



Union of Concerned Scientists  
Citizens and Scientists for Environmental Solutions

Edie Chang, Chief  
Planning and Management Branch  
Office of Climate Change  
Air Resources Board  
1001 I Street • P.O. Box 2815  
Sacramento, California 95812

Dear Ms. Chang:

The Union of Concerned Scientists is pleased to submit Vehicle Feebates Program as a market based solution to reduce global warming emissions from the transportation sector. Based upon our studies, we believe that feebates is a cost effective approach to create measurable and verifiable reductions in greenhouse gas emissions from passenger cars and trucks. A feebates program is also flexible and offers the Air Resources Board many different options and price levels.

We would welcome the opportunity to discuss this further. Please contact us if you have any questions.

Sincerely,

Spencer Quong  
Senior Vehicles Analyst

Daniel Kalb  
California Policy Coordinator

cc: R. Duvall

## **Attachment 1: Description of Emission Reduction Measure Form**

Please fill out one form for each emission reduction measure. See instructions in Attachment 2.

**Title: Passenger Vehicle Feebates Program**

**Type of Measure (check all that apply):**

- |                                                        |                                                             |
|--------------------------------------------------------|-------------------------------------------------------------|
| <input type="checkbox"/> Direct Regulation             | <input checked="" type="checkbox"/> Market-Based Compliance |
| <input checked="" type="checkbox"/> Monetary Incentive | <input type="checkbox"/> Non-Monetary Incentive             |
| <input type="checkbox"/> Voluntary                     | <input type="checkbox"/> Alternative Compliance Mechanism   |
| <input type="checkbox"/> Other Describe:               |                                                             |

**Responsible Agency:** Air Resources Board

**Sector:**

- |                                                    |                                                 |
|----------------------------------------------------|-------------------------------------------------|
| <input checked="" type="checkbox"/> Transportation | <input type="checkbox"/> Electricity Generation |
| <input type="checkbox"/> Other Industrial          | <input type="checkbox"/> Refineries             |
| <input type="checkbox"/> Agriculture               | <input type="checkbox"/> Cement                 |
| <input type="checkbox"/> Sequestration             | <input type="checkbox"/> Other Describe:        |

**2020 Baseline Emissions Assumed (MMT CO<sub>2</sub>E):** 164.7 MMT CO<sub>2</sub>E

**Percent Reduction in 2020:** 7-25%

**Cost-Effectiveness (\$/metric ton CO<sub>2</sub>E) in 2020:**

Cost to State of California	\$0
Vehicle Lifetime <u>Savings</u> to Consumer	\$800 to \$1800
Increase in auto retailer revenue	\$1.1 to \$3.5 billion

## **Description:**

This measure would create a program which would assess fees and rebates (i.e., feebates) on new passenger cars and trucks at time of purchase based upon their tailpipe greenhouse gas emissions. For example, the purchaser of a clean passenger vehicle might receive a rebate of \$1000 to \$2000 while someone buying polluting truck would have to pay an additional \$1000 to \$2500. In the proposed program, the surcharges would pay for the rebates and administrative costs, thereby making the program self-financing.

The Air Resources Board (ARB) would design and manage the program, but the Board of Equalization (BOE) or Department of Motor Vehicles (DMV) could be responsible for collecting fees and dispensing rebates.

Flexibility is one of the benefits of a feebates program. For example, ARB could adjust the cost of emissions to achieve higher emissions reductions or to reduce the size of the feebates on each vehicle. (The cost of emissions in a feebates program in this proposal is shown as dollars per GHG emissions per mile or \$ per g of CO<sub>2</sub>-eq/mi. This is often referred to as the slope of the feebate curve.) Furthermore, feebates can be assessed based upon vehicle size or footprint.

Studies have found that while feebates will change some consumer behavior, most of the emissions reductions will come through auto manufacturers installing cleaner technologies on their vehicles to reduce its fee or increase its rebate. While this additional technology will increase the cost of the vehicle, the consumer would save money over the life of the vehicle due to decreased operating costs. Thus, feebates is a cost-effective, market-based approach to reduce heat trapping gases from vehicles.

## **Emission Reduction Calculations and Assumptions:**

Depending on the design, a feebates program can achieve various levels of emissions reductions and can work in conjunction with a regulatory program, such as California's existing motor vehicle greenhouse gas emissions (GHG) regulations (aka AB 1493-Pavley).

A study by McManus at the University of Michigan<sup>1</sup> analyzed the effects of the feebates program such as the one proposed in Assembly Bill 493 (AB 493) under various scenarios, including the one's listed below:

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<sup>1</sup> McManus, W. (2006) *Economic Analysis of Feebates to Reduce Greenhouse Gas Emissions from Light Vehicles for California*. University of Michigan, UMTRI Automotive. (<http://www.umtri.umich.edu/news.php?id=1455>).

- Feebates without GHG regulation with a modest cost of emissions (\$18 per g CO<sub>2</sub>-eq/mi)
- Feebates without GHG regulation but the cost of emissions is selected to achieve the same reduction as existing California GHG regulations. (\$36 per g CO<sub>2</sub>-eq/mi)
- Feebates with GHG regulations and a modest cost of emissions (\$18 per g CO<sub>2</sub>-eq/mi)

The ARB in their development of GHG standards for vehicles determined the cost of installing various technologies to reduce global warming emissions.<sup>2</sup> The McManus study used these costs and economic models to determine reaction of the consumer and auto manufacturers to a feebates program. McManus found that in response to a feebate program manufacturers will install technology to reduce the emissions of their vehicles, thereby reducing their surcharge or increasing their rebate. (One note is that a feebates program will improve the emissions of almost all vehicles, clean and dirty, while a pollution tax or rebate will only affect one side.)

The fleet-wide reduction in emissions under each feebate scenario modeled by McManus is shown in the Table below. For example, a feebates on top of existing regulations could achieve an additional 7% reduction in global warming emissions.

	<b>Fleetwide Avg Tailpipe Emissions (g CO<sub>2</sub>-eq/mi)</b>	<b>Reduction in Emissions (g CO<sub>2</sub>-eq/mi)</b>	<b>% Change in Tailpipe Emissions</b>
<b>Modest Feebates Only</b> (\$18 g CO <sub>2</sub> -eq/mi)	292	-60	-17.1%
<b>Feebates Only</b> (\$36 g CO <sub>2</sub> -eq/mi)	258	-94	-26.7%
<b>Pavley plus Feebates</b> (\$18 g CO <sub>2</sub> -eq/mi)	235	-117	-33.3%

The ARB also developed statewide emissions estimates for 2020 and the impact of California GHG vehicle regulations.<sup>2</sup> The Union of Concerned Scientist (UCS) combined the ARB estimates with the McManus study to estimate the impact of a feebates program across California as shown in the Table below. Under even a modest program without regulation, feebates could achieve 7% reduction GHG pollution.

<sup>2</sup> California Air Resources Board. (2004.) *Addendum Presenting And Describing Revisions To: Initial Statement Of Reasons For Proposed Rulemaking, Public Hearing To Consider Adoption Of Regulations To Control Greenhouse Gas Emissions From Motor Vehicles.*

	<b>2020 Emissions (MM tons/yr)</b>	<b>% Reduction from 2020 Baseline</b>
<b>Baseline</b> <sup>2</sup> <b>(No Regulations nor feebate)</b>	164.7	
<b>GHG Regulations</b> <sup>2</sup>	135.6	
<b>Modest Feebates Only</b> (\$18 g CO <sub>2</sub> -eq/mi)	153.5	7%
<b>Feebates Only</b> <b>(same as GHG Regulations)</b> (\$36 g CO <sub>2</sub> -eq/mi)	135.6	18%
<b>GHG Regulations plus Feebates</b> (\$18 g CO <sub>2</sub> -eq/mi)	123.5	25%

Depending on the design of the program, feebates can be used to achieve the same or greater amounts of GHG emissions reduction as the existing regulations.

#### **Cost-Effectiveness Calculation and Assumptions:**

##### Costs to the State of California

As discussed above, the ARB can design the feebates program so that it is self-financing where the fees pay for the rebates plus the administrative costs. The California ARB, BOE, and DMV would all incur initial costs to establish the feebates program and re-occurring costs to manage the program as it progresses. The Assembly Committee on Appropriations estimated that Assembly Bill 493 (AB 493), a similar feebates program, would require a one-time, startup cost of \$2.35 Million and on-going, annual administrative costs of \$1.3 Million. Thus, if the program were started in 2010, the total administrative costs over 10 years would be roughly \$15 million. However, because the surcharges compensate the state for start-up and on-going costs, the net cost to the state's general fund is zero.

##### Costs to the Consumer

UCS estimates that consumers who purchase high-polluting vehicles would pay \$600 to 900 million dollars in surcharges per year. However, this does not tell the entire story, as the technologies the automakers install on their vehicles to reduce emissions also reduce the lifetime operating costs of the vehicle. The table below from the McManus study shows that under a feebates program equivalent to the existing California GHG Regulations, the consumer will pay an additional \$658 when purchasing a vehicle, but will save \$1,892 over the lifetime of the vehicle due to reduce fuel costs. This shows that a feebates program will save the average consumer \$1,234 over the life of the vehicle.

Details of each vehicle type (car, pickup truck, sport utility vehicle, minivan) are available in the McManus study. However, buyers of cleaner vehicles will save even more money because they will receive a rebate. Conversely, even with the surcharge, vehicle purchasers of all types can still save money of the life of the vehicle.

Scenario		Costs
<b>GHG Regulations</b>	Lifetime Fuel Savings	<b>(\$2,928)</b>
	Retail Price	\$1,275
	Total Change	<b>(\$1,652)</b>
<b>Modest Feebates Only</b> (\$18 g CO <sub>2</sub> -eq/mi)	Lifetime Fuel Savings	<b>(\$1,892)</b>
	Retail Price	\$658
	Net Feebates	\$0
	Total Change	<b>(\$1,234)</b>
<b>Feebates Only</b> (same as GHG Regulations) (\$36 g CO <sub>2</sub> -eq/mi)	Lifetime Fuel Savings	<b>(\$2,957)</b>
	Retail Price	\$1,164
	Net Feebates	\$0
	Total Change	<b>(\$1,793)</b>
<b>GHG Regulations plus Feebates</b> (\$18 g CO <sub>2</sub> -eq/mi)	Lifetime Fuel Savings	<b>(\$3,670)</b>
	Retail Price	\$2,866
	Net Feebates	\$0
	Total Change	<b>(\$804)</b>

### Costs to Auto Retailers

Previously, we showed that the cost of the vehicle would increase due to the additional technologies the auto manufacturer installs to improve their feebate. The retailer is also affected by the price change through decreased demand and increased revenue. Through his economic models, McManus determined that the additional revenue from the price increase exceeds the loss in revenue from decreased sales.

The table below from the McManus study shows that under a feebates program equivalent to the existing California GHG Regulations, retailers will increase their revenue by \$1.9 billion.

	<b>Retailers' Revenue (\$ Billions)</b>	<b>Revenue Change from Base (\$ Billions)</b>	<b>% Change Revenue from Base</b>
<b>Baseline</b> (No Regulations nor feebate)	\$52.2		
<b>GHG Regulations<sup>2</sup></b>	\$54.9	\$2.8	5.3%
<b>Modest Feebates Only</b> (\$18 g CO <sub>2</sub> -eq/mi)	\$53.2	\$1.1	2.1%
<b>Feebates Only</b> <b>(same as GHG Regulations)</b> (\$36 g CO <sub>2</sub> -eq/mi)	\$54.1	\$1.9	3.7%
<b>GHG Regulations plus Feebates</b> (\$18 g CO <sub>2</sub> -eq/mi)	\$55.7	\$3.5	6.7%

**Implementation Barriers and Ways to Overcome Them:**

There are no major technical or economic barriers to placing a vehicle based feebates into action across the state of California. Much of the preliminary work has been done by ARB in the development of the GHG Vehicle Regulations. UCS is planning additional studies on various feebates designs which could assist the ARB in creating the program. The BOE and DMV would have to create methods to collect fees and disperse refunds. All three governmental agencies would need to work together to adjust the program as vehicles become cleaner to ensure the program is self-financing.

**Potential Impact on Criteria and Toxic Pollutants:**

Criteria and toxic pollutants could be incorporated into a GHG feebates program. However, if this is done, care must be taken not to decrease the economic incentives to reduce a vehicle's global warming pollution.

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