

### Should Alex Buy a Battery-Powered Car?

*The scene: Lunchtime at a crowded café on campus. Baylor, Chris, and Dale are grabbing a bite to eat as they compare notes about their perpetual on-campus parking woes. From across the café, Baylor spies Alex.*

*Baylor:* Hey, Alex! Come join us. Where have you been? We haven't seen you in weeks.

*Alex saunters over to their table and pulls up a chair.*

*Alex:* Can't stay long. I'm shopping for a new car.

*Chris:* Whatever for? Your car is still running, isn't it?

*Alex:* It's my New Year's Resolution for 2003. I decided that I'd like to live a more environmental lifestyle. So I'm going to be part of California's Zero Emission Vehicle program. I want to buy a car that doesn't pollute.

*Dale nearly chokes on a cup of coffee.*

*Dale:* A ZEV? You're crazy! When the California Air Resources Board started their ZEV program in 1990, they were operating in fantasy land, just hoping that by mandating that 10% of the cars sold in California by 2003 they could force car manufactures to develop electric vehicles. But car manufacturers are market driven. They can't justify developing complicated new technology if consumers won't buy it. And people don't want to buy battery powered cars. The State of California has had to relax the ZEV guidelines several times since the 1990s, just to prevent the automakers from suing the state for creating an unfair business environment. What's the deal now? They require 2% of cars sold to be true ZEVs? And the state is still contending with potential law suits from the auto makers. The ZEV program is toast. Besides, ZEVs have no resale value. At my Dad's car dealership, no one ever comes in asking to buy a battery powered car. You can only use them for short errands—the maximum range is what? About 50 miles?

*Alex (interjecting):* Actually the new electric cars can go nearly 150 miles on a single charge, if they're driven carefully. And the newest ZEVs that use hydrogen fuel cells have a range of more than 200 miles, although they're outrageously expensive and only available for lease at present.

*Dale (continuing on):* And you absolutely don't want to drive a small under-powered car, especially now that over 50% of the vehicles sold in the U.S. are big S.U.V.s and trucks.

*Chris:* I agree with Dale that you shouldn't buy a new ZEV, but I disagree with Dale's reasons. ZEVs just aren't sufficiently environmental to justify their cost. For one thing, manufacturing a new car uses an enormous amount of metals, plastics, and lots of energy. And then once they are built, you have to keep charging the batteries off the regular power grid. So a ZEV still uses power and it still pollutes—the only difference between a ZEV and a gas-powered car is that the pollution no longer comes out of your tailpipe. Sure in theory ZEVs generate less pollution per mile than conventional cars, but that assumes that

the power plants are following modern emissions guidelines. And you know how problematic electricity can be in California. Finally, when the car dies, the batteries are major environmental contaminants. If you really want to live the pure and simple life, you should stop driving your car altogether. Save it for emergencies if you have to, but take the bus or bicycle to get around day to day.

*Alex:* I thought about giving up my car altogether, but the bus routes really don't meet my needs, and I just hate bicycling in the rain. Plus, it's tough to take a group of friends to the movies on the back of my bicycle. All in all, I estimate that I use a car often enough that I may as well make it an efficient vehicle.

*Baylor:* In that case, why aren't you looking at gas hybrid cars? They're low polluters, and they have enormous range so you don't have to worry about being stranded far from a power socket. Plus their fuel efficiency is amazing. I was reading that they use regenerative braking to charge up their batteries, so they can do more than 50 miles to the gallon, in the city and on the highway.

*Alex:* I've thought about hybrids too, but they just aren't ZEVs. They pollute a little more, and they don't meet California's original zero-pollution goals. Plus, here's the ultimate selling point: with a ZEV, I'll be able to park in a designated spot, at a recharging station right in the center of campus.

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### **Questions:**

- (1) What is a zero emission vehicle (or ZEV)?
- (2) What does the California Air Resources Board mandate for new car sales starting in 2003, and why? Why is air quality an important issue in California?
- (3) What four points of view are presented in this dialogue by Alex, Baylor, Chris, and Dale? Each of you should choose one of these perspectives to represent within your groups.
- (4) Based on what you know now, what are the advantages and disadvantages of gasoline-powered vehicles, electric cars, and gas-electric hybrids? How do they compare with bicycles or public transportation?
- (5) What would you advise Alex to do? What additional information do you need to better advise on car shopping options? Make a list of questions for which you want to find answers, and come prepared to debate this topic in greater detail next time?

In particular, you'll want to find out why the ZEV program was initially established in 1990, why it was scaled back in the mid-1990s, and why it has not yet been cancelled despite lobbying from automakers.

## **In California, Clean Air Rules Force Changes in Autos**

July 22, 2002 *New York Times*

By DANNY HAKIM

DETROIT, July 21 - While automakers rail against landmark California legislation that would force them to cut greenhouse gas emissions by the end of the decade, they face a much more immediate challenge from the state.

On Monday, Gov. Gray Davis of California will sign a bill requiring automakers to cut carbon dioxide emissions by the 2008 model year. The bill directs the California Air Resources Board to decide how much to reduce emissions over all and how to do it.

But of more immediate concern for automakers is one of California's last big initiatives on air pollution - a decade-old mandate to create zero-emission vehicles that could soon force them to sell more than 100,000 electric cars and other fuel-efficient vehicles in the state each year.

Although the zero-emission standard, which was scheduled to take effect with the 2003 model year, has been delayed by a court injunction, it has prompted automakers to spend billions of dollars developing technologies to cut harmful tailpipe emissions and has led them to start promoting and selling electric vehicles. In addition, New York and Massachusetts plan versions of the Z.E.V. mandate, as it is known, meaning the zero-emissions requirement could cover almost one-fifth of the American auto market. Other states could follow suit.

The mandate, set in motion in 1990, aims to cut emissions of nitrogen oxide and hydrocarbons, large contributors to smog, and particulates, which lead to respiratory ailments. But the mandate has been delayed by a legal challenge from General Motors and Daimler-Chrysler, which won an injunction in federal court last month.

State regulators have appealed and insist they will be able to tweak the regulation, if necessary, to mollify legal objections.

The rule requires large automakers to derive 10 percent of sales from vehicles that produce nearly zero emissions, including at least 2 percent from vehicles with no emissions. Auto executives say that 2 percent requirement has forced them to keep alive a technology they would just as soon give up on: the battery-powered automobile, the only pure zero-emission vehicle now made.

To comply, carmakers are already selling everything from armies of beefed-up golf carts to a few electric versions of sport utility vehicles to highly efficient versions of gas vehicles. Nissan is equipping most Sentra sedans sold in California with an extra catalytic converter. Toyota is advertising an electric version of its RAV4 sport utility vehicle on a billboard in Berkeley, at nearly double the normal price.

Some executives worry that they will have to take additional steps to meet the mandate, like subsidizing sales of costly electric vehicles and spending thousands of dollars a vehicle to convert gas cars to electrics.

"I remember I had a meeting in Tokyo where they showed me all the cost of this stuff. I said, 'Oh my God, the others have to do this too?' " Carlos Ghosn, the chief executive of Nissan, said.

"Nobody believes in it, but you have to do it," Mr. Ghosn said. "It's a huge cost, but it's part of the cost of doing business."

California regulators, as well as environmental groups, counter that the rule has forced automakers to accelerate the development of cleaner technologies with sound prospects. These include hybrid engines, which run on both gasoline and electricity, as well as hydrogen fuel cells, a zero-emission technology widely considered as the power source of the future.

“They wouldn’t have been topics of discussion if not for Z.E.V.,” said Jerry Martin, a spokesman for the California Air Resources Board, the regulatory body that established the mandate. “The standard fare for drivers around the world would be 8,500-pound S.U.V.’s, probably half of them powered by diesel.” The air resources board has also modified the regulation several times to give automakers credit for cars with low emissions.

Many zero-emission vehicles in California are more golf cart than car and meant for gated communities, city-sponsored car sharing programs and corporate and government fleets. The Think division of Ford sells a beefed-up golf cart called the Neighbor for \$6,500, which needs six to eight hours to recharge after traveling 30 miles. Ford is also considering bringing an electric subcompact sold in Europe, the Think City, to California.

For a Think Neighbor “we had a man trade in his Cadillac,” said H. L. Fletcher, fleet manager of Fritts Ford in Riverside, Calif., who sells 40 to 50 Neighbors a month.

Mr. Fletcher said the man, in his mid-80s, was “too old to drive a big car and bought a Think to drive back and forth from the grocery store and get himself around.”

But many car executives say the development of realistic technologies is being sacrificed for the money-losing, obsolete idea of electric cars.

California has shown some flexibility, though. Nissan, for instance, has a varied compliance plan. It makes an electric station wagon, the Altra, that can travel 100 miles between charges and is being leased to power companies like Southern California Edison. It also makes a big golf cart, the Hypermini, that is being used in Pasadena and Palm Springs for parking enforcement. And Nissan will get credits for its modified Sentra.

The most familiar vehicle is the electric version of Toyota’s RAV4, which can go up to 78 miles an hour and travel up to 126 miles before it requires a recharge. The RAV4 EV sells for \$42,510, versus a \$17,000 starting price for a gasoline version, although it is eligible for \$13,000 in state and federal rebates. Toyota has sold 120 since February. “We lose large amounts of money on every EV we sell,” said Mike Love, Toyota’s national regulatory affairs manager. “They cost us in excess of \$100,000 apiece to build.”

New York and Massachusetts have plans to adopt mandates that would give automakers until the 2006 model year before they have to produce any pure zero-emission vehicles. Until then, car companies could comply by selling hybrids, efficient gas cars or cars that use alternative fuels.

“The small neighborhood-type vehicles really aren’t as marketable here in the Northeast,” said Gina McCarthy, assistant secretary for the environment in the Massachusetts executive office of environmental affairs. “Residents in Massachusetts are really looking to get access to hybrids. They’re buying them now, and they’re on waiting lists. We want more hybrids.”

Erin M. Crotty, the commissioner of the New York State Department of Environmental Conservation, said earlier this year that the state’s Z.E.V. mandate will be a strong incentive for automakers.

For the moment, though, both states are awaiting the outcome of the legal challenge in California.

In 1990, when California’s zero-emission mandate was formulated, there were hopes that the electric vehicle would be viable for the mass market by the end of the decade. But technology has still not solved the crucial drawbacks: short range and long charging time.

G.M., now the most outspoken opponent of the Z.E.V. mandate, was a pioneer in electric vehicle development in the 1990’s with its EV-1 sedan, spending more than \$1 billion before abandoning it.

G.M. plans to use credits from sales of the EV-1 to help meet the requirement, though it is not clear how it will comply if its legal challenge fails. Part of its plan, which has angered competitors, is to give away electric vehicles it has purchased from Club Car, a golf cart maker.

“You don’t mandate markets,” said Chris Preuss, a G.M. spokesman. The Z.E.V. mandate, he added, was “completely unworkable both in California and anywhere else.”

The suit in federal court filed by G.M. and DaimlerChrysler, along with some state dealers, contends the mandate is superseded by federal fuel economy standards. Though reducing gas mileage is one way to cut harmful emissions, direct action on that is reserved for the federal government. A federal judge in Fresno granted the plaintiffs an injunction last month, saying the automakers had a strong case because of a 2001 amendment that gave credits for high-mileage vehicles.

The air quality board, which at first threatened to enforce an older version of the regulation, has since appealed and says it will rewrite the mandate if necessary.

Environmental groups say they have little choice but to turn California into a battleground. The auto industry has successfully lobbied since the 1980’s to prevent significant increases in federal gas mileage standards, and the Bush administration rejected the Kyoto protocol, the international treaty to reduce global warming emissions.

Since California’s air quality regulations predate the federal Clean Air Act, it has its own, tougher rules, and other states can choose whether to follow them. The Z.E.V. rule was set in motion before global warming was a hot-button issue and was aimed at pollutants that lead to smog and other environmental hazards. Whether carbon dioxide, linked to global climate change, is itself a pollutant is a matter of much debate, but the Z.E.V. mandate will have the practical effect of curbing such emissions as well.

“It forced the auto industry to evaluate and use technologies they never wanted to even look at,” said Daniel Becker, director of global warming strategies at the Sierra Club, adding, “As a direct result of that, we have hybrid electric vehicles on sale today.”