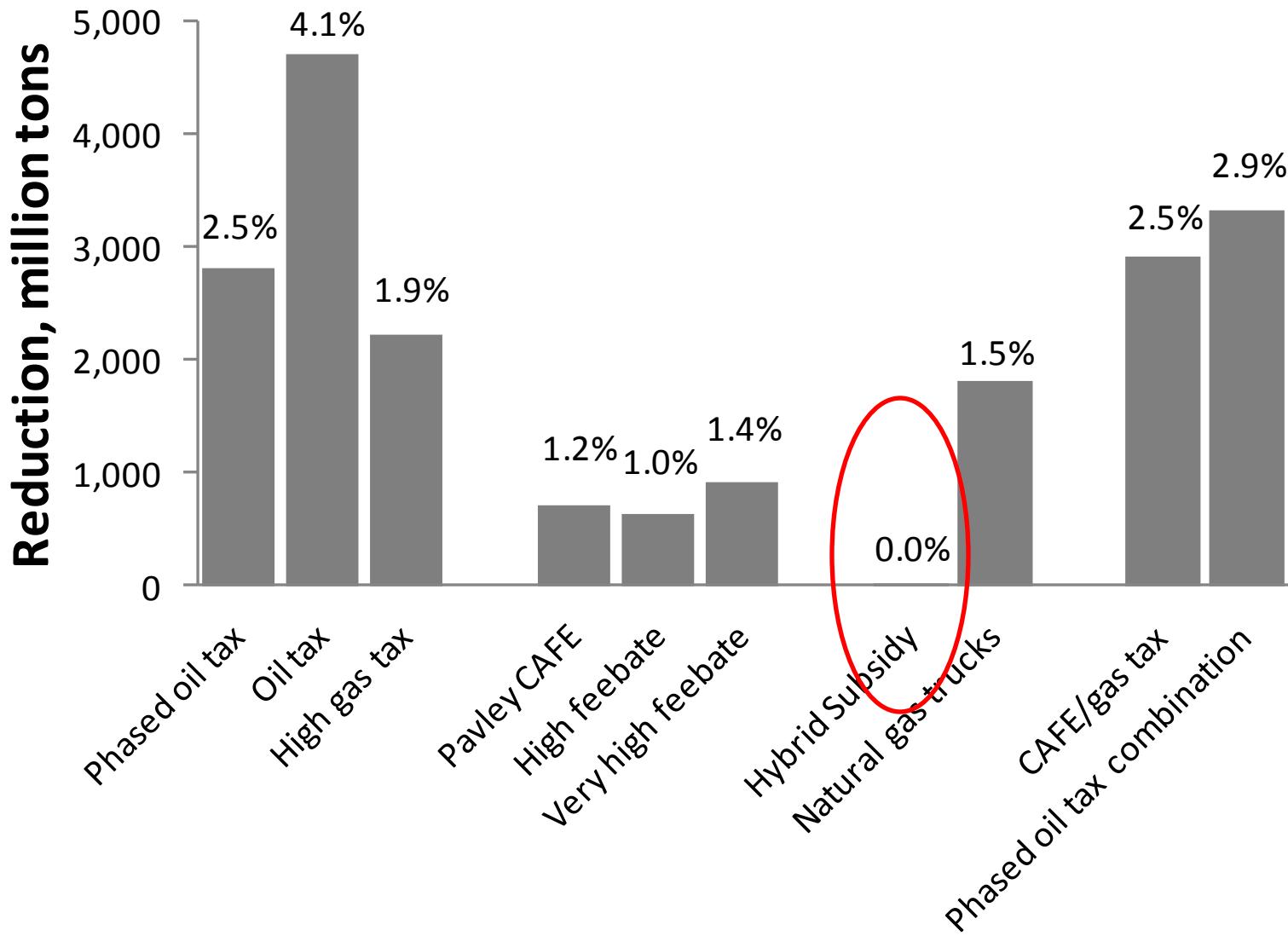
# Cumulative Reductions in CO<sub>2</sub> 2010-2030



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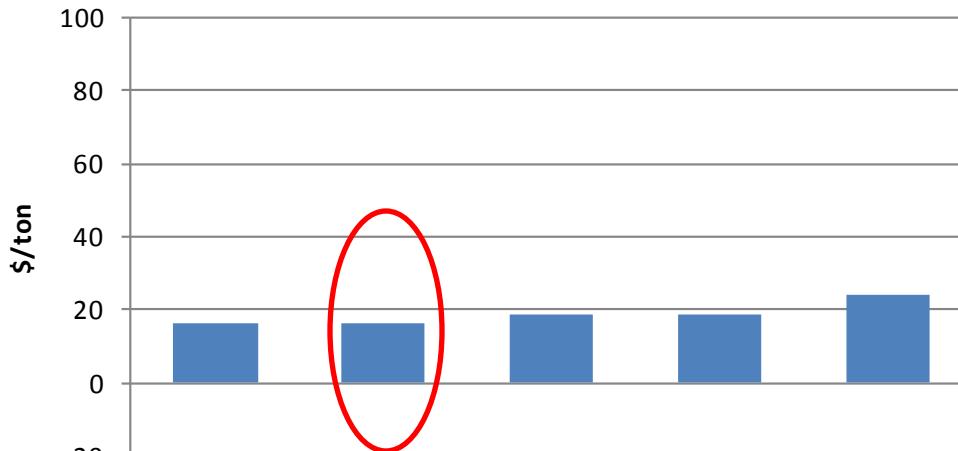
# Cost Effectiveness

- important for gauging which tax provisions should be expanded/cutback.

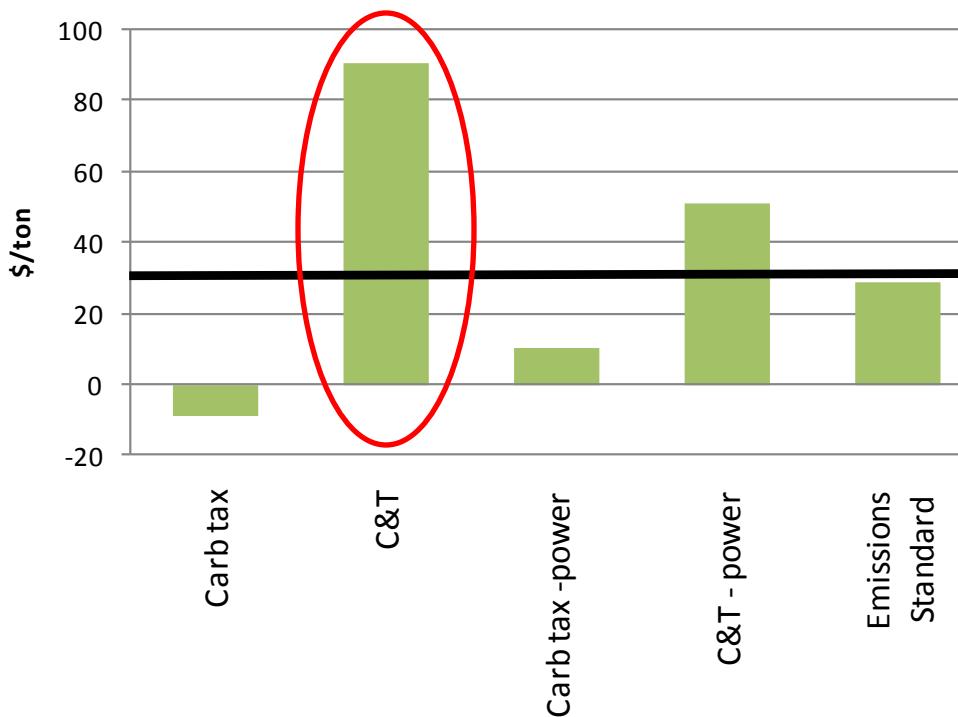
*But must account for...*

- Non-CO<sub>2</sub> externality benefits → MC's of higher fuel taxes are *negative*.

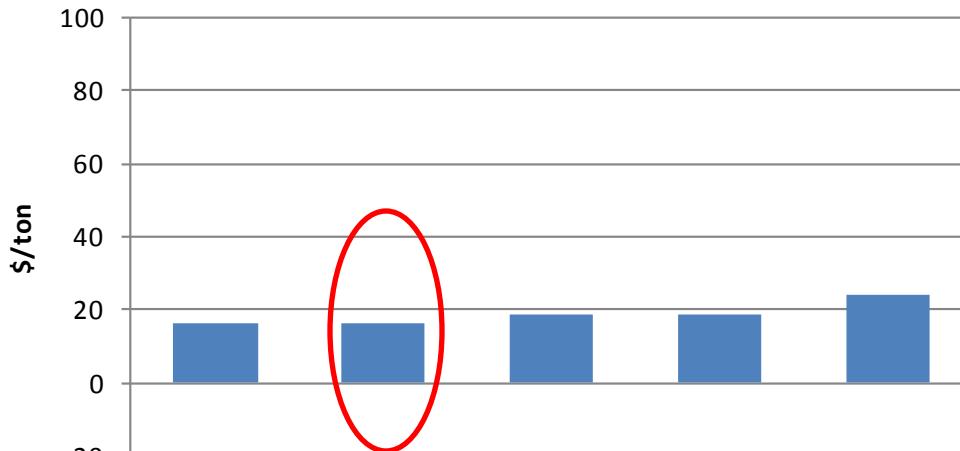
**(a) Cost with no Tax Distortion**



**(b) Cost with tax Distortions**



**(a) Cost with no Tax Distortion**



**(b) Cost with tax Distortions**

