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**HONDA**  
The Power of Dreams

## Honda's Major ZEV Rule Concern

### ZEV Credit Ratios :

- The revised vehicle substitution ratios are a disincentive to investment in fuel cells & hydrogen.
- Current ZEV rule recognized the need to reflect state of development and cost in credit ratios.
- The weighting of ZEV credits and ratios is critical at this stage, to maintain FCVs as a viable option.

*Ben Knight*  
*Honda R&D Americas*

I'm Ben Knight, Vice President with Honda. I want to talk about the importance of CARB establishing sufficient credits for fuel cell vehicles so that companies like Honda, that believe in the technology, are not discouraged from continuing their evolution of the vehicle.

Honda is committed to a sustainable transportation future.

We see fuel cell vehicles as the key path to long term goals for zero emissions and energy sustainability.

We want to continue to put fuel cell vehicles (FCVs) on a path to commercial reality.

But the amendments proposed, specifically to vehicle substitution and credit ratios, harm the fuel cell option.

An "economic" factor is needed for the weighting of ZEV credits and ratios at this early stage, to maintain FCVs as a viable option.

*American Honda President and CEO Mr. Iwamura:*

*“The FCX Clarity is a shining symbol of the progress we’ve made with fuel cell vehicles and with our belief in this promising technology”*

*“Step by step, with continuous effort, commitment and focus, we are working to overcome obstacles to the mass-market potential of zero-emissions hydrogen fuel cell automobiles”*

The President of American Honda stated our belief in FC technology prospects, and our recent progress.

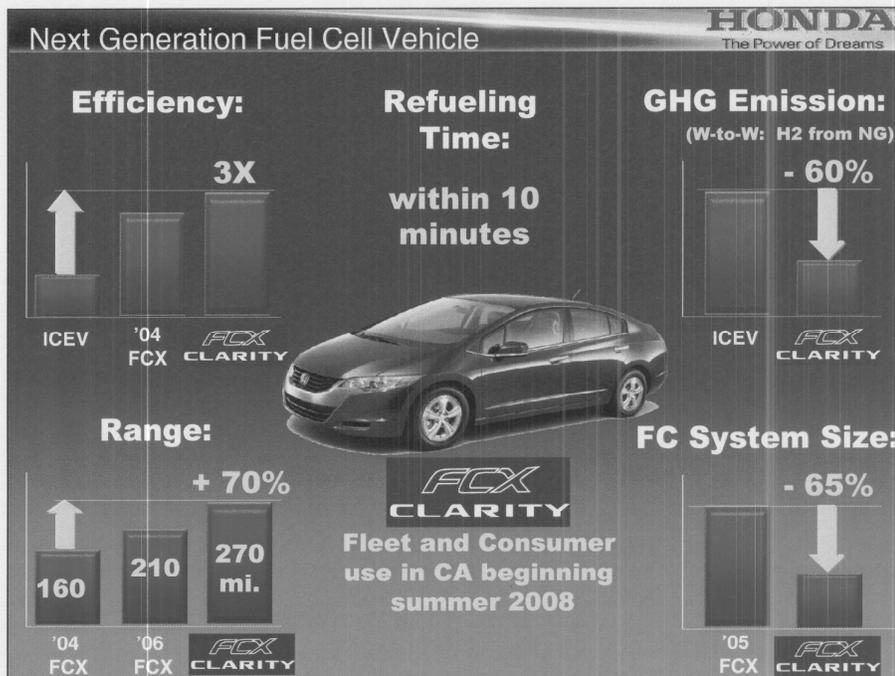
We are taking critical steps to overcome the hurdles to realize their mass market potential.

2002	<p>March 1 - Honda FCV granted certification by the Japanese Ministry of Land, Infrastructure and Transport</p> <p>March 3 - Honda FCV serves as pace car for Los Angeles Marathon</p> <p>July 15 - Honda FCV first fuel cell vehicle to receive US government certification for commercial use</p> <p>October 9 - Agreement concluded with the city of Los Angeles to make Los Angeles the first US customer for a fuel cell car</p>	<p>October 22 - Introduction of the FCV prototype planned for commercial release within the year</p> <p>November 22 - FCV granted certification by the Japanese Ministry of Land, Infrastructure and Transport</p> <p>December 2 - FCV fuel cell vehicles delivered on the same day in Japan and the US</p>	 <p>Vehicle delivery ceremony at the official residence of the prime minister of Japan</p>  <p>Vehicle delivery to the mayor of Los Angeles</p>	
2003	<p>July 15 - Honda becomes world's first automaker to supply a fuel cell vehicle to a private corporation</p>  <p>FCV delivered to Nissan International Corporation</p>	<p>October 7 - Experiments begin in the US with a hydrogen Home Energy Station, providing hydrogen fuel supply and regeneration functions</p> <p>October 10 - Release of the Honda FC Stack, a next-generation fuel cell stack capable of power generation at temperatures as low as 473-503K</p>  		
2004	<p>April 13 - City of San Francisco takes delivery of two Honda FCV vehicles</p> 	<p>June 25 - The South Coast Air Quality Management District takes delivery of two Honda FCV vehicles</p> 	<p>September 1 - Honda begins sub-freezing demonstration program in Northeast US</p> <p>July 28 - 2005 Honda FCV receives certification from CABS and USCPA</p> <p>November 10 - City of Chula Vista takes delivery of two Honda FCV vehicles</p>	<p>November 15 - New York State takes delivery of two Honda FCV vehicles equipped with Honda's own originally developed fuel cell stack and begins testing Home Energy Station II</p> 
2005	<p>January 11 - Honda announces that it intends to lease a fuel cell powered FCV to an individual customer in 2005</p> 	<p>June 29 - Delivering on its January 11th promise, an FCV is delivered to San Quentin, making that Southern the world's first Hydrogen Fuel Cell Family</p> 	<p>July 27 - Honda announces that all 2005 FCV vehicles will be the first fuel cell vehicles in the world to be equipped with a hydrogen station locating navigation system</p> 	<p>November 14 - Honda begins testing Home Energy Station III</p> 
2006	<p>January 9 - Honda announces that it will begin production in Japan of its next generation FCV in three to four years</p> <p>June 29 - Honda celebrates the Synthetic Energy's first anniversary of becoming the world's first retail FCV customer</p> <p>August 28 - Honda extends driving range of 2006 FCV to 210 miles (EPA certified) through refueling software upgrade</p> 		<p>November 18 - Honda demonstrates fully functional, drivable FCV Concept vehicle at Laguna Seca Raceway in Monterey, California</p> 	
2007	<p>March 7 - 17 year old actress, Q'orianka Kilcher, becomes world's youngest retail FCV customer</p> 	<p>September 17 - Jerry Tomkinson, father of the California Hydrogen Highway, becomes the first individual FCV customer</p> 	<p>November 14 - The Honda FCV Concept and Home Energy Station II make their world debut at the Los Angeles International Auto Show</p> 	

This slide illustrates some of our activities to lay a foundation for fuel cell electric vehicles and hydrogen infrastructure in California.

They include significant advances to the vehicle technology, and real world deployments in a variety of applications including fleet and consumer use.

Our activities are extensive and progressive these past several years.



Advancing the performance of technology is key to progress.

We are making effective progress on a number of key vehicle technology challenges. For example:

- Efficiency is greater than anyone expected at this stage.
- GHG emission reductions of about 60% are achieved even with hydrogen made from natural gas.
- And driving range is up 70% in 4 years, to 270 miles, or probably over 300 miles on CARB's UDDs metrics.

Progress is real and verifiable. We still face hurdles, including FC and battery life (we are using lithium ion in this vehicle), vehicle range, as well as for infrastructure (to support our early introductions).

**Vehicle Substitution Ratio** (Battery EV : Fuel Cell EV)

	2009-2011	2012-2014
<b>Existing Regulation</b>	<b>10 : 1</b>	<b>5 : 1</b>
<b>Staff's 2/8/08 Proposed Changes</b>	<b>1.6 : 1</b>	

Suddenly shifts investment & focus away from FCV

Major change in ratio undercuts Fuel Cell and Hydrogen Hwy investments in California.

- Gradual change in ratio needed
- Consider investments/vehicle cost (economic factor) in credits/ratios
- Base ZEV "number" on Battery EV (Type II) not FCV.

Yet, the sudden shift in the mandate's focus, with changes in the 'weighting' of options, effectively removes the FCV option.

In the current rule, vehicle substitution ratios for the FC path are 10:1 decreasing to 5:1 for this period, but, in the latest proposed amendments they now plummet to 1.6:1. This harms the fuel cell option.

ZEV technologies need continued investment to overcome challenges. Advancing the performance of the technology is key to progress right now.

We are prepared to spend to get best results, and balance vehicle numbers with R&D efforts to advance the technology. If too many vehicles are required too early, it sets us back (it can stall technology progress). It's critical to use industry resources effectively.

## CARB Cost Estimates: "Incremental Cost"

Table 6.1: Incremental Vehicle Cost Estimates

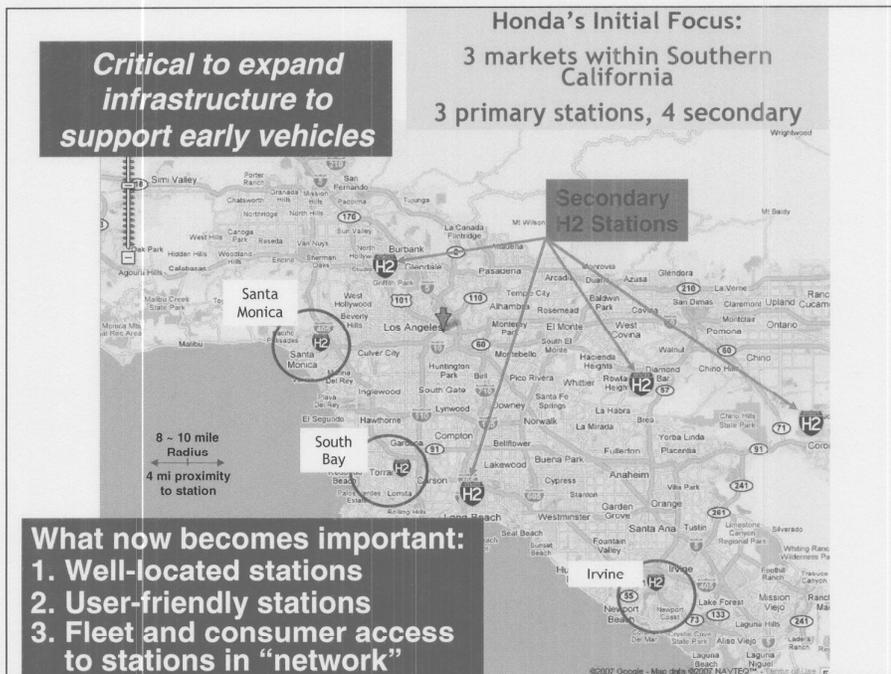
Vehicle Type	2012 to 2014	2015 to 2017
<b>ZEVs</b>		
Fuel Cell Vehicle: Type IV	\$300,000	\$150,000
Fuel Cell Vehicle: Type III	\$250,000	\$125,000
Battery Vehicle: Type II	\$80,000 to \$120,000	\$40,000 to \$60,000
Battery Vehicle: Type I.5	\$40,000 to \$80,000	\$20,000 to \$40,000
Battery Vehicle: Type I	\$35,000 to \$65,000	\$15,000 to \$35,000
<b>AT PZEVs</b>		
Plug-in Hybrid Electric Vehicle	\$25,000	\$12,500

The current rule's fuel cell path recognized the need to reflect cost in the credit ratios.

If ZEV amendments want to encourage a new or additional technology or simplify the regulation, that's OK as long as credit is given that is in proportion to technologies that other companies were encouraged by CARB to pursue.

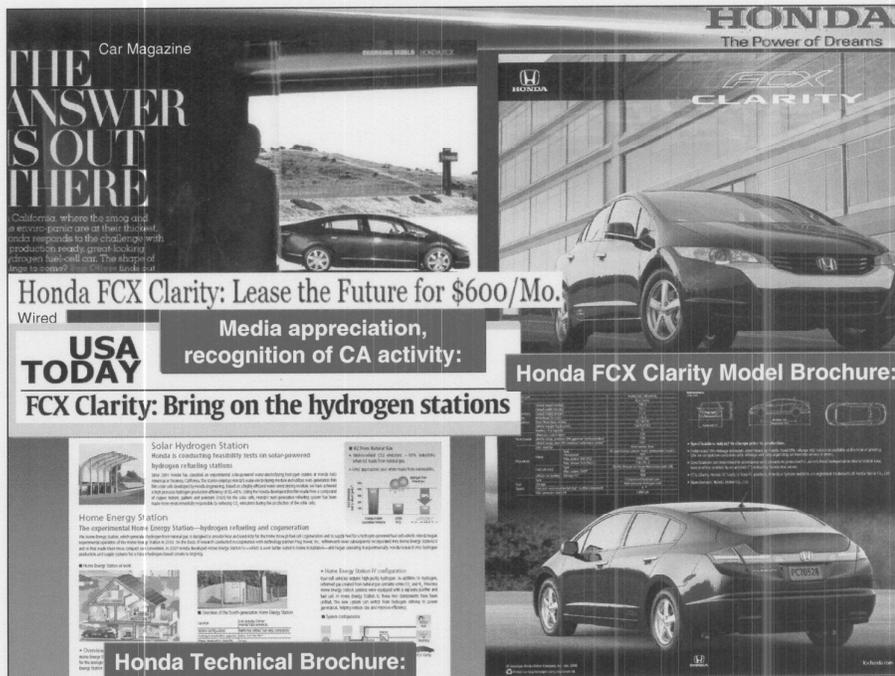
But companies should not be disadvantaged in this process merely because a new technology has come along.

Without 'economic' consideration among the options, it harms the FC path we believe in. In general, manufacturers will select the lowest cost compliance option, because ultimately customers have to bear the cost.



For stations, a focus on reliable, accessible, well-sited stations in CA is critical to increase fuel cell vehicle numbers. We need more effective collaboration to best deploy infrastructure in CA, step by step.

(Honda is even developing and encouraging home refueling for AFVs: H2, CNG, etc.)



I welcome any questions, especially if you have any doubt about whether our fuel cell vehicle and efforts are real and progressive.

The ratio changes proposed have the unintended consequence of undercutting the FC option.

This is an extremely serious issue to Honda.

Staff needs to make the FC path a viable option (and work with industry for an infrastructure plan/steps).

Honda has aggressively committed to California's near-zero and zero emission vehicle goals and efforts, solved gasoline ULEV and near-zero emission SULEV first in the world. Sold the first hybrids in CA, offered the first two AT-PZEVs, the first advanced battery EVs and HEVs, and the first and still the only FC cars certified for public use and leased to consumers and fleets.

## Honda comment on proposed ZEV amendments regarding ZEV credits and substitution ratios

March 27 2008 CARB Hearing

The proposed ZEV amendments represent a major shift in focus for ZEV technology options and their weighting. Some manufacturers (like Honda) want to continue to invest in zero emission fuel cell vehicles (FCVs). But the amendments proposed, specifically to vehicle substitution ratios and credit values, harm the fuel cell option. An economic consideration is needed for the weighting of ZEV credits and vehicle substitution ratios at this stage, to maintain FCVs as a viable option.

Vehicle Substitution Ratios -		Battery EV : Fuel Cell EV	
		2009-2011	2012-2014
<b>Existing Regulation</b>		<b>10 : 1</b>	<b>5 : 1</b>
<b>2/8/08 Proposed Amendments</b>		<b>1.6 : 1</b>	

Vehicle Substitution Ratios -		Plug-in gasoline HEV : Fuel Cell EV	
		2009-2011	2012-2014
<b>Existing Regulation</b>		(N/A)	(N/A)
<b>2/8/08 Proposed Amendments</b>		<b>1.1 : 1</b>	<b>3.3:1</b>

Honda believes that hydrogen fuel cell vehicles have the greatest potential for sustainable transportation long term. We are making significant advances in fuel cell vehicle technology and have deployed these zero emission vehicles in a variety of applications in California including early fleet and consumer use. Our activities are extensive and progressive these past several years.

Yet the sudden shift in the mandate's focus, without careful weighting of options, effectively removes the fuel cell option. ZEV technologies need continued investment to overcome challenges. Advancing the performance of the technology is key to progress right now. We are prepared to balance vehicle numbers with R&D efforts to advance the technology. If too many vehicles are required too early, it sets us back. It is critical to use industry resources effectively as we progress on these challenges to commercialization.

Currently, vehicle substitution ratios (BEVs:FCVs) are 10:1 and decreases to 5:1 by 2014. But in the latest proposed amendments they now plummet to 1.6:1 for this entire period. This harms our efforts and investment in FCVs. If ZEV amendments want to encourage a new or additional technology or path, or to simplify the regulation, that's OK as long as it is given credit that is in proportion to technologies that other companies were encouraged by CARB to pursue. But companies should not be disadvantaged in this process merely because a new technology has come along.

Honda believes that FCVs may offer the best option for zero emission vehicles on a broad scale. We are committed to a sustainable transportation future, and want to continue to put fuel cell vehicles on a path to commercialization. Honda solved gasoline

vehicle ULEV and near-zero emission SULEV technology with the first offerings in California. We offered the first low emission hybrids, first two AT-PZEVs, and the first advanced battery EVs and HEVs in California as well as the first and still only FC cars certified for public use and leased to California consumers and fleets. Staff needs to make the FC path a viable option, and work with industry for a supporting infrastructure.

**CARB incremental cost estimates for each vehicle technology (ISOR page 34):**

**Table 6.1: Incremental Vehicle Cost Estimates**

Vehicle Type	2012 to 2014	2015 to 2017
<b>ZEVs</b>		
Fuel Cell Vehicle: Type IV	\$300,000	\$150,000
Fuel Cell Vehicle: Type III	\$250,000	\$125,000
Battery Vehicle: Type II	\$80,000 to \$120,000	\$40,000 to \$60,000
Battery Vehicle: Type I.5	\$40,000 to \$80,000	\$20,000 to \$40,000
Battery Vehicle: Type I	\$35,000 to \$65,000	\$15,000 to \$35,000
<b>AT PZEVs</b>		
Plug-in Hybrid Electric Vehicle	\$25,000	\$12,500

**Considerations needed for a viable FCV option:**

- Base the 25,000 vehicle number on Type II ZEVs @3 credits/vehicle.
- Increase Type IV ZEV credit to 12 credits/vehicle to reflect the relative incremental cost, and range/recharge performance. (Alternatively, require 300 miles range and fast charge to qualify for 12+ credits.)
- Increase Type IV credit ratios relative to Enhanced AT-PZEVs to maintain an incentive, not a disincentive, for additional Type IV volume beyond the minimums required.