



San Francisco Examiner

Monday, February 5, 1990 ★

Shall we drive electrically?

ONCE AGAIN the idea of the electric automobile is drawing attention, as well it should. Years back, the notion was spurred to prominence briefly by a fuel crisis, as we learned of our oil vulnerability when Mideast supplies were cut off. Now the necessity to meet clean-air standards has renewed the interest, to the extent that a promising electric vehicle actually has materialized.

We can thank General Motors for this — for producing its new Impact battery-powered car. But all we have thus far is the prototype model that runs nicely. No Impacts are on showroom floors, in fact no assembly line is in sight as yet. Production must await the development of public demand for such a non-oil using auto, and some further improvement of the technology is required. The vehicle in its present state is much costlier than a regular gasoline-powered car and must be recharged after 120 miles of driving. But we expect that that range can be extended in future models, and large-scale production could reduce unit costs, especially as other manufacturers got into competitive play.

One thing is certain — such an automobile would drastically cut air pollution if ever it got into large use. And toward that end, California Congressmen Vic Fazio, D-West Sacramento, and George Brown, D-

Riverside, are offering legislation to get the government into this development. Their Electric Vehicle Technology Commercialization Act of 1990 calls for a multi-year federal cost-sharing program to demonstrate both the environmental and energy benefits of electric vehicles. Compared to gasoline-fueled cars, Fazio says, electric vehicles show a 98 percent reduction of major pollutant emissions. If just 1 percent of our cars were battery-powered, emissions would be cut by 160,000 tons a year and 60,000 barrels of oil per day would be saved.

And there is an extra urgency in the fact that once again we are letting ourselves become dangerously dependent on imported oil. Under this bill the Energy Department would launch into the business of stimulating market demand for electric cars and hastening technological advances to make them more attractive. Federal cost-sharing to get this started is fully defensible. Petroleum pollutants must be put down to meet clean-air goals and protect the global environment.

Some alcohol-type fuels being considered, such as methanol, offer hope but not complete freedom from emissions. The proliferating automobile with its current gaseous emissions is a threat that must be controlled by strictures not contemplated before. And why not try to replace it in sizable degree with a new-era vehicle that is practically emission-free? This electrifying legislation deserves enthusiastic approval.

"THE IMPACT OF GM'S IMPACT ON ETAP"

by Tony de Bellis

Late in 1989, several Electric Auto Association members suggested that I put in for a California Energy Commission (C.E.C.) Emerging Technology Advancement Program (ETAP) Grant. They reasoned that I taught physics at a (good) high school and had done "it" before. "It" being building from the ground up an electric motorcycle that crossed the continent from Massachusetts to California and building from the ground up a twenty-four battery electric car that competed in the Urban Vehicle Design Competition (U.V.D.C.)

"Yes, my students and I did that".....meanwhile thinking what a long time ago and what a lot of work it was. My friends persisted, arguing that the motorcycle held the world's land speed record for three years, and the electric car placed 16th out of 80 entries in the Urban Car Contest. Good results for working on a shoestring with bright high schoolers.

And so, with the help of Gary Starr, President of Solar Electric in Santa Rosa, my first ever grant proposal went in to Sacramento on time. I also incorporated Electric Vehicle Systems to produce the prototype vehicle after the grant phase.

The abstract reads: "This project builds upon twenty years of electric vehicle construction and testing and completion. The primary research contract will fund a two-passenger 1500 lb. electric commuter vehicle prototype with photo voltaic enhancement. The electric commuter will feature an on board computer to optimize range and performance, and to control charging during the off-peak hydroelectric grid period. The motor will be under 20 lbs. and over 85% efficient. The front wheel drive will integrate a continuously variable transmission (CVT) which is 10% more efficient than the best 5 speed manuals on the market today. The electric commuter will feature a very low drag coefficient coupled with small cross sectional area. Top speed will be 70 mi/hr. (110 km./hr.) and the typical range will be 60 mi. (220 km). Recharging will be from the sun in approximately two days or overnight on hydro power from the on board charger or in two hours with a fast charger. Recyclable materials and metals will be featured throughout. The electric commuter will be safe and simple and will quickly and quietly interface anywhere in the traffic flow, using approximately 5% the gasoline of a typical gasoline commuter."

And then GM unveiled the IMPACT. We Electric Auto Association people knew it was possible to do this --- 125 mi./hr. top speed, 120 mi. range, acceleration of 0 - 60 mi./hr. in six seconds! It simply takes a couple of years, tens of millions of dollars and the best consultants, that money can buy.....and good old lead-acid batteries. The Impact unveiling ratified the Electric Auto Association and my grant proposal.

We can build a fast, simple safe electric commuter now with standard-sized batteries and D.C. control and off the shelf components...and the California Energy Commission willing...we will!!!

(Tony de Bellis can be reached at (415) 837-7086 or at 231 Kuss Road Danville, CA 94526)

Environmental Education at Campolindo High School

It started 20 years ago last October with a dream, hope and vision of the future. A group of three social studies teachers, Bob Evans, Murray Grant, and Bob Johnson, along with a science teacher named Tony de Bellis felt that changes should occur and Campolindo should be a model.

Situated in the hills of Moraga, Campolindo lived up to and even surpassed their hopes. This was a time when many of the students were drafted and sent to Viet Nam. Political awareness was acute. Problems of environmental degradation were making themselves known and environmental awareness was awakening. While there wasn't then (and still isn't) a class on ecology, a group of angry seniors felt environmental education was needed. Therefore the Earth Club came into being.

Bob Evans headed the club at that time and woke up many at the school and the neighboring community to the wastefulness of our society. The Earth Club established the oldest continuous recycling center in Contra Costa County. In the beginning the center recycled steel, aluminum, newspaper and glass. Today the center is still in operation and is recycling aluminum, newspaper, white paper and is soon to get another facility for recycling glass. The club was then able to buy a muncher, which was internal combustion at first and is now electric. The same muncher is still in operation today. Due to the newspaper recycling alone, Tony de Bellis, who is still at Campolindo, estimates the club helped to save over 65,000 pine trees.

The club was also able to help mobilize and publicize California's first Earth Day. They encouraged the entire student body to find alternate modes of transportation to the wasteful automobile. The day was a success with many walking, bicycling and carpooling. In fact, not a car was to be found in the parking lot, instead there were about a dozen horses that took the cars' place.

Along with the Earth Club, a club in those days known as AIR (Awake, Inhale, Revolt) became its counterpart focusing on the reduction of air pollution. This club, headed by Tony de Bellis, built an electric motorcycle. In 1970 this motorcycle set incredible records including: being the only high school entry in the Clean Air Car Race of 1970. It placed third in the race and went on to hold the world land speed record for electric motorcycles.

The AIR club, in its continuing search for pollution reduction, went on in 1972 to build an electric car from the "ground up". This time they entered the Urban Vehicle Design Competition, and once again they were the only high school to compete. They came in an impressive 17th out of 80 participants. In the years between 1972 and 1980, the club continued to perfect its "machine."

January 1990/ecology center newsletter

January 1990
Vol. XX, No. 1

Today, the Earth and the Physics Clubs (the latter originating from the AIR club) are still going strong. Both clubs continue to have recycling as their main focus, yet they have also ventured into other current environmental arenas. The Earth Club is now focusing on the problems that surround the destruction of the rainforests. They are also doing a tree planting project hoping to plant approximately 20,000 trees by June 1990.

The Earth Club has also attacked the mistreatment of animals being used for experiments and the killing of animals for their fur. They continue to protest the destruction of the old growth forests, especially the proposed cutting of the Headwaters Forest in Humboldt County.

The Physics Club, while still focusing on the electric car, is today rebuilding an electric golf cart for the pickup of recycled materials on campus. By petitioning the California Energy Commission for a grant, they hope to be able to design, model and build a two-person, battery run car with solar cell back-up, a commuter for use in getting to and from BART or work.

With the continued increase of environmental awareness and concern, the future of the Earth and Physics clubs looks bright. Both clubs will continue with their recycling center, adding to it a campaign to let the neighboring community know that although curbside recycling exists, the center is still open and needs their support. The Earth Club plans to continue planting trees, writing letters and protesting the destruction of the rainforests and old growth forests, as well as the unethical treatment of animals. The Physics Club is going to improve their recycling cart and start the design of the electric commuter, providing the grant is approved. It looks as though both clubs will "keep on keeping on" with the support of the administration, including new principal Tom Ehrhorn, and the student body. Happy 20th birthday Earth and Physics Clubs! Keep up the ecological education at Campolindo High School and good luck with all your future endeavors.

—J.P. Hanson

(J.P. Hanson is a senior at Campolindo, a member of the Campolindo Earth and Physics clubs and an Ecology Center volunteer.)

The Ecology Center, 2530 San Pablo Ave.,
Berkeley CA 94702.

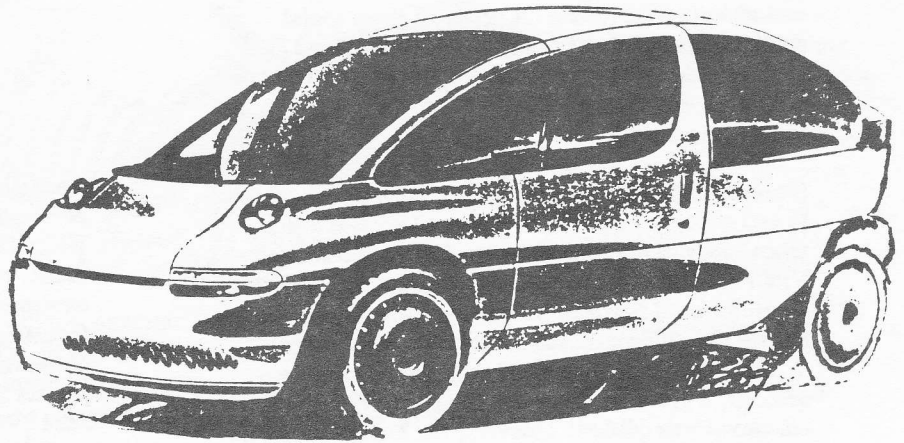
THE PROMISE OF ELECTRIC VEHICLES

by Frank Di Massa

Background

Electric Vehicles (cargo and passenger vans, light duty trucks, two and four passenger automobiles, commuter vehicles etc.) use electricity stored in "secondary" or rechargeable batteries as fuel to power electronically controlled AC or DC motors. Electric Hybrid Vehicles (EHV) differ from Electric Vehicles (EV) by the addition of an on-board auxiliary power unit (APU). The APU is typically a small (8-20 hp) two cylinder/four stroke internal combustion engine (ICE) fueled by liquid propane, methanol, or natural gas, coupled to an alternator. The engine of an APU is sized to run at constant speed or rated load. It is activated and deactivated by the driver of the vehicle. The electricity it generates feeds into a common electrical bus for distribution to the batteries, electric drive motor or auxiliary systems. Therefore, it is understood that the ICE never idles or changes speed and always puts out useful energy, even when the vehicle is not moving. The Auxiliary Power Unit is a range extender and power enhancer. It increases the practicality of electric vehicles and allows them to retain "environmental" superiority over non-electric ICE vehicles by burning a "cleaner" hydrocarbon fuel only when necessary and at a higher level of efficiency.

The great majority of electric vehicles on the road today are converted or retrofitted ICE vehicles, as opposed to vehicles built from scratch. An existing ICE vehicle, stripped of its engine, gas tank, fuel pump, muffler, radiator and several other unnecessary components, becomes the base unit. If the base unit comes directly off an assembly line it is called a glider. The glider or base unit is then adapted with batteries, a controller, an electric drive motor and an on-board charger. Everything from BMWs to Cadillac Eldorados to Chrysler T-115 minivans have been converted either by a manufacturer, an entrepreneur or a do-it-yourselfer. The December issue of the *Electric Auto Association News* has a "Believe it or Not" headline stating that



Front view LA 301 Electrical Vehicle

the California DMV has 36,894 EV registered out of a total of 22,727,561 vehicles.

Limitations

Limited range before recharge and difficulty with grades have always been the weakness of EV, which are otherwise clean, quiet and energy efficient when compared to ICE vehicles. The limiting factor is the battery pack. But wait one minute, there are electric vehicles on the road today (converted VW Jettas with sodium sulphur batteries) that claim a 75 mile per hour top speed, 0 - 30 mph in 9 seconds, a range of 75 miles at a constant speed of 55 mph and a range of well over 100 miles at a constant speed of 30 mph. The batteries in this car take six to eight hours to recharge and have a life of 1,000 discharges before replacement is necessary. A very encouraging profile.

Batteries

Today most electric vehicles on the road bear lead-acid batteries. Lead-acid batteries are durable (1200 cycles), reliable, tried and proven, but have a relatively low energy (23-36 Wh/kg) and power density compared to some other batteries which are commercially available, or will be available within the next two years. The com-

petitors include nickel-cadmium, nickel-iron, zinc-bromide, lithium-alloy/metal sulfide, sodium sulphur and aluminum-air. Of these batteries, the one of greatest interest for the early to mid 90's appears to be sodium sulphur (NaS). The high temperature NaS battery cell is made of beta double prime alumina separating molten sulphur and sodium creating a compact, high energy density (80 Wh/kg) electrochemical cell. To keep the reactants liquid the battery must be maintained at a temperature of about 300 degrees Celsius. This requires a thermally-insulated enclosure. The batteries require preheating prior to use after prolonged periods of inactivity. The world's foremost manufacturer of NaS batteries, Powerplex, a subsidiary of MAGNA (Canada's largest auto parts producer), in joint venture with Asea, Brown-Boveri has stated that it will be ready to manufacture 10,000 units (1 unit/vehicle) in 1993 or 1994. They are waiting for an order. (*editor's note to utility engineers: large (100 Megawatt) sodium sulphur storage stations are currently being considered for load leveling*)

Still in research and development, aluminum-air batteries differ from all those mentioned above in that they eliminate electrical recharging. The cells are mechanically recharged by adding new aluminum electrodes. The aluminum-air battery

has a high projected energy density (300Wh/kg) and therefore holds great promise for the future.

Applicability

A report published by the Metropolitan Transportation Commission in Oakland states that the average roundtrip Bay Area home-to-work-to-home commute is approximately 21 miles. The average home-based shopping round trip is about 9 miles. Given these figures, and common sense, one can see the opportunity for electric "purpose" vehicles as a second or third family car. The purpose EV would need to be equipped with all the creature comforts commuters expect while sitting in traffic - air conditioning, a stereo or CD player etc. It would need to be safe, affordable, inexpensive to operate and require little maintenance.

There are other opportunities for the use of EV besides as town cars or commuter vehicles. Fleet vehicles (cargo vans) and multi-passenger minivans (for corporate vanpools) are currently being promoted for commercial application. The Electric Vehicle Development Corporation in Sunnyvale and the Electric Power Research Institute (EPRI) in Palo Alto are marketing electric General Motors G-Vans (based on the Vandura) being assembled by Vehma International. The G-Van is based on the Griffon van which has been successfully utilized in fleets in England, Canada and the United States for several years. Most of the G-Vans will be purchased and used by Electric Utilities around the nation. The Utilities will lease or loan some of the vans to interested customers. Electric Utilities around the world are actively participating and effectively overseeing EV development - for a very obvious reason: driving an electric car 60 miles/day would cost approximately 30 kwh per evening to recharge, charging 20 times/month will add 600 kwh to your monthly statement.

In France, Peugeot has a similar program for electric utilities. In 1990 they will produce 250 light duty vans for use by Electricite de France. Germany's largest -- producer of electricity, Rheinisch-Westfälisches Elektrizitätswerk, has had 70 converted VW Golfs on the road for several

years and is testing a variety of batteries.

In 1989, Peugeot placed fifteen of their "205" Model 2-seater, 3-door compact cars and a small number of the C-15 model light duty trucks on the road for two years of real life testing (Peugeot has announced it will offer electric propulsion as an option on commercially available C-15s this year). Not to be outdone, France's other automotive giant, Renault, has developed and is testing their own very impressive 2 passenger and light duty vehicles. Many of the French vehicles employ nickel-iron (NiFe) batteries manufactured by SAFT. The NiFe batteries (invented by Thomas Edison in the early part of this century) have a good energy density (55-60 Wh/kg) and cycle life (1500 cycles) but at a lower energy efficiency and a higher cost.

Government and Utility Sponsored Programs

There are currently several government sponsored programs in California dealing with EV. The most interesting one is Los Angeles Councilman Marvin Braude's *LA Initiative* being administered by the Los Angeles Department of Water and Power (LADWP). The goal of the project is the commercial application of 10,000 electric and hybrid electric vehicles (vans, minivans, light duty trucks and two and four passenger cars) in Los Angeles by the year 1995. LADWP has issued an RFP and selected three manufacturing firms to participate in the program: the Canadian firm VEHMA International, a vehicle systems integrator capable of low volume (25,000 vehicles/year) production; Unique Mobility, an advanced research and development firm in Colorado (backed by ALCAN, Canada's largest aluminum producer) which has a very impressive track record in EV; and Clean Air Transport, a small group based in England which seems to be developing some very progressive concepts (*see illustration previous page*). LADWP, the CEC, the South Coast Air Quality Management District and Southern California Edison (SCE) are all committed to various levels of financial support for pre-production activities and/or per-unit incentives to purchasers. In addition, the City of Los Angeles, LADWP and SCE will play a proactive role

in developing the government and private institutional market for EV.

SCE is strongly supporting the introduction and use of EV in their service territory. Their marketing and support efforts could easily be used as a model by the other electric utilities in California.

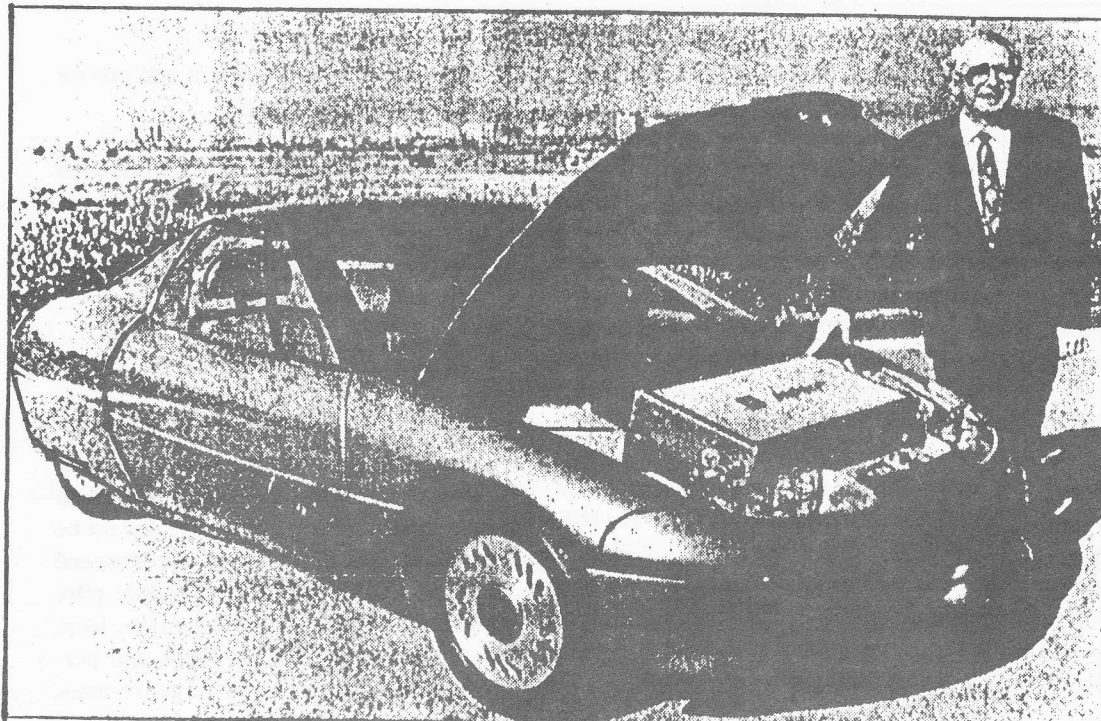
Summary

In order for EV and EHV to penetrate the market and play a tangible role in air quality improvement in this decade, additional government incentive programs should be introduced. The EV technology is advanced and tested to the extent that viable pilot programs could be established by local governments. Given the range and performance characteristics of the above-mentioned Jetta and the increased range and performance of electric hybrid vehicles, many more California cities and counties should develop programs like the one in Los Angeles. Pilot projects could easily be implemented, requiring only minor modifications to existing facilities to provide for recharging and servicing. A concerted effort by cities and counties throughout the Golden State would bring variation and innovation, and increase the possibility of the timely commercialization of more effective and benign on-road vehicles.

News Flash !!

General Motors has unveiled the "Impact". The aerodynamic two passenger EV borrows many of its design characteristics from GM's solar-electric Sunrayer. Thirty-two 10-volt sealed lead-acid batteries weighing 870 lbs power the vehicle. Its total weight is a lean 2500 lbs. The car displays impressive acceleration and claims a range of over 100 miles at freeway speed on a full charge. Notable features include special low resistance tires, a heat pump for heating and cooling the passenger compartment and relatively fast recharge.

The GM Impact will be the standard other manufacturers will attempt to match and supercede. Designing from the ground up is the key. Hopefully competition will heat up and we will see a few EV and EHV on the market while the new decade is still young.



AP Laserphoto

General Motors Corp. Chairman Roger Smith, with the Impact concept car.

GM nears decision point on producing electric car

By Jim Mateja
Auto writer

General Motors Corp. will decide in 60 to 90 days whether to produce a battery-powered electric car, which would be available to consumers in about two years.

GM Chairman Roger Smith, in town for the opening of the Chicago Auto Show at McCormick Place, said the automaker has four alternatives to choose from on electric cars:

- Produce the recently unveiled Impact concept car, powered by 32 10-volt batteries.

- Build a hybrid of the Impact, powered by batteries but with a gas engine in reserve to ensure a longer travel range.

- Convert an existing GM car—a Chevy Geo Prizm or Chevy Geo Storm, to electric power.

- Shelve plans for an electric car until a battery breakthrough is made that would increase driving range.

Impact was unveiled last month at the Los Angeles Auto Show and will be on display at the Chevrolet exhibit at the Chicago show through Feb. 18. The two-seater Impact is built on a 95-inch wheelbase and is

163 inches long, or smaller than the former Chevrolet Chevette mini-car.

With the 32 batteries powering an electric motor, GM claims Impact has a top speed of 100 m.p.h. and a 0-to-60-m.p.h. acceleration time of 6.8 seconds (quicker than many gas-powered cars). However, the cruising range is only 125 miles before the battery pack must be plugged into a socket for a 2-hour recharge. After 25,000 miles of driving, the 32 batteries have to be replaced.

"We'll make up our minds

on what to do in 60 to 90 days," Smith said in an interview. "I would hope to have an electric, and the ideal car would be the hybrid gas and electric."

Smith said GM has only one electric Impact undergoing testing.

"We need to build more for testing and to evaluate with consumers," Smith said.

"The curse of the lead acid battery is still upon us in terms of driving range, and maybe we should just wait until we have a battery breakthrough for greater range," Smith said. "But we don't have the luxury of being able to wait."

An electric car's two strongest features are energy conservation, because it doesn't rely directly on fossil fuels, and near-zero emissions.

The federal government is considering stricter fuel economy and emissions legislation that would force alternate-fuel vehicles to be built.

California, with the nation's worst pollution problem, is pushing clean-air laws so strict they would ban cooking on an outdoor grill.

"Probably the smartest and most sensible way to do this would be to come up with a low-volume electric to sell on a regional basis in those areas with the greatest existing pollution problems, such as Los Angeles," Smith said.

Smith said one obstacle GM has to overcome with an electric car, and one reason it plans to build more vehicles for testing, is the consumer perception of a battery car as a golf cart with a trunk.

"I wouldn't go out on the highways in a golf cart, I'd get run over," Smith said. "But Impact's performance is better than a lot of gas-powered cars already on the market. We have the acceleration and passing power in our Impact."

"Fiat just announced it has come up with an electric by converting one of its gas cars [the Panda sold in Europe] to batteries. Its top speed is only 43 m.p.h., and I certainly don't want to go out on the highway at 43 m.p.h."

Smith said that in the long term, electrics should become more appealing as people realize that fossil fuel is a finite source.

"There's only so much petroleum out there," he said. "It's bad enough we're going to leave our grandchildren with a bankrupt nation, we don't want to leave them with a bankrupt environment."

In a separate interview, GM President Robert Stempel said GM's cautious pace on Impact was intended.

"Remember four or five years ago, when there was all the excitement over the Saturn and we didn't even have a bird in the hand at the time? We don't want to have unbridled enthusiasm like that again," he said.

"We want to sample consumer opinions about the car at the auto show, to learn if it makes sense to them, and then if it makes sense to us as a business decision, in terms of volume and price and where do we build it and who builds it."

CAN THIS REPLACE FOSSIL FUELS?

A NEW GENERATION OF REACTORS

BY DAVID PERLMAN

Reactors using high temperature helium gas to cool their nuclear fuel and generate electricity are by no means the only concepts now being explored by the nuclear industry in the quest for new and safer atomic power plants.

Despite the promise of greater efficiency, safety and modular standardization advanced by the proponents of gas-cooled reactors, industry leaders insist that for decades to come competing reactors cooled by "light water" will remain the dominant source of nuclear power in America, just as they have been since the beginning of the atomic energy era.

Right now the nation's major utilities — represented by the Palo Alto-based Electric Power Research Institute — are working cooperatively with industries in Taiwan, Korea, Japan, the Netherlands, Italy and France to develop a variety of reactor designs based on the use of light water as the coolant.

In America alone, Westinghouse, General Electric and Combustion Engineering are all designing new generations of light water reactors, while only General Atomics, a San Diego firm, is still working on high-temperature gas-cooled reactors related in principle to the concept proposed by MIT's Lawrence M. Lidsky.

General Atomics, in fact, has already

built two operating gas-cooled nuclear plants. One was a small prototype designed to generate only 40 megawatts of electricity that operated successfully at Peach Bottom, Pennsylvania, in the 1960s. The other was a full-scale plant located at Fort St. Vrain, Colorado. It operated off-and-on safely for 10 years. But its record of on-time was so sporadic that it was shut down permanently last year.

The Department of Energy is now supporting the firm's ongoing research and development efforts exploring new gas-cooled reactor concepts.

In another unconventional approach to nuclear power, the Electric Power Research Institute and the energy department are sponsoring a long-term design effort aimed at developing an advanced reactor that would be cooled by liquid sodium.

This exotic concept, its developers believe, would create reactors that could actually "breed" more nuclear fuel than they consume; would recycle their own radioactive wastes; would permit construction of standardized compact reactor modules; would shut down automatically in the event of a hazardous malfunction, and would release so little radiation during an accident that no evacuation plans would be needed.

These ambitious possibilities are all part of General Electric's "PRISM" project — standing for Power Reactor Inherently Safe Module — and the company has been joined

in design efforts by engineers from virtually the entire nuclear industry, including 10 major atomic energy companies as well as the DOE's Argonne and Oak Ridge National Laboratories.

The goal is to have a full-scale design for the first liquid metal reactor complete by the year 2000, and deployment early in the next century. But despite the near-disaster at Three Mile Island in 1979 and other less-threatening reactor accidents over the years, the major firms developing new generations of reactors insist it could be decades before any of the exotic concepts supplant the oncoming generation of light water reactors — if indeed they ever do.

The light water reactor, says a position paper from the industry's Nuclear Power Oversight Committee, "is a proven technology. It has been a safe, reliable and efficient workhorse for more than 30 years in the U.S. and throughout the world."

Among the concepts for a new generation of those reactors, for example, is one developed by General Electric engineers in San Jose. They call it the Advanced Boiling Water Reactor (ABWR) and according to Daniel R. Wilkins, who heads the project, it is the only advanced light water reactor now being "commercially deployed." Designs are under review by the U.S. Nuclear Regulatory Commission, and Wilkins says his company expects the final design to be approved by the federal agency by late next year.

Japan's Tokyo Electric Power Company has ordered two of the new General Electric reactors for operation in 1996 and 1998, Wilkins reported recently, and each power plant would generate 1,356 megawatts of electricity — considerably more than the 1,100 megawatts generated by each of Diablo Canyon's two reliable but conventional reactors.

The Department of Energy has also awarded a \$50 million contract to General Electric, together with engineers at Bechtel Power Corporation and the Massachusetts Institute of Technology to pursue designs for a new type of "simplified boiling water reactor."

This nuclear plant would be much smaller than the "advanced" version, generating only 600 megawatts of electricity. But its small size would permit standardized units to be deployed more rapidly and maintained more easily, according to its designers. And its gravity-operated safety system, they say, would be designed to flood the reactor with water and quench the nuclear fuel automatically in the event of a threatened runaway reaction without requiring alert action by human crews. ■

Ford wants boost for electric car

Associated Press

WASHINGTON — Ford Motor Co. unveiled an electric-powered minivan in the capital with a suggestion that the nation's No. 2 automaker would welcome more government involvement to boost the fledgling technology.

"Joint government-industry initiatives are critical if any alternative fuel strategy is going to become a viable national option in the foreseeable future," said John McTague, Ford's vice president for research.

The Aerostar van showed by Ford at a hotel near the Transportation Department was powered by a sodium-sulfur battery, with the drive provided by a motor mounted on the rear axle. The inverter, which converts direct current from the battery to the alternating current needed to run the motor, was a new, lighter and smaller design, Ford said.

Company officials said the van has a 100-mile driving range and a maximum speed of 65 mph, with acceleration from a standstill to 50 mph in less than 20 seconds. The battery takes eight hours to recharge, the company said.

The cost of operating the vehicle, both

replacing the battery every three or four years and recharging it, is comparable with the cost of running a gasoline-powered vehicle at today's prices, Ford said.

Electric-powered vehicles have been put forward as a long-term solution to the problems of diminishing petroleum supplies and increasing air pollution.

The system was developed jointly by the Energy Department, Ford, General Electric Co. and several battery manufacturers.

McTague said bringing the vehicle from the prototype stage to commercial practicality would require government support of battery research aimed at bringing down recharge times and "substantial production to test out" the vehicles for durability, cost and acceptance.

Bill Day, Ford's chief of public relations in Washington, hinted broadly that the company would need government purchase of the electric vehicles in order to build momentum for their use.

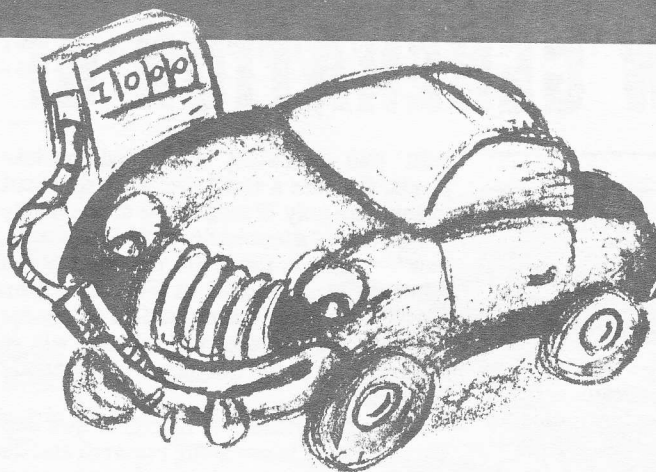
"You've got to read between the lines," Days said, citing other instances of new technology, such as air bags, where government purchases created the momentum that led to commercial success.

Rollback— or Rollover?

For a while it was a race, a patriotic display of U.S. drive and ingenuity. As a nation we were going to show our European and Japanese rivals that we could make our cars as fuel-efficient as theirs—maybe even more so. But the race has been called off for now.

Had all gone according to a schedule set by the Environmental Protection Agency in 1975, this year's fleet of U.S. automobiles would have averaged 27.5 miles per gallon of gas used. But in October 1988, Ronald Reagan's transportation secretary, James Burnley, rolled back U.S. automobile fuel-efficiency standards. As a result, this year's auto fleet will fall one mile per gallon short of the original EPA goal.

The effect, according to



Amory B. Lovins, director of research at the Rocky Mountain Institute in Colorado, will be a substantial increase in oil consumption. He calculates that rollbacks in the efficiency of the 1986 car and light-truck fleets led to an increase in U.S. crude-oil use of some 295,300 barrels a day—equal to the amount that the Interior Department hopes can be extracted from the Arctic National Wildlife Refuge in one year. (Similar rollbacks have been approved each year since 1986, but data on

the consequent oil demand are not yet available.)

Burnley made his decision under pressure from Ford and General Motors. The two industrial giants pleaded, for the fourth year running, that the congressionally mandated fuel standards placed them at a disadvantage in competing with Japanese automakers. They also said the standards would force them to lay off workers.

The undermining of the fuel-efficiency program comes at enormous expense

to consumers and to the nation's future energy supply. "It cost manufacturers at most \$80 billion to achieve light-vehicle efficiency gains from 1975 to 1987," says Lovins. "But that increased efficiency saved American consumers a cumulative \$260 billion in fuel costs."

In the long run, rollbacks may hit more than just people's pocketbooks. In the November/December 1988 issue of *Technology Review*, Deborah L. Bleviss of the International Institute for Energy Conservation wrote that failure to pursue fuel-economy improvements increases the likelihood of a new fuel crisis in the 1990s and adds to the buildup of carbon dioxide that causes global warming. "Clearly," she warns, "neither the United States nor the world at large can afford to neglect making more fuel-efficient light vehicles." ■

SIERRA CLUB: A DRIVING FORCE

A full 91 percent of Sierra Club households in the United States own (and presumably operate) at least one car, almost precisely matching the nationwide figure for adults of 90.6 percent. In fact, our most recent readership survey shows, more than half of all Club households support two or more gasoline-powered, exhaust-belching vehicles (although

some small reduction in pollution levels may result from the tendency of Sierra Club members to purchase relatively fuel-efficient models).

The table below shows which makes of automobiles Club-member households purchase in significant numbers, and how their preferences compare with those of the general U.S. adult population.



Cars Purchased New	Sierra Club households owning 1+ cars	U.S. adults owning 1+ cars	Cars Purchased New	Sierra Club households owning 1+ cars	U.S. adults owning 1+ cars
HONDA	16%	2.8%	SAAB	3%	0.2%
TOYOTA	16%	3.6%	BMW	2%	0.6%
FORD	11%	8.6%	CADILLAC	2%	1.5%
CHEVROLET	8%	11.5%	CHRYSLER	2%	2.3%
VOLKSWAGEN	7%	1.3%	PONTIAC	2%	4.1%
NISSAN/DATSUN	7%	3.4%	OLDSMOBILE	2%	5.1%
DODGE	5%	3.4%	ACURA	1%	0.1%
VOLVO	4%	0.4%	PORSCHE	1%	0.1%
MAZDA	4%	1.1%	AUDI	1%	0.3%
SUBARU	4%	1.1%	MERCEDES BENZ	1%	0.3%
MERCURY	4%	2.4%	PLYMOUTH	1%	2.0%
BUICK	4%	5.1%			

Source: *Sierra Subscriber Profile, 1988* (Mediamark Research, Inc.)



* In the past few years there's been an average of 6-8 European solar car events per year. Now it appears there may be as many as 36 events for 1990. With 2 distinct sanctioning bodies; the International Federation of Solarmobiles and the International Federation for Electric Vehicles. ASCA will keep in close contact with both for information and event scheduling.

Proposed US Events	Date	Contact:
American Tour de Sol Vermont to Massachusetts	Memorial Day Weekend	Nancy Hazard (802) 254-2386
Northern California Race	June (?) (incomplete information)	John Frey
GM Sunrayce Florida to Detroit	July 4	George Ettenheim (602) 773-0230
Light Wheels New York to Washington D.C.	July 29	Steve Stollman (212) 925-8505
Ka'ahale La Hawaii	May (?)	David Rezachek (808) 548-4195

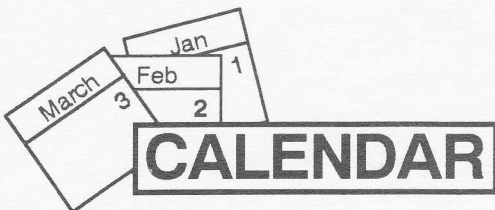
* Astro Power- Has announced the 1990 Solar Challenge. A program to provide technical assistance and solar cells at reduced rates for solar car competitors. For more information call; Robert Mulligan at (301) 544-7963 FAX (301) 544-7968

* Japan's second solar boat race took place 8/30/89. First place went to a monohull, second - hydrofoil, third - trimaran.

* Japan also hosted a solar car race with some intriguing looking vehicles. Results have yet to be translated.

* The American Solar Cup will be an annual trophy presented to the team or individual that achieves the most significant performance for the year in the US.

* Video tapes of the Solar Electric Car Symposium. Send \$10.00 plus postage to; Northeast Solar Energy Assoc. PO. Box 541 Brattleboro, VT. 05302 (802) 254-2386



Planned East Bay Meetings

March 10, 1990 - Steve Post - Curtis PMC Controllers

April 14, 1990 - Toni de Bellis - Proposal of rental Electric Cars at BART Train stations

Santa Clara Meetings changed (because of Earthquake) to:
Mercury Savings, 19376 Stevens Creek Blvd.

Battery Council International 102nd Convention April 29-May 2
San Francisco, Ca. Marriott Hotel

AMERICAN TOUR de SOL May 23-27 1990 5 Day race
through New England

WORLD SOLAR CHALLENGE-Due to start in Darwin, Austrila
on Sunday November 11 1990. ENERGY PROMOTIONS
P.O. BOX 290, Bribie Island Qld. 4507, Australia

For sale two G-29 Gen. motors. One \$100. other \$125. Also
several heavy duty relays \$5.00 each. Call (916)381-0344 or
write to: J.P. Garbero, 8190 La Riviera Dr., Sacto. Ca. 95826

For sale: U.S. ELECTRICAR RENAULT only \$2800.00. Wanted
Electric cars! Are you wanting to sell or trade your car? Send
photo and specs to: Solar Electric, 175 Cascade Ct., Rohnert
Park, Ca. 94928 or Phone (707)586-1987

Mechanix Illus. Trimuter, Great project. Frame is complete,
have all components, just needs body. (707)553-1815

Dear Electric Vehicle Enthusiast: I have a small catalog listing
unusual vehicles including Parasails, Hovercraft, Mopeds and
All-terrain vehicles. I am interested in expanding my catalog
by including Solar Powered or Electric Vehicles. If you have
any products or know of any products that may be of interest,
Please write or call Charlie Fetzer, 2810 Algonquin Ave.,
Jacksonville, Fl. 32210 or Phone (904)269-8823

Advertisement Rates: 5 Lines for \$5.00 - 1/4 page for \$15.00
Full Page for \$50.00

EAA Chapters

ARI ZONA: Phoenix

Lee Clouse 602 943 7950
P.O. Box 11371
Phoenix, AZ. 85061

CALIFORNIA

East Bay
Charles Smith 415 525 4434
61 San Mateo Rd.
Berkely, Ca. 94707

North Bay

G. Schaeffer 415 456 9653
211 Ballan Blvd.
San Rafael, Ca. 94901

Peninsula

Jean Bardon 415 355 3060
540 Moana Way
Pacifica, Ca. 94044

Santa Clara

Lee Hemstreet 415 493 5892
787 Florales Dr.
Palo Alto, Ca. 94306

Southern Cal-EVA of SC

Ken Koch 714 639 9799
12531 Breezy Wy.
Orange, CA. 92669

TEXAS: Houston

Ken Brancroft 713 729 8668
4301 Kingfisher
Houston, TX. 77035

WASHINGTON: Seattle

Bryan Lowe 206 632 4496
5011 9th NE
Seattle, WA. 98105

WISCONSIN: Milwaukee

Dave Pares 414 481 9655
3251 S. Illinois
Milwaukee, WI. 53207

NEW JERSEY: Hackensack

Kasimir Wysocki 201 342 3684
293 Hudson St.

Hackensack, NJ. 07601

VANCOUVER, BC:

VEVA 604 987 6188

543 Poweii St.

Vancouver, BC. V6A 1G8

NON-AFFILIATED GROUPS

CANADA: Ottawa, Ontairo

Fred Green

Box 4044 Sta. "E"K1S 581

Ottawa, Ontario, Canada

NEW MEXICO: Albuquerque

Mike Lechner 505 848 2331

PNM Alvarado Square

Albuquerque, NM 87158

NEW ENGLAND

Bob Batson 508 897 8288

1 Fletcher St.

Maynard, Ma. 01754

Denver, CO. DEVC

George Gless 303 442 6566

Fox Valley, IL. 312 879 0207

John Stockberger

2S 643 Nelson Lake Rd.

Batavia, IL. 60510

Eastern-EEVC 215 696 5615

P.O. Box 717

Valley Forge, PA. 19482

For information on forming a chapter in your area write to the
address below or phone between 10AM-5PM Pacific Time
415 591 6698

EDITORS: JOHN NEWELL-BILL PALMER-PAUL BRASCH-E.W. AMES

Send your chapter news, coming events, articles to the address below

**ELECTRIC
AUTO**



NEWS

1249 Lane Street
Belmont, Ca. 94002

ASSOCIATION

March 1990

NON-PROFIT
ORGANIZATION
U.S. POSTAGE
PAID
SUNNYVALE, CA.
PERMIT NO. 420

Forwarding and Return Postage
Guaranteed, Address Corection Requested

TIME DATED MATERIAL-PLEASE DO NOT HOLD