MEETING NOTICE

The next meeting will be Dec. 16th, at *CRAGIN FEDERAL SAVINGS & LOAN* 333 W. Wesley St. Wheaton, Ill. -Time - 7:30 P.M. *sharp.* Guests are welcome and need not be members to attend the meeting.

THE PRES SAYS

Members who have not yet paid their 1989 dues will find this will be the last issue of our newsletter you will receive. I anticipate an active organization next year. We need your participation and support. Your 15 bucks will help keep our group solvent and make Vana happy.

I was impressed with the facilities at Moraine Valley Community College where we gathered last month. If we hold another rally or program next summer, I believe we should consider a Community College facility such as Moraine Valley or Triton.

There will be a number of matters to consider at our December 16th Meeting. The election of officers for next year which was postponed from the November meeting must be concluded. I have asked each of the present officers if they would be willing to serve another year and the response in each case was affirmative. Each also indicated willingness to step aside. My father had a theory about organization leadership that is hard to argue with. He observed if it is a good job, pass it around; if it is a lousy job, don't stick one man with it. Our group has a lot of different talents that can contribute. Please be prepared to elect officers at the next meeting.

After the election, I propose that we have a general discussion about our 1989 objectives. Included in this should be a decision about the future of the club-owned Fiat. The change in insurance regulations next year will be a factor.

Bill

F. V. E. A. A.

FOX VALLEY ELECTRIC AUTO ASSOCIATION
624 Pershing St. Wheaton, Il 60187

FIRST CLASS

ADDRESS CORRECTION REQUESTED

ELECTRIC CAR ENERGY USE

I have been requested to prepare a few remarks for this alterntive energy conference as it relates to the efforts of the Fox Valley Electric Auto Association (FVEAA). I will compare the energy sources and consumption of electric cars with present petroleum-fueled vehicles and with prospective energy-efficient vehicles.

Electric cars are presumed to be very energy-efficient. Members of the FVEAA havve converted over 20 conventional cars for electric drive, beginning with the oil embargo 15 years ago. Our vehicles have averaged about 500 watthours of energy use per mile of travel. This can be expressed as 1706 Btu/mile.

To compare electric and petroleum cars, it is necessary to look at the entire process, back to the basic natural resources. The production of electrical energy principally involves the process of burning fossil fuels and with rest produced by hydroelectric or nuclear plants.

Any thermal generation process involves losses defined by thermodynamic laws. Commonwealth Edison in 1987 produced produced 1 kwh with a fuel input of 11,017 Btu for a generation efficiency o 31%. Two-thirds of this energy was nuclear, the remaining was fossil-fired. Most electrical generation in the US uses coal or oil. The coal-fired system of Central Illinois Light Co in Peoria required 10,471 Btu/Kwh for a generation efficiency equal to the national average of 33%.

The transmission of electrical energy involves a loss of about 2%. Distribution losses depend on the customer location and range from 2-5%. The efficiency of an utility system electrical network can be calculated by dividing the total sales of energy by the total production. For Edison this calculation yields an efficiency of 92%. Overall, the efficiency of United States electrical systems, from the fuel source to retail delivery of energy is about 30%.

Applying an electrical system efficiency of 30% to the 1706 Btu/mile energy consumption for FVEAA cars yields 5688 Btu/mile fuel source consumption. It is beyond the scope of this presentation to consider the efficiecies of fuel extraction, refining, transportation, nuclear fuel enrichment, waste disposal, and other factors involving energy used in the total fuel cycle.

Conventional cars use petroleum which contains about 120,000 Btu per gallon. The Corporate Average Fuel Economy (CAFE) standard of 26.5 miles per gallon will be used, even though the current automobile fleet is much lower than this. The CAFE car therefore uses energy equal to 4530 Btu/mile, 80% that of the current FVEAA electric car.

Fuel efficiency improvements can be made in both petroleum and electric powered cars. Dramatic improvements can be made in petroleum fueled cars. Up to 80 % of fuel energy can be lost to coolant systems, exhaust gases, and radiation to the surrounding air. Use of lean-burn, electronically-controlled combustion together with ceramic engine components can reduce this loss. New types of automatic transmissions can improve the present 80-85% efficiency. Reduction in weight, improvement in tires that reduce rolling friction, better aerodynamics, and recapture of braking energy can all contribute to greater efficiency.

Fuel-efficient prototypes have been built and tested by various automobile manufacturers. GM's TPC has achieved 61 Mpg in urban driving, VW's Auto 2000 gets 63, and Toyota's AVX can go 89 miles on a gallon. It is estimated that advanced cars can reach 70 miles per gallon in urban driving. Energy consumption for a small 70 Mpg car amounts to only 1714 Btu/mile.

Electric car energy consumption can also be improved. FVEAA cars that require 500 watthours/mile are built by individuals using available, reasonably-priced components. Research cars in which the electrical system has been optomized have been built and tested slightly above 200 watthours/mile in urban traffic driving. This represents a primary fuel economy of only 2275 Btu/mile. Further improvements can be made. It is estimated that the energy consumption can be reduced to about 150 watthours per mile or only 1706 Btu/mile for a small car. This is almost identical to the energy efficiency of a 70 Mpg petroleum car.

At 150 watthours per mile, the interests of electric car enthuasiasts and solar energy proponents begin to converge. The roof of a car is approximately 1 square meter. Improved solar cells on the roof may be able to produce the reqired 150 watts. When this is achieved, the major part of personal transportation needs can be met without depleting our limited petroleum supply and should produce a significant improvement in air quality.

A complete comparative analysis of electric and petroleum cars must include the economics of each. While manufacturing costs for each are unknown at the present, it has been noted that about 40% of the advanced petroleum fueled car is expected to be for the electronic control systems. This is more than the cost of the electronic speed control systems for electric cars.

Electric car operating costs include an amount for battery amortizatization. Although some FVEAA cars have achieved a 4-year life for the standard deep-discharge batteries, a 2-3 year replacement cycle is considered typical. At current prices, the battery amortization for FVEAA caars amount to 5-10 cents per mile.

ELECTRIC CAR ENERGY USE

The energy cost for an electric car is dependent on electric rates. The current Commonwealth Edison marginal residential winter rate, including all charges for taxes is 6.05 cents per kwh. For the FVEAA cars, the energy cost amounts to 3.08 cents per mile. The total "fuel" charge including battery amortization is about 10 cents per mile.

The present CAFE standard car using unleaded gasoline costing $ 1.05 per gallon, including all taxes, is 3.9 cents per mile. Present economics favor the petroleum car.

The relative operating economics do not change with improved cars. A research electric car consuming 200 watthours/mile has a cost of about 4 cents/mile. The achievable electric @ 150 watthours/mile would have an operating cost of about 3 cents/mile. The prototype 70 mile/gallon petroleum car has an energy cost of half this, 1.5 cents/mile.

Expected advantages of an electric over a petroleum vehicle are the electric's expected lower maintenance and longer life. I recently had a $ 200 annual maintenance "tuneup" on a 1987 car at 12000 miles. This works to be 1.6 cents/mile. Lombard Toyota recently offered a similar annual checkup on a Toyota for a reduced price of $ 156 which would reduce maintenance to about 1.5 cents/mile. The only similar costs for an electric consists of periodically adding distilled water to the battery, an insignificant amount.

If a conventional car is replaced after 5 years while the mechanically simpler electric can last twice as long, the economics will then favor the electric. Of course, all these figures are speculative. The way to verify costs is to build and operate electrics over a 2-4 year period to determine owning and operating total costs.

While most FVEAA cars have been individually constructed as a hobby, I think they point a way for future personal transportation. They are a wonderful insurance policy and will become a much desired object if (and when) there is another artifically contrived petroleum shortage.

William H. Shafer
FVEAA President
22 November, 1988

THE WAY IT WAS

In 1930, as a freshman in High School, one of my courses was Auto Mechanics. The text book we used was "Dyke's Automobile and Gasoline Engine Encyclopedia." Since then I have spent over 35 years in the Automotive and Diesel trade.

Recently I was looking for some information on antique cars and came across a 1930 edition of Dyke's Automobile and Gasoline Engine Encyclopedia. This book, by A. T. Dyke of St. Louis, Missouri, is the Fifteenth edition, published by the Goodheart-Willcox Publishing Co. of Chicago, Illinois. Goodheart-Willcox is still in business in South Holland, Illinois. While the Dykes manual is no longer in print nor are any copies available, we received permission from Goodheart-Willcox to reprint excerpts from this book which we feel will be of interest to all of our readers.

A. T. Damm
Manager
Technical Services

INSTRUCTION No. 80

WOODS GAS-ELECTRIC CAR

The Woods dual power car: The power plant consists of a small gasoline engine and an electric motor-generator combined into one unit, as illustrated, and mounted on a three-point suspension. The movement of a finger lever on the steering wheel connects the engine to the electric motor-generator, which cranks the engine and develops power which is transmitted through the armature shaft of the electric motor and propeller shaft, direct to the rear axle. See Fig. 1.

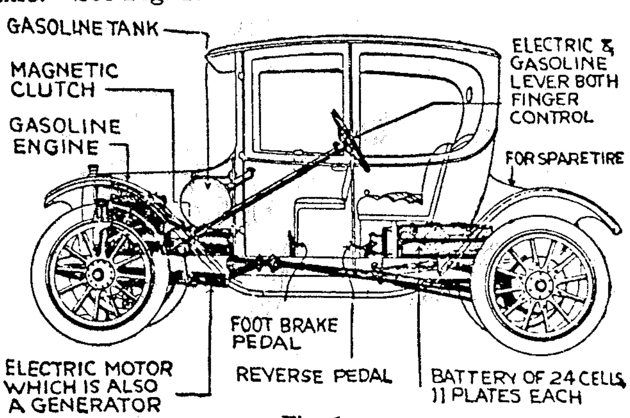


Fig. 1

The car starts as an electric, by a simple movement of a finger-controlled lever on the steering wheel, which operates the means for connecting the battery to the motor, and increasing the speed, as the lever is advanced.

At any advanced position of the electric lever the first movement of the finger-controlled gasoline lever instantly starts the gasoline motor. As this lever is moved forward, it causes the car to be operated more on the gas, and at a certain point it will run as a straight gasoline car, neither charging nor discharging the battery. With a slight variation of the relative position of the two levers on the steering wheel, the battery may be either charged or discharged at will on any speed from ten miles an hour up to twenty-eight or thirty miles an hour. Electricity is generated and stored in the battery while the car is running.

At any speed above six miles an hour, dynamic breaking may be effected by retarding the electric lever. This causes the electric motor to run as an electric generator driven by the gasoline motor or by the momentum of the car. The power thus generated is used for charging the battery. The same effect may be obtained by a simple movement of the foot-brake pedal, which also acts as a mechanical brake below six miles per hour.

The parts of this car and their location are shown in the illustration, Fig. 1 (Woods Electric Vehicle Co., Chicago, Ill.).

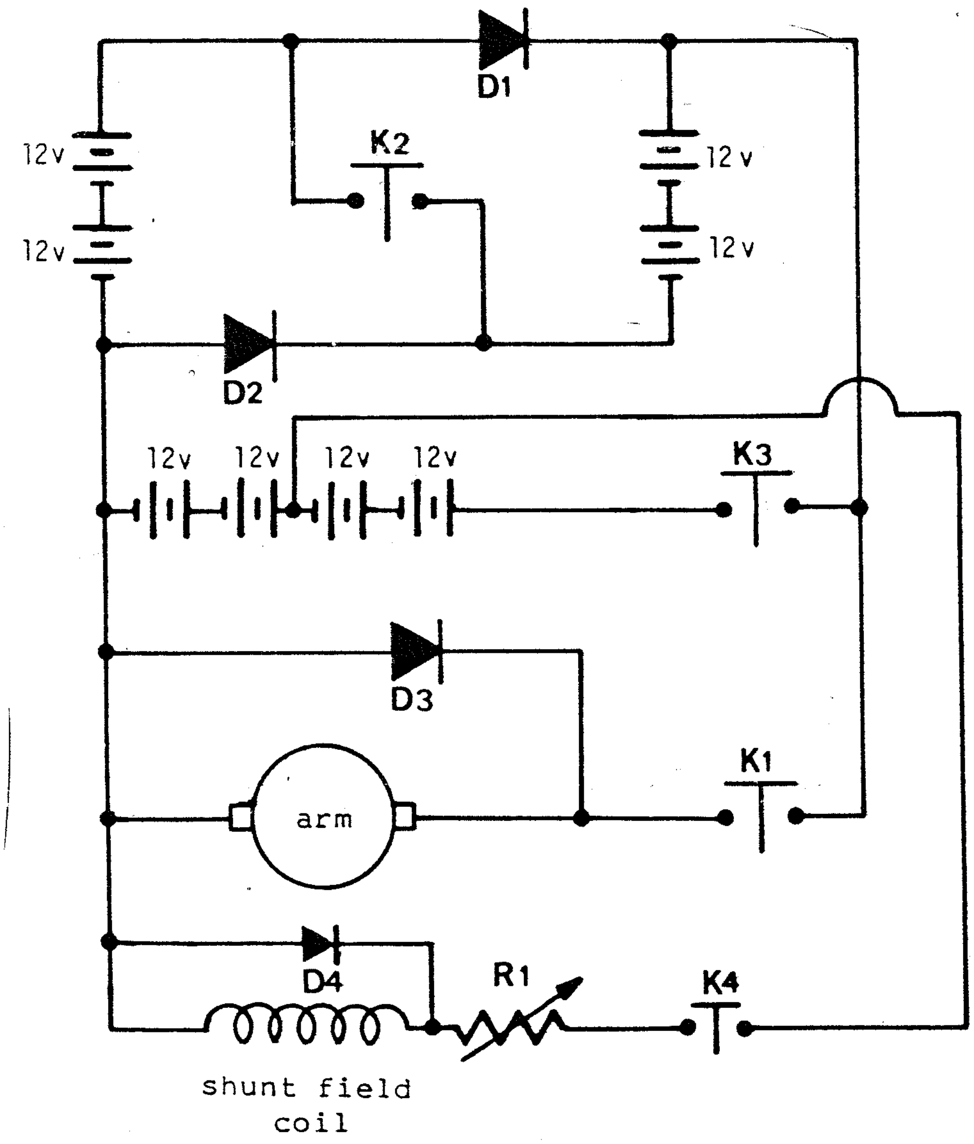
A SIMPLE DIODE-SWITCHING CONTROLLER

by Ric Barline of Siskiyou Energy Systems

Here is a simple 48 volt controller for aircraft generators which gives very good performance with high efficiency and a cost of under $300. The controller works as follows: With a suitable switch attached to the accelerator pedal, when the pedal is depressed K1 closes which places 24 volts onto the armature by the two 24 volt battery packs being in parallel, and K4 closes which places 24 volts onto the field coil. When the accelerator pedal is depressed further, K2 closes which series the two 24 volt battery packs thus placing 48 volts onto the armature, and K3 closes which puts a second 48 volt battery pack in parallel with the first one for added range. For even more range, a third 48 volt battery pack may be permanently paralleled with the second one.

PARTS LIST

D1, D2, D3 are 400 amp power diodes mounted on heat sinks.
D4 is a 20 amp diode which does not require a heat sink.
K1, K2, K3 are 400 amp contactors (may be two 200 amps in parallel)
K4 is a 20 amp contactor. R1 is a 2ohm 100 watt rheostat for field weakening. This resistor may be eliminated for simplicity. All of these parts are available from SES, 16892 Mitchell Ave., Los Gatos, California 95030 (408) 356 0289.



Electric car still a bright idea

THE TAMPA TRIBUNE
Saturday, June 25, 1988

By MARK SOKOLOWSKI
Tribune Staff Writer

SEBRING — Remember the gasoline lines?

It was 1973. The Organization of Petroleum Exporting Countries had cut oil exports to the United States.

Gasoline prices skyrocketed.

Bumper-to-bumper lines formed at gas stations as Americans feared that if they didn't buy fuel for their cars today, there might not be any tomorrow.

Remember the solution? The electric car.

Using a power source that was non-polluting, abundant and cheap, the electric car was going to put America on wheels that no longer relied on the world oil market.

A little government funding, some speeded up research, and soon everyone would be buying an electric car, batteries included.

But it didn't quite happen that way.

A small part of the solution goes on sale in Sebring today. Part by part, a Sebring company's effort to solve the energy crisis will roll past the auctioneer's block.

The equipment, and even completed vehicles built by Commuter Vehicles of Sebring, will be sold to the highest bidder. Everyone who buys will be walking off with a part of Frances W. Flowers Sr.'s dream.

"It was a wonderful experience," Flowers said. "But it was not the right product for the right time. I think it has its niche. I think there is a future for electric automobiles."

New owner

Flowers, who founded his company in 1974 at the height of the oil crisis, recently sold out to Sebring Auto-Cycle Inc.

Its new owner, Jim Tervort, will continue to build electric cars, but for a specialty market.

Tervort's cars will be small vehicles designed to be towed behind mobile homes, giving owners the ability to drive short distances from where they camp or park their mobile home.

Tervort hopes mobile-home owners will favor his smaller, lighter car rather than tow along the family car.

Tervort bought Commuter Vehicles of Sebring earlier this year. He is keeping the equipment he can use and putting the rest up for auction, including 64 completed vehicles: 50 electric vans and 14 electric cars.

If the 64 vehicles are sold, it will be 64 more than Commuter Vehicles sold in 1987.

"The vehicles were well received as long as there was a gasoline shortage," Flowers said of his now defunct company. "When the shortage went away, so did the market. When you had to stand in line for a block to buy gasoline, then you had a hell of a market."

Formed in 1974, the company did not have a working model to sell until 1978. In its 14-year history, Commuter Vehicles sold about 2,000 of its two-passenger, aluminum frame, plastic-bodied cars.

Known as the Commuter Car, the vehicle looked like a wedge of cheese. The passenger car cost between $4,000 and $6,000, depending on options. A van, priced at $7,000 to $8,000, was also available, Flowers said.

But sales never took off.

Problems crop up

Problems with a fleet of Commuter Vehicles sold to the U.S. Postal Service hurt the company. In 1981, the postal service purchased 231 electric vans to use throughout its southeastern district. Twenty-nine of the vehicles went to postal carriers in the St. Petersburg area and 20 vans went to Tampa carriers.

The National Letter Carriers Union complained about the performance of the vehicles being used in St. Petersburg, saying they stalled, produced irritating battery fumes and had braking problems on wet pavement. No such complaints were received from the Tampa carriers.

Still, the postal union asked that the vans be removed from service because of safety concerns. End of experiment.

Commuter Vehicle officials blamed postal carriers for taking the vans down sand roads the vans weren't designed to travel. Flowers declined to comment on the postal vehicles, saying only the availability of gasoline hastened the decline in public interest in his vehicles.

Flowers wasn't the only one who, in the early 1970s, got caught up in the allure of what a powerful pack of batteries could mean to America's driving public.

In 1976, Congress passed the Electric and Hybrid Vehicle Research, Development and Demonstration Act, appropriating $11.2 million that year to be spent on development of electric vehicles.

In a bold statement, the government said it wanted 10,000 electric vehicles on the road by 1983.

However, three years later in 1979, government officials realized the technology did not exist to meet that goal. The cars being developed had limited range, lower speeds, and acceleration was slower than those of gasoline-powered vehicles.

The government changed its funding emphasis from building vehicles to solving the research and development problems.

Verge of development

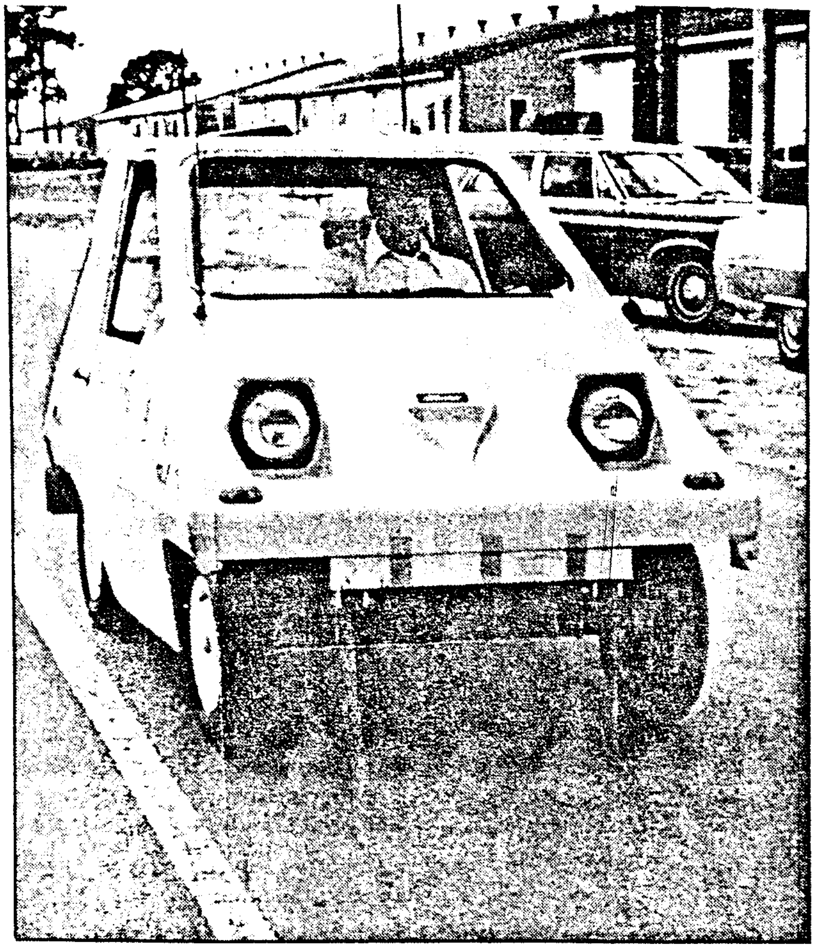
Today the electric car remains a concept on the verge of being developed. Research is being done by the Big Three automakers, universities and American electric utilities to extend the range, power and speed of electric vehicles.

The federal Department of Energy will spend $14.5 million this year on electric vehicle research, said Paul Brown, director of the DOE's Electric and Hybrid Propulsion Division.

Among recent developments are:

■ The Electric Power Research Institute, a non-profit corporation supported financially by 600 American utilities, has been testing 31 British-built Griffon electric vans throughout the country since 1985.

Company manager sees electric vehicles in country's future



Tribune file photograph

In 1974, electric cars like this one seemed an answer to the fuel crisis.

■ EPRI also is working on a General Motors G-Van that will travel 60 miles on one charge and has a top speed of 53 mph. The vans will have a range of 90 miles if driven at a constant 35 mph. Limited production is expected to begin in the middle of 1989.

■ Chrysler is developing a TEVan that will travel 110 miles on one charge and have a top speed of 65 mph. It will carry passengers, unlike the Griffon and the G-Van, which are cargo vans.

Cargo vans are the market for which today's electric vehicles are best suited, said Gary Purcell, electric vehicle development project manager for EPRI, which is based in Palo Alto, Calif.

"That's the market niche that fits the performance capabilities," Purcell said. "We found in market surveys that cargo delivery vans very rarely go over 50 to 60 miles" on trips during the day.

In addition, cargo vans generally return to a central storage location for the night, perfect for recharging spent batteries.

Florida Power Corp. in St. Petersburg has been operating two Griffon vans since 1985. J.T. Young, an energy program engineer with the utility, said one of the vans has been used by the utility and the other has been lent to Abilities Rehabilitation Center in Clearwater.

"We're going to allow local businesses to use it for three months and evaluate how they like it," Young said. "The comments we've gotten back are very favorable."

Purcell said, once in production, electric cargo vans probably will cost more than gasoline-powered versions: around $20,000 to $25,000. However, the high purchase price will be offset by lower operating costs.

Electric vans cost about 5 cents a mile to operate, while gas-powered vans cost about 10 cents a mile, Purcell said. In addition, an electric vehicle will require less maintenance because there are fewer moving parts in the engine, he said.

Florida Power's vans usually require 16 to 18 kilowatt hours to recharge. That comes out to between $1.07 and $1.21 an overnight charge at current off-peak rates, Young said.

Discounts may be negotiated in the future between electric vehicle users and utilities to help sell more power at night when the utility has surplus generating capacity, Purcell said.

Oil independence

DOE's Brown said the goal of today's electric car research is the same as that sought by Flowers and his small company in Sebring: to free the United States from its dependence on the 17.5 million barrels of oil it uses each day.

Of its daily consumption, Brown said, 64 percent is used for transportation.

"There is a perception that we have plenty of oil," he said. "We are using more oil than ever before. We have not become less dependent; we've become more dependent.

"It's become masked so there is a perception that there is plenty of oil," he said.

That perception is distorted, Brown said. Developing a usable electric car is a necessity for the future.

As the technology advances, oil and gasoline price increases and more stringent air pollution emissions controls are mandated, Purcell said. He feels electric vehicles will be as common in the future as today's gasoline-powered vehicles.

"In 30 to 40 years from now," he said, "you're going to see us all driving electric vehicles."