

# California Fuel Cell Partnership – Alternative Fuels Research

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TNS Automotive



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# Background

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- **CaFCP conducted annual public opinion surveys**
  - Administered by phone as part of an “omnibus” survey
  - Asked only about H2 and FCVs
  - Gauged knowledge
- **2008 survey to gauge opinions, attitudes and identify trends**
- **Important elements included:**
  - Larger, more diverse panel with defined demographics
  - “With station” and “Without station” groups
  - Mask the true subject to avoid “please the teacher”
  - Ask questions that help predict trends
- **Engaged TNS Automotive**
  - Online surveys by defined panelists
  - Expertise in survey design and administration
  - Very fast turn around
  - [www.mysurvey.com](http://www.mysurvey.com)

# We asked ....

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- **General beliefs:**
  - Are alt fuel vehicles better for the environment?
  - Do we have plenty of oil?
  - Do alt fuel vehicles fit your lifestyle?
  - Are you concerned about global warming?
  
- **Specific questions about:**
  - Biodiesel
  - Clean (ultra-low sulfur) diesel
  - Electricity (plug-in hybrid)
  - Ethanol (E85)
  - Hydrogen fuel cells
  - Natural gas (CNG)

# Executive Summary – General Beliefs

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- **The majority of respondents believe California needs sustainable fuels, and that alternative fuels benefit the environment.**
  - Half of respondents are concerned about global warming.
  - Except for E85, environment benefits outscored reducing reliance on petroleum.
- **Consumers are expecting California's fuel type use to change.**
  - Respondents' prevailing view was that in the future most vehicles will be powered by a mix of traditional and alternative fuels.
- **More than half of respondents are concerned about global warming.**
  - Concern is greatest among non-car owners and college grads.

# Agreement With Key Environmental Statements

- The majority of respondents across groups believe we need sustainable fuels for energy, and that alternative fuels benefit the environment.
- Respondents near fueling areas are more likely to think that fuel efficient vehicles are more important than alt fuel, air quality is better now than 20 yrs ago, and air pollution is caused by industry, not cars.

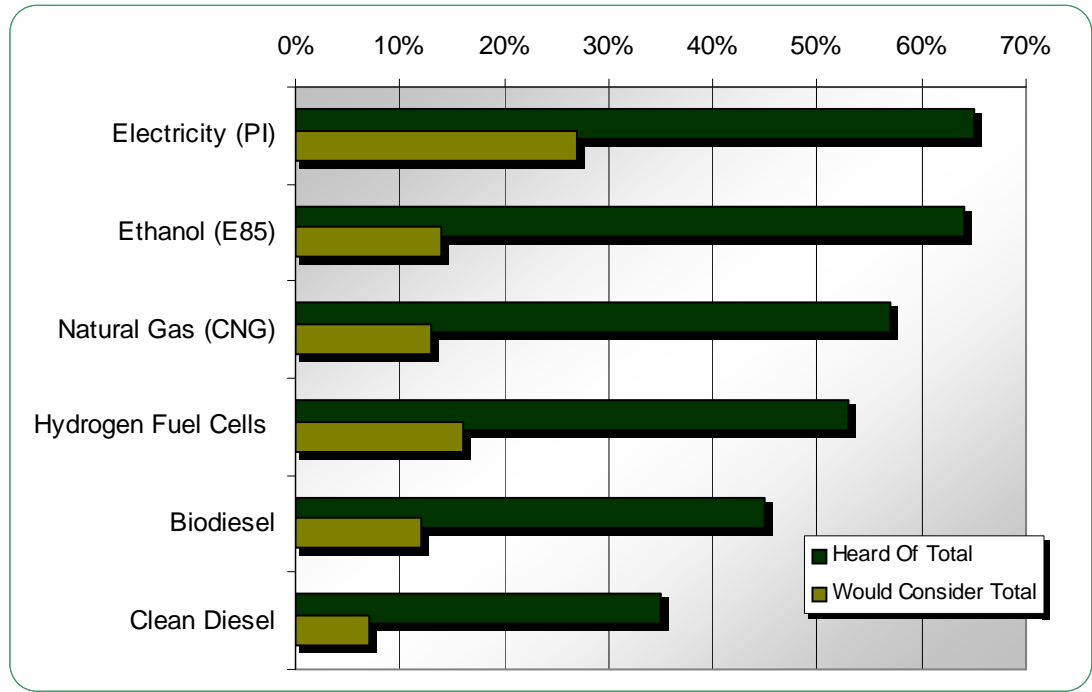
Base: Total respondents	Region		Ownership		Education		Income			Tech Status		
	Total	Fueling Area	Non Fueling Area	Own Car	Do not Own Car	College Grad +	Not College Grad	Less than \$60K	\$60K to \$99K	\$100K or More	Early Adopters	Influencers
	A	B	C	D	E	F	G	H	I	J	K	L
	n=816	n=204	n=104	n=757	n=59	n=399	n=417	n=278	n=193	n=196	n=193	n=456
%	%	%	%	%	%	%	%	%	%	%	%	%
<b>% Who Totally/Somewhat Agree With Statement</b>												
We need sustainable alternative fuels so we never run out of energy	81	80	84	82 E	66	82	79	80	80	85	83	87 K
Alternative fuel vehicles benefit the environment	79	75	82	80	71	82 G	76	77	81	83	80	86 K
Alternative fuels will give us energy independence	69	67	72	69	61	72 G	65	67	71	74 H	76	77
Alternative fuels help provide national security	47	47	49	48	37	53 G	41	47	43	53 I	53	51
Instead of alternative fuels, we need more fuel efficient gasoline and diesel vehicles	38	41 C	31	38	32	36	39	38	35	36	35	37
Air quality is better today than it was 20 years ago	27	27 C	18	28 E	12	29	25	25	30	30	27	26
Most air pollution is caused by industry, not vehicles	23	26 C	17	24 E	14	24	23	23	25	21	23	21
Global warming is just fiction	14	12	15	15	8	14	15	14	16	15	11	13
We have plenty of oil and don't need alternative fuels	7	5	6	7	7	6	8	9 J	7	4	7	6

Letters indicate value is significantly higher than comparison group at 90% confidence.

# Awareness vs. Consideration

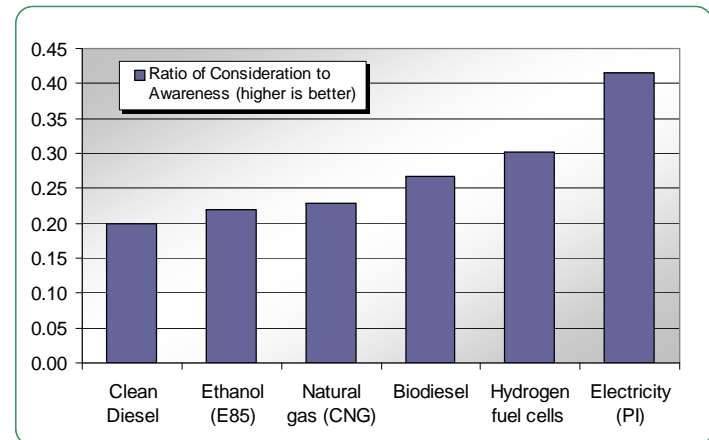
- Respondents reported the greatest awareness and potential purchase consideration of electricity (plug-ins) (*top chart*)

- Ethanol had the second-highest awareness, but trailed hydrogen fuel cells in potential purchase consideration.
- Perhaps this is because E85 does not yet have the availability in California it enjoys in many Midwestern states.



- Vehicles powered by electricity (plug-ins) have been best able to bridge the gap between awareness and potential purchase consideration (*bottom chart*)

- Clean diesel fared the worst, with one fifth of those aware being potential purchasers



# Belief Statements Regarding Alternative Fuel

- The leading motivator for purchase of plug-ins, clean diesel, CNG, and hydrogen fuel cells is concern for the environment, while ethanol is most thought of as reducing petroleum dependence.
  - Plug-ins also are rated highly for cost-effectiveness.

	Fuel Type					
	Biodiesel	Clean (ultra-low sulfur) diesel	Electricity (plug-in hybrid)	Ethanol (E85)	Hydrogen fuel cells	Natural gas (CNG)
	A n=816 %	B n=816 %	C n=816 %	D n=816 %	E n=816 %	F n=816 %
<i>Base: Total respondents</i>						
<b>Q5. If you were to purchase an alternative fuel vehicle, which of the following best represents the statement the vehicle makes about you?</b>						
I care about the environment	26	33 ADE	36 ABDEF	26	30 AD	32 ADE
I am investing in national security	3	3	4	4 ABF	4 B	3
I am reducing petroleum dependence	19 B	14	21 B	28 ABCEF	22 B	22 B
I am saving money on fuel	9 B	7	20 ABDEF	9 B	8	9 B
I am the owner of a unique vehicle	6 BD	5	6	5	10 ABCDF	6
None of these	36 CDEF	39 ACDEF	13	28 C	26 C	28 C

# Attitudes Toward Alternative Fuel

- **Electric/plug-ins have a high potential to be well-received in California, where there is already general acceptance for traditional hybrid technology.**
  - They rate highest on ‘good for the environment’, fuel efficient, would fit my lifestyle, and has the style/power I want.

Base: Total respondents	Fuel Type					
	Biodiesel	Clean (ultra-low sulfur) diesel	Electricity (plug-in)	Ethanol (E85)	Hydrogen fuel cells	Natural gas (CNG)
	A n=816 %	B n=816 %	C n=816 %	D n=816 %	E n=816 %	F n=816 %
<b>Q4. What do you believe to be true for each alternative fuel vehicle?</b>						
Affordable	10 BE	6	15 ABEF	15 ABEF	6	11 BE
Fuel Efficient	23 B	21	45 ABDEF	27 AB	29 AB	27 AB
Good for the environment	42	41	66 ABDEF	46 AB	52 ABDF	48 AB
Has the style and power I want	6 B	4	9 ABDEF	6 B	6 B	5
Would fit my lifestyle	8	7	21 ABDEF	10 ABF	12 ABF	8
None of these	42 CDEF	43 CDEF	17	34 C	34 C	33 C



# Development Impact for Alternative Fuel

- Auto/oil company agendas and public awareness are noted as two factors most hindering progress on alternative fuels.
  - High cost was also cited as significantly hindering plug-ins and fuel cell progress.

Base: Total respondents	Fuel Type					
	Biodiesel	Clean (ultra-low sulfur) diesel	Electricity (plug-in hybrid)	Ethanol (E85)	Hydrogen fuel cells	Natural gas (CNG)
	A n=816 %	B n=816 %	C n=816 %	D n=816 %	E n=816 %	F n=816 %
<b>Q8. Which factors impact the progress of the development of alternative fuels?</b>						
Technology not keeping pace	12	11	19 ABDF	13 B	18 ABDF	12
High cost	15	16	29 ABDF	18 AB	28 ABDF	17 A
Public awareness	29 BDE	25	27	25	25	27 B
Auto or oil company agendas	32 B	30	36 ABEF	36 ABEF	32	33 B
Government investment	20	18	22 AB	20 B	22 ABD	22 AB
No impact on progress	4 E	3	4 E	4 E	2	3 E
Don't Know	37 CDEF	39 ACDEF	22	32 C	33 C	35 CDE

# Summary Findings - Hydrogen fuel cells

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- **About half of respondents have heard of hydrogen fuel cells.**
  - College grads and high earners (over \$100k) have the greatest awareness, close to 60%.
  - No differences in awareness or consideration exist between fueling station areas and non-fueling station areas.
- **The majority of respondents agree they are good for the environment.**
  - Only about 6% of respondents believe they are affordable, and over one-fourth of respondents note high cost as a roadblock for development.
- **A greater percentage of respondents (10%) believe a hydrogen fuel cell vehicle is a unique vehicle, compared with other alternative fuel types.**
  - Caring for the environment (~30%) and reducing dependence of petroleum (~22%) are attributes most commonly associated with fuel cells.

# Summary Findings – Emissions and Production

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- **Knowledge about emissions is low.**
  - For each fuel, when asked if specific emissions were zero, greater than, less than or the same as a conventional vehicle, more than half the respondents answered “don’t know.”
  - Further research can clarify the gap in knowledge.
- **Fuel production is a mystery.**
  - For each fuel, when asked if a fuel could be made from a feedstock today, in the future or not at all, 65-85% of respondents answered “don’t know.”
  - Further research can uncover if respondents are uninformed or uninterested.

# Alternative Fuel Safety

- Alternative fuels are generally thought of as safer than conventional fuels, though over half of respondents need more information on biodiesel, clean diesel, and hydrogen fuel cells to make their decision.
  - Ethanol is generally thought of as less unsafe than conventional gasoline (8% vs. 25%).

	Fuel Type						
	Biodiesel	Clean (ultra-low sulfur) diesel	Electricity (plug-in hybrid)	Ethanol (E85)	Hydrogen fuel cells	Natural gas (CNG)	Conventional gasoline
	A n=816 %	B n=816 %	C n=816 %	D n=816 %	E n=816 %	F n=816 %	G n=816 %
<i>Base: Total respondents</i>							
<b>Q11. Thinking about the fuel only, which statement best represents your opinion about the safety of conventional and alternative fuels?</b>							
I am confident it is safe	19 BE	15	47 ABDEFG	21 BEF	14	18 BE	24 ABDEF
I am somewhat confident	18	21 A	28 ABE	27 ABE	21	29 ABE	29 ABE
Unsure - need more info	55 CDFG	54 CDFG	20	45 CG	54 CDFG	44 CG	23 C
I think it is unsafe	2 C	3 C	1	2 C	5 ABCD	5 ABCD	18 ABCDEF
I know it is too unsafe to use	6 CF	6 CF	4	6 CF	6 CF	5 C	7 CF

# Station Availability for Alternative Fuel – Hydrogen fuel cells

Hydrogen fuel cells	Total	Region		Ownership		Education		Income			Tech Status	
		Fueling Area	Non Fueling Area	Own Car	Do not Own Car	College Grad +	Not College Grad	Less than \$60K	\$60K to \$99K	\$100K or More	Early Adopters	Influencers
		A	B	C	D	E	F	G	H	I	J	K
<i>Base: Total respondents</i>	n=816 %	n=204 %	n=104 %	n=757 %	n=59 %	n=399 %	n=417 %	n=278 %	n=193 %	n=196 %	n=193 %	n=456 %
<b>Q12. Are you aware of fuel stations near you that dispense or provide these alternative fuels?</b>												
In or near my city	1	1	1	1	2	2	1	2	2	2	2	2
In my state	6	8	4	6	7	7	6	7	6	8	12 L	7
In other areas of the US	3	3	5	3	7	4	3	5 I	2	3	4	4
In other countries	2	2	2	2	0	3	1	2	1	3	3	3
Not aware of any	87	85	88	87	85	85	89 F	83	89 H	85	78	84 K

# Take Aways

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- **We're doing OK**

- 50% awareness for a product that's not for sale is respectable

- **Environmental benefits are the hook.**

- Capitalize on the green movement, but remember that green is a trend
- Emphasize that FCVs will fit your lifestyle: car size, refueling, range, durability
- Change how we say things
  - Zero pollution and greenhouse gases (not emissions)
  - Produced from local resources (not diverse feedstocks)

- **Narrow the target audience.**

- Reach the higher-income, more educated people.
- Provide information in formats for busy lifestyles

- **More research is necessary.**

- Where do people get their information?
- What sources do they find credible?
- What kinds of information do they want?