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Transportation Fuel Cost Savings with Proposed Greenhouse Gas Reduction Policies

Summary

The petroleum industry and its allies are claiming that greenhouse gas reduction policies will hurt consumers by causing transportation fuel prices to soar.[1] This assertion is incorrect on two counts:

- First, the increase in the cost of a gallon of gasoline due to the carbon cap-and-trade program established in the climate bill will in fact be modest. The U.S. Environmental Protection Agency (EPA) projects that, under the House bill H.R. 2454, the cost of a carbon allowance will be $16 per ton carbon dioxide (CO_2) in 2020 and $26 per ton CO_2 in 2030.[2] The Congressional Budget Office (CBO) provided an alternative projection of $28 per ton CO_2 in 2020.[3] Given that it takes 110 gallons of gasoline to generate a ton of CO_2, consumers might expect to pay an additional $0.15 per gallon in 2020 (or $0.25 per gallon using the CBO projection) and $0.24 per gallon in 2030 due to the cap-and-trade program. These increases are dwarfed by run-ups in the price of gasoline in recent years and contrast with the American Petroleum Institute's warnings of gasoline prices pushed over $5 per gallon.[4]
- Second, while an increase of $0.15 to $0.24 per gallon could represent a substantial amount of money for a household over a year of driving, implementation of a cap-and-trade program will coincide with the phase-in of a dramatic and money-saving rise in the fuel economy of U.S. vehicles. The net effect of the tighter fuel economy (Corporate Average Fuel Economy, or CAFE) standards for vehicles just proposed by the Department of Transportation (DOT) and the cap-and-trade program in the House climate bill will be to lower the average household's transportation costs in 2020 and 2030, as shown in Table 1.

The net savings shown reflect all of the following factors:

- Fuel savings due to more efficient vehicles
- Lower world oil price due to reduced demand
- Increased driving due to lower fuel cost per mile
- Higher vehicle purchase costs due to advanced efficiency technologies
- Higher cost per gallon due to cap-and-trade

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[1] See, for example, http://energycitizens.org/issues/the-climate-bill/ and http://api.org/ehs/climate/regulation/ upload/MARYLAND_WAXMAN_MARKEY4.pdf.

[2] See http://www.epa.gov/climatechange/economics/economicanalyses.html#wax, Tab Overall Summary ADAGE scn02.

[3] See http://www.cbo.gov/ftpdocs/103xx/doc10327/06-19-CapTradeCosts.htm.

[4] See http://api.org/ehs/climate/regulation/upload/MARYLAND_WAXMAN_MARKEY4.pdf, which cites without explanation the Energy Information Administration's 2030 No International Offsets / Limited Alternatives Case. That scenario, which the EIA describes as "pessimistic," ignores two essential tools that are available to moderate carbon prices. EIA's Basic Case projects $4.18 per gallon in 2030, $0.36 per gallon above the Reference Case price.

Table 1: Net Savings at the Pump due to Climate Bill plus Proposed Vehicle Standards

Year	Allowance price (per metric ton CO_2) — EPA	Oil consumption in reference case (million barrels per day)	Oil consumption in policy case — CAFE + climate bill (million barrels per day)	Increased cost of fuel-efficient vehicles ($ billion)	Net savings ($ billion)	Average net savings per household
2020	$15.95	9.23	8.43	$16.3	$12.9	$100
2030	$25.99	11.09	9.51	$17.7	$46.3	$326

Introduction

Transportation accounts for 28 percent of anthropogenic greenhouse gas emissions in the U.S. and 72 percent of petroleum use. Two-thirds of transportation emissions, or 18 percent of all U.S. greenhouse gas emissions, come from cars and light trucks. Hence reducing these vehicles' fuel consumption, and consequently their emissions, is a key climate policy. Climate bills offered to date have included relatively limited provisions to address car and light truck efficiency, because the DOT and the EPA are proposing rules to accomplish this already, as is discussed in the next section. In addition to reducing emissions, these rules will yield large consumer savings, even taking into account the higher prices of the more fuel-efficient vehicles that will be needed to meet the standards.

Improvements in Vehicle Efficiency

In March 2009, the Department of Transportation issued a rule requiring an increase in average fuel economy for model year 2011 vehicles. In September, the DOT proposed standards for model years 2012 through 2016 as well, in conjunction with EPA's proposal of vehicle greenhouse gas emission standards for the same period. Expected average fuel economy for new cars and light trucks as a result of the rules are shown in Table 2.

Table 2: Average Fuel Economy of New Vehicles, 2011–2016[5]

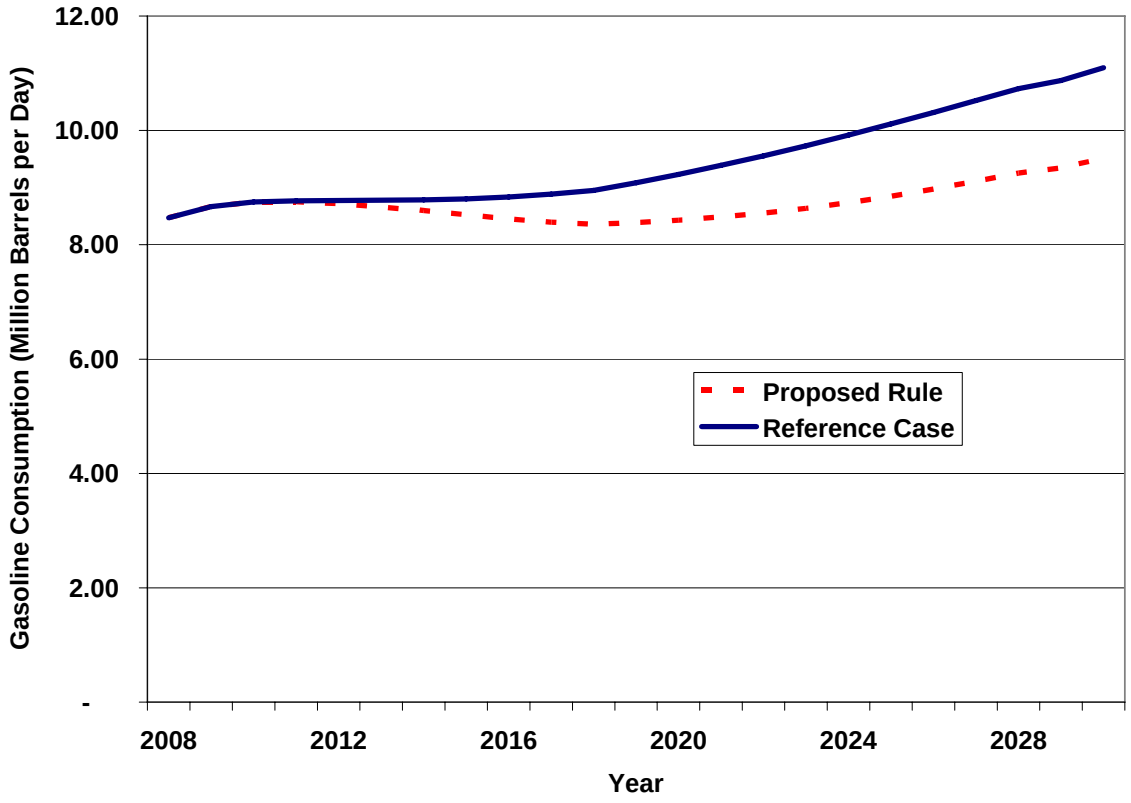
Year	Cars	Trucks	Combined
2011	30.5	24.2	27.6
2012	32.5	24.1	28.7
2013	33.4	24.6	29.6
2014	34.3	25.3	30.4
2015	35.3	26.3	31.6
2016	36.5	27.0	32.7

The new standards will take about fifteen years to percolate throughout the U.S. vehicle stock. Fuel savings and greenhouse gas (largely CO_2) reductions attributable to the

[5] EPA and DOT, *Proposed Rulemaking to Establish Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards,* http://www.epa.gov/otaq/climate/regulations/ghg-preamble-regs.pdf, pp.66–67. These are not the values of the standards, but rather projected real fuel economy averages given compliance flexibility mechanisms in the proposed rule.

standards out to 2030 are shown in Figure 1.[6] It should be noted that the nature of the standards is such that the average fuel economy achieved, and hence total fuel savings, depends on the size mix of the vehicles that consumers buy, and thus could be somewhat higher or lower than shown here.

Figure 1: Oil Savings and CO_2 Reductions from Fuel Economy Standards



Source: ACEEE stock model

The fuel-efficiency technologies needed to achieve these standards will raise the purchase price of new vehicles; DOT's projections of expected price increases are shown in Table 3. These added costs will paid back over time by the value of the fuel savings shown in Figure 1.

[6] The savings shown in the graph reflect the "rebound effect," which is the tendency of car owners to drive more miles when their cost of driving goes down — in this case, due to the increase in miles per gallon under the standard. This assumes an elasticity of driving with respect to fuel costs of -0.1, the value used in the proposed fuel economy and greenhouse gas emissions rules.

Table 3: Projected Increase in Average Vehicle Price Due to Proposed Vehicle Standards[7]

Year	Per vehicle increase
2011	$78
2012	$349
2013	$489
2014	$649
2015	$794
2016	$944

Gasoline Prices

Under the cap-and-trade program proposed in the *American Clean Energy and Security Act*, H.R. 2454, petroleum refiners and distributors would be "covered sources," meaning that they would be need to hold emissions allowances sufficient to cover the carbon content of their products. Assuming that these companies pass the cost of the allowances on to consumers at the pump, the price of gasoline would rise with the price of carbon emissions allowances. The EPA's analysis of the impacts of H.R. 2454 projects that price will reach $16 per ton CO_2 in 2020 and $26 per ton CO_2 in 2030.[8] Given that it takes 110 gallons of gasoline to generate a ton of CO_2, gasoline will cost an additional $0.15 per gallon in 2020 and $0.24 per gallon in 2030 due to the cap-and-trade program.

On the other hand, fuel economy standards will reduce oil consumption, which will in turn lower the price of oil. Assuming these modest price reductions are reflected in the price of gasoline, they will offset to some extent the increase associated with the emissions allowance price. To quantify this benefit, we use the Department of Transportation's and Environmental Protection Agency's calculations of the "monopsony" effect, which is the drop in world oil prices that follows from reducing consumption in the U.S. The agencies estimate that each barrel of fuel not imported as a result of fuel economy improvements will reduce U.S. fuel costs by $12.31 in 2020 and $10.57 in 2030.[9] They also estimate that each gallon saved due to the rules will reduce imports by 0.95 gallons.[10] Given reductions in fuel use of 0.8 million barrels per day in 2020 and 1.6 million barrels per day in 2030 (see Figure 1), the above monopsony benefits therefore translate to $3.4 billion in 2020 and $5.8 billion in 2030.

[7] Vehicle price impacts from EPA, DOT proposed rule (Table III.D.6-4). Note price impacts for 2012–2016 in the table above are the sum of price increases for the two rules.
[8] See http://www.epa.gov/climatechange/economics/economicanalyses.html#wax. Tab Overall Summary ADAGE scn02.
[9] Proposed Joint Rulemaking EPA and DOT, September 9, 2009, p.609.
[10] Draft Technical Support Document, p.4–33.

Net Consumer Savings

The net effect of the fuel economy (CAFE) and emissions standards plus cap-and-trade on consumers' transportation expenditures is a savings of $12.9 billion in 2020 and $46.3 billion in 2030, as shown in Table 4. This amounts to average savings per household of $100 in 2020 and $326 in 2030.

Table 4: Net Consumer Impact of Proposed Vehicle Standards (2011–2016) Plus Cap-and-Trade

Year	2020	2030
Reference case consumption (million barrels per day)	9.23	11.09
CAFE case consumption (million barrels per day)	8.43	9.51
Fuel savings from CAFE (million barrels per day)	0.80	1.58
Baseline fuel price ($ per gallon)	$3.62	$3.82
Reference case annual fuel expenditures ($ billion)	$513	$650
Annual reduction in fuel expenditures due to monopsony effects, with CAFE ($ billion)	$3.4	$5.8
EPA allowance price ($ per ton CO_2-equivalent)	$15.95	$25.99
Annual fuel expenditure — CAFE + H.R. 2454 ($ billion)	$483	$586
Vehicles purchased per year (million)	17.28	18.80
Total increase in price of vehicles ($ billion)	$16.3	$17.7
Net savings ($ billion)	$12.9	$46.3
Average net savings per household	$100	$326

To the extent that policies, technological advances, and market forces yield a sizeable population of electric-drive vehicles, a cap-and-trade program for greenhouse gases will prove essential to further reductions in transportation sector emissions. Other efficiency measures for the transportation sector, notably heavy truck fuel economy increases and policies to reduce the need for motor vehicle travel, can provide emissions reductions and fuel savings well beyond those discussed in this analysis.

Alarmists warn of dramatic increases in gasoline prices in the wake of a climate bill but fail to consider the net impact of the full complement of policies underway to control greenhouse gas emissions. For cars and light trucks, the combination of new standards and a cap on carbon emissions brings substantial savings at the pump while helping to address the climate and energy security challenges facing the nation.

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