

## GM and Ford Investment Plans and California Greenhouse Gas Emission Standards

### *Fuel Economy Improvements in Federal Loan Plans Show that Automakers Can Comply with California Greenhouse Gas Standards Nationwide*

**Natural Resources Defense Council  
December 8, 2008**

#### **Executive Summary**

On December 2, 2008, General Motors Corporation, Ford Motor Company and Chrysler LLC submitted business plans to the Senate Banking Committee and the House of Representatives Financial Services Committee to support their request for federal loans. GM's plan states that it will achieve 2012 fuel economy levels of 37.3 mpg and 27.5 miles per gallon (mpg) for their new car and light truck fleets, respectively.<sup>1</sup> Ford's plan states that, compared to its 2005 baseline, it will improve the average fuel economy of its fleet by 26% by 2012 and by 36% by 2015.<sup>2</sup> The Chrysler plan does not provide any fuel economy projections.

All three companies state that they will at least comply with future federal fuel economy ("CAFE") standards. This analysis demonstrates that GM and Ford are now positioned also to comply with the more stringent California greenhouse gas (GHG) standards if they were extended to apply nationwide. The obvious solution to all of the automaker concerns -- including their desire for a uniform national standard -- is to adopt California's GHG standards nationwide.

For GM, our results show that the 2012 fuel economy levels in GM's plan (along with other simple GHG reduction vehicle measures that the company is expected to adopt) would result in a greenhouse gas emission rate of 289 grams of CO<sub>2</sub>-equivalent per mile. This projected GHG emission level would enable GM to comply with a national version of the California GHG standards in 2012. While GM does not provide 2015 fuel economy levels, if it simply matches the Ford plan's rate of improvement between 2012 and 2015, GM would also easily meet the 2015 California GHG standards nationwide.

**Table ES-1. Greenhouse Gas Emission Estimates, General Motors Corporation**  
grams of CO<sub>2</sub>-equivalent per mile

	California GHG Standard	California GHG Compliance Level*
<b>2012</b>	294	289
<b>2015</b>	277	(262)**

\* Assumes national fleet mix and credits from N<sub>2</sub>O, CH<sub>4</sub> and improved air conditioning GHG reductions as provided for by the California regulations and projected in the California Air Resources Board's February 25, 2008 report.

\*\* Assumes that GM will improve their emission levels between 2012 and 2015 by the same percentage as Ford has committed to in its plan.

For Ford, our results show that the fuel economy levels in Ford's plan (along with other simple GHG reduction vehicle measures that the company is expected to adopt) would result in a greenhouse gas emission rate of 301 grams per mile in 2012 and 273 grams of CO<sub>2</sub>-equivalent per mile in 2015. This projected GHG emission level would enable Ford to comply with a national version of the California GHG standards in 2015. In 2012, Ford's projected improvements in fuel economy would allow Ford easily to meet the California GHG standard simply by making modest additional improvements to the air conditioning system.

**Table ES-2. Greenhouse Gas Emission Estimates, Ford Motor Company**  
grams of CO<sub>2</sub>-equivalent per mile

	California GHG Standard	California GHG Compliance Level*
<b>2012</b>	295	301**
<b>2015</b>	279	273

\* Assumes national fleet mix and credits from N<sub>2</sub>O, CH<sub>4</sub> and improved air conditioning GHG reductions as provided for by the California regulations and projected in the California Air Resources Board's February 25, 2008 report.

\*\* If Ford adopted low leak and more efficient air conditioning on 100% of their 2012 fleet instead of the 50% assumed in this analysis, it would achieve a level of 295 grams per mile and meet the California GHG requirements.

### Methodology

The question asked in this analysis is whether the fuel economy levels projected in the GM and Ford plans would place them in compliance with a national version of the California GHG standards. To answer this question, we convert each automaker's projected fuel economy levels into greenhouse gas emissions levels. We use a methodology and assumptions consistent with recent (February 25<sup>th</sup>, 2008) analysis by the California Air Resources Board.<sup>3</sup>

We start by estimating the fleetwide GHG emission levels that GM and Ford would need to achieve if the California GHG standards were adopted nationwide. Tables 1 and 2 show the projected new vehicle sales for each company in 2012 and 2015 for passenger cars (PCs) and light trucks (LDTs) based on data from National Highway Traffic and Safety Administration.<sup>4</sup> Because the California GHG program uses a slightly different vehicle classification system, we also estimate sales volumes for light trucks less than 3751 lbs ("LDT1") and for light trucks greater than 3751 lbs but less than 8750 lbs ("LDT2"). Table 2 also contains 2005 market shares for Ford since its plan is based on a percentage improvement to its 2005 fleetwide fuel economy.

**Table 1. Projected Sales Volumes, General Motors Corporation**

	2012	2015	2012	2015
PC	2,000,900	1,935,000	47%	45%
LDT	2,213,600	2,358,400	53%	55%
PC+LDT1	2,211,625	2,149,670	52%	50%
LDT2	2,002,875	2,143,730	48%	50%
Total	4,214,500	4,293,400		

Source: National Highway Traffic and Safety Administration, *Corporate Average Fuel Economy for MY 2011-15 for Passenger Cars and Light Trucks*, Preliminary Regulatory Impact Analysis, April 2008 and NRDC calculations.

**Table 2. Projected Sales Volumes, Ford Motor Company**

	2005	2012	2015	2005	2012	2015
PC	1,213,710	1,415,300	1,364,700	42%	46%	44%
LDT	1,667,221	1,644,600	1,752,300	58%	54%	56%
PC+LDT1		1,568,295	1,520,550		51%	49%
LDT2		1,491,605	1,596,450		49%	51%
Total	2,880,931	3,059,900	3,117,000			

Source: National Highway Traffic and Safety Administration, *Corporate Average Fuel Economy for MY 2011-15 for Passenger Cars and Light Trucks*, Preliminary Regulatory Impact Analysis, April 2008 and NRDC calculations.

Based on the national fleet mixes shown in Table 1 and 2, we estimate the fleetwide average greenhouse gas emissions levels that would result from the PC/LDT1 and LDT2 GHG emission standards for GM and Ford. The results are show in Table 3.

**Table 3. California Greenhouse Gas Standards**

grams of CO<sub>2</sub>-equivalent per mile

	2012	2015
<b>PC+LDT1 requirements</b>	233	213
<b>LDT2 requirements</b>	361	341
<b>GM average based on national mix</b>	294	274
<b>Ford average based on national mix</b>	295	279

Source: California Air Resources Board, *Comparison of Greenhouse Gas Reductions for the United States and Canada Under U.S. CAFE Standards and California Air Resources Board Greenhouse Gas Regulations*, an Enhanced Technical Assessment, February 25, 2008, and NRDC calculations.

Next, we convert the fuel economy improvements forecast in the GM and Ford plans to greenhouse gas emission levels consistent with the compliance requirements of the California GHG regulation. We reduce their rated fuel economy levels to remove the credits for flex fuel vehicle allowed by the federal CAFE program but not by the California program, in a manner consistent with the methodology used by the California Air Resources Board in its February 25<sup>th</sup>, 2008 analysis.<sup>5</sup> The available CAFE credit in 2012 is 1.2 mpg and 1.0 mpg in 2015. Tables 4 and 5 show the projected fuel economy levels with the flex fuel vehicle credits removed.

**Table 4. Fuel Economy Levels, General Motors Corporation**

miles per gallon

	GM Plan 2012	With Flex Fuel Vehicle Credit Removed
<b>PC</b>	37.3*	36.1
<b>LDT</b>	27.5*	26.3
<b>Fleetwide Average</b>	31.4	30.2

\* Source: Table 7 of General Motors Corporation, *Restructuring Plan for Long-term Viability*, Submitted to Senate Banking Committee & House of Representatives Financial Services Committee, December 2, 2008.

**Table 5. Fuel Economy Levels, Ford Motor Company**

miles per gallon

	Baseline*	Ford Plan		With Flex Fuel Vehicle Credit Removed	
	2005	2012	2015	2012	2015
<b>overall increase**</b>		<b>26%</b>	<b>36%</b>		
<b>PC</b>	28.6	36.0	38.8	34.8	37.8
<b>LDT</b>	21.6	27.2	29.4	26.0	28.4
<b>Fleetwide Average</b>	24.1	30.3	32.7	29.1	31.7

\* Source: National Highway Traffic and Safety Administration, *Summary of Fuel Economy Performance, March 2008*.

\*\* Source: Page 14 of Ford Motor Company, *Ford Motor Company Business Plan*, Submitted to the House Financial Services Committee, December 2, 2008.

The California GHG program allows the manufacturers to take credit for reductions in three other non-CO<sub>2</sub> greenhouse gas emissions (N<sub>2</sub>O, CH<sub>4</sub> and HFC-134a) and other improvements to vehicle air conditioning systems that indirectly reduce tailpipe CO<sub>2</sub> emissions. We adopt the same assumptions as the California Air Resources Board regarding the use of these credits from their February 25<sup>th</sup>, 2008 analysis.<sup>6</sup>

The N<sub>2</sub>O and CH<sub>4</sub> credits result in a combined emission rate for these pollutants of 1.9 grams of CO<sub>2</sub> equivalent per mile. This rate must be added to the CO<sub>2</sub> emissions derived from the fuel economy conversion. The air conditioning credits assumed are shown in Table 6. Finally to convert miles per gallon to CO<sub>2</sub>-equivalent per mile, we adopt the California Air Resources Board conversion factor of 8,887 grams of CO<sub>2</sub>-equivalent per gallon of gasoline.

**Table 6. N<sub>2</sub>O and CH<sub>4</sub> Emission Rates and Air Conditioning Credits Assumed for this Study**  
grams of CO<sub>2</sub>-equivalent per mile

	2012	2015
<b>N<sub>2</sub>O+CH<sub>4</sub> combined emission rate</b>	1.9	1.9
<b>Improved Air Conditioning GHG credit</b>	5.7	8.5

Source: California Air Resources Board, *Comparison of Greenhouse Gas Reductions for the United States and Canada Under U.S. CAFE Standards and California Air Resources Board Greenhouse Gas Regulations*, an Enhanced Technical Assessment, February 25, 2008, and NRDC calculations.

## Results and Conclusions

As shown in Table 7 and Figure 1, the 2012 fuel economy levels in GM's plan (along with other simple GHG reduction vehicle measures that the company is expected to adopt) would result in a greenhouse gas emission rate of 289 grams of CO<sub>2</sub>-equivalent per mile. This projected GHG emission level would enable GM to comply with a national version of the California GHG standards in 2012. While GM does not provide 2015 fuel economy levels, if it simply matches the Ford plan's rate of improvement between 2012 and 2015, GM would also easily meet the 2015 California GHG standards nationwide.

As shown in Table 8 and Figure 2, the fuel economy levels in Ford's plan (along with other simple GHG reduction vehicle measures that the company is expected to adopt) would result in a greenhouse gas emission rate of 301 grams of CO<sub>2</sub>-equivalent per mile in 2012 and 273 grams of CO<sub>2</sub>-equivalent per mile in 2015. This projected GHG emission level would enable Ford to comply with a national version of the California

GHG standards in 2015. In 2012, the Ford fleet average falls just 6 grams per mile above compliance, a shortfall that Ford could easily make up by applying additional technologies, rebalancing of their vehicle sales mix or a combination of both. For example if Ford chose to equip 100% of their fleet in 2012 with a low leak, improved air conditioning systems (versus the 50% assumed in this analysis), their fleet average would drop to 295 grams per mile.

This analysis demonstrates that GM and Ford are now positioned also to comply with the more stringent California greenhouse gas (GHG) standards if they were extended to apply nationwide. The obvious solution to all of the automaker concerns -- including their desire for a uniform national standard -- is to adopt California's GHG standards nationwide.

**Table 7. Greenhouse Gas Emission Estimates, General Motors Corporation**  
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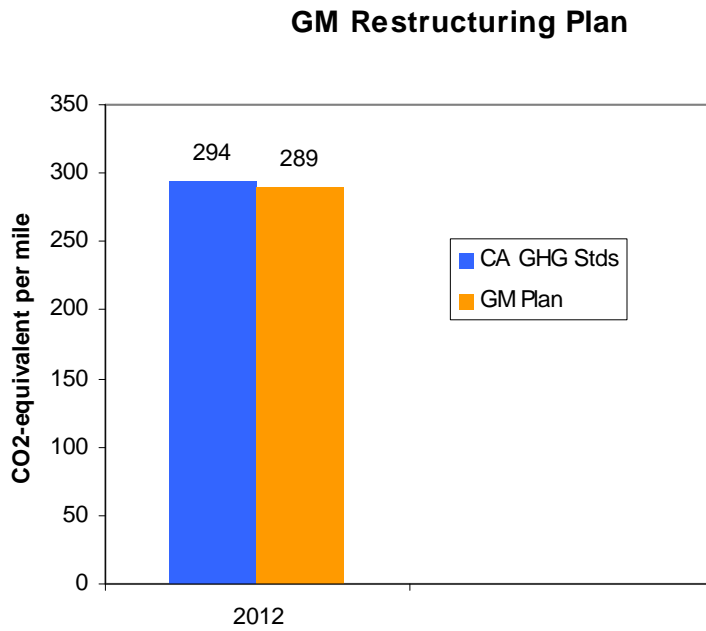
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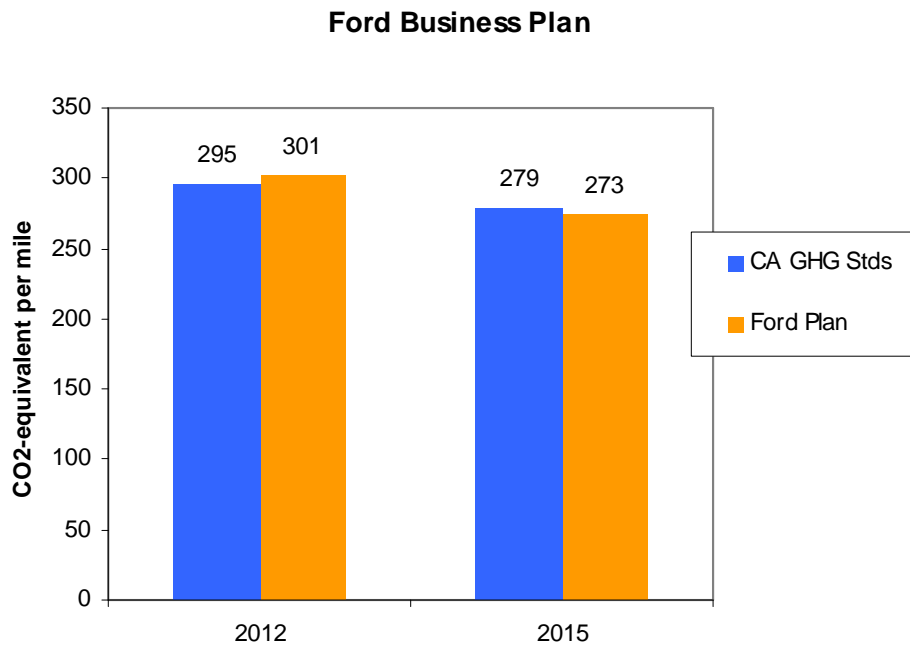
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\*\* If Ford adopted low leak and more efficient air conditioning on 100% of their 2012 fleet instead of the 50% assumed in this analysis, it would achieve a level of 295 grams per mile and meet the California GHG requirements.

**Figure 1. Greenhouse Gas Emission Estimates, General Motors Corporation**



**Figure 2. Greenhouse Gas Emission Estimates, Ford Motor Company**



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<sup>1</sup> See Table 7 of General Motors Corporation, *Restructuring Plan for Long-term Viability*, Submitted to Senate Banking Committee & House of Representatives Financial Services Committee, December 2, 2008.

<sup>2</sup> See page 14 of Ford Motor Company, *Ford Motor Company Business Plan*, Submitted to the House Financial Services Committee, December 2, 2008.

<sup>3</sup> See California Air Resources Board, *Comparison of Greenhouse Gas Reductions for the United States and Canada Under U.S. CAFE Standards and California Air Resources Board Greenhouse Gas Regulations*, an Enhanced Technical Assessment, February 25, 2008

<sup>4</sup> See National Highway Traffic and Safety Administration, *Corporate Average Fuel Economy for MY 2011-15 for Passenger Cars and Light Trucks*, Preliminary Regulatory Impact Analysis, April 2008.

<sup>5</sup> See CARB 2008.

<sup>6</sup> According to CARB 2008: “The air conditioning credit ... assumes that 50 percent of new vehicles achieve a 50 percent reduction in indirect CO<sub>2</sub> emissions due to air conditioning system improvements and a 50 percent reduction in CO<sub>2</sub> equivalent emissions as a result of reducing refrigerant leaks beginning in 2009 and switching to a low GWP refrigerant beginning in 2013.”