ELECTRIC AUTO ASSOCIATION NEWS

JAN 1990 Vol. XX11 No. 1

The beginning of massed produced Electric Cars

The Electric Vehicle Assoc. of Southern California was privileged to have guest speaker JERRY ENZENAUER, Energy services Manager for the L.A. Dept. of Water and Power. Jerry came by to make a very special and longawaited announcement as to who the principal(s) would be in supplying the 10,000 electric vehicles to be placed on the streets of L.A. by the year 1995. After more than a year since the first Braude proposal responses were received, the decision was made to award contracts to not one, but three companies:

(l) Vehma International, Inc. of Toronto, Canada, suppliers of the GMC-based electric G-vans.

(2) Unique Mobility of Englewood, Colorado, suppliers of a Dodge Caravan minivan which has a small engine-driven generator on board to supplement battery power. (Unique also manufactures the state-of-the-art propulsions systems that were described in the EVAOSC November '89 newsletter.)

(3) Clean Air Transport of Sweden, who will produce a small, commuter-style passenger car similar to the Honda Civic.

The three winners are expected to form a consortium to coordinate their activities in connection with the project. The implications of Jerry's announcement caused a marathon number of questions to be fielded from the audience, altogether lasting nearly an hour. The following is a summation of information from Jerry's responses to the many questions and comments.

As a club, the EVAOSC was hoping that ElRoy Engineering would be selected. Even Peugeot, with all of its, manufacturing capabilities and large financial backing was passed over. They plan to offer electric propulsion as an option on their pickup truck models in 1990 anyway.

All 3 of the finalists will start out with the use of lead-acid batteries, and their vehicles will have ranges of 50-60 miles per charge. The eventual range requirement per vehicle to insure better market penetration is 150 miles. Unique Mobility proposes to use a 12 HP Honda engine and one of their small, powerful UNIQ motors for propulsion and as a generator to achieve range extension. This comes as somewhat of a surprise, as we thought that the SCAQMD would frown on the use of small gasoline engines. The idea is to run the engine at constant speed and optimum power curve to get maximum efficiency while minimizing emissions. Coupled with a catalytic converter, the combination of hardware is expected to run extremely clean.

The main program sponsors are LADWP and SoCal Edison. The program will cost them $70-100 million after granting EV manufacturers per-unit subsidies and/or buying down the interest on zero interest loans.

Part of the market thrust for the 10,000 vehicles is expected to come from Fleet Owner Rule #1601. This rule is being formulated by the SCAQMD. In its current manifestation it would require that purchasers of fleets larger than 4 vehicles be required to buy 20% ultra-low emission vehicles by 1993. By 1995, the number would increase to 50% turnover to ultra-low emission. EVs and hybrids are considered to be "ultra-low"; methanol, for example, is only "low". Rule #1601 has not been approved as yet. The SCAQMD is moving forward to that end with hearings and workshops scheduled early next year. One way or the other, a clean transportation rule will come forward, even if it has to be mandated by the Clean Air Resources Board. In the meantime,the petroleum industry with all of its financial investments and power will be marketing more and more of their cleaner burning "reconstituted fuel". ARCO's EC-l is an example. For them to change over their infrastructure to produce methanol, CNG, propane, or the like would be outrageously expensive. Their research will continue toward cleaning up and refining gasoline as a fuel, so long as emission standards can be met.

Beating swords into plough-shares

IEEE SPECTRUM DECEMBER 1989

Old strategies good as new

Take note of this projection: "Defense-dependent scientists and engineers face the bleak prospect of elimination of up to 73 percent of defense electronics job opportunities within three years. The unhappy additional factor is that this is about 55 percent of all electronics R&E employment. This means that there is little opportunity for an individual to find a job in the nondefense segments (in absence of corrective actions)."

Lest you panic unduly, this warning was issued by the Battelle Memorial Institute in 1965, as premature hope for the end of the Vietnam war and expectations for significant cooling of the arms race were in evidence. It was part of a study that Battelle conducted for the U.S. Arms Control and Disarmament Agency (ACDA), which by Congressional act was chartered to assess the economic consequences of arms control and disarmament, including the problems of readjustment arising in industry and the reallocation of national resources.

The Battelle report made recommendations for actions that might ameliorate the dire projections that could otherwise materialize. As the climate for arms reduction grows more favorable today, many of the recommendations are worthy of re-examination.

Among its suggestions, the report advised that the development of new markets was fundamental to shift companies and technical personnel to nonmilitary activities. And new markets were dependent on "new area" engineering research, it urged. A further conclusion was that diversification efforts would be more successful if they were not undertaken randomly by individual companies, but rather as part of a national shared effort that prioritized specific goals.

The goals identified in this 24-year-old report seem perfectly valid today, as the United States and other major nations anticipate the consequences of accelerated disarmament. They include:

- Maintaining electronics capacity adequate for national security.
- Stimulating an environment that gives continued employment opportunities to those now in the electronics industries, and uses their present skills.
- Encouraging new applications of electronics to areas of greatest national benefit.
- Encouraging progress in electronics technology and economic health of the electronics industries.
- Providing full employment and economic well-being on a regional basis.

Satisfying such ambitious objectives requires, at least in terms of national security and a generally healthy economic environment, initiatives by the Federal government.

Not the least of the services that might best be performed at the Federal level would be data acquisition that would help companies react intelligently to decreasing military markets.

The 1965 Battelle report had suggested that the ACDA serve as a natural nucleus for coordinating pertinent data collection and dissemination. Such present-day information might include the status of arms control and disarmament agreements, an appraisal of all defense-related industries, and analyses of the economic implications of arms control and disarmament.

To these essentials might be added a database representing manpower deployment and projections—an area that even today is under fire as inaccurate and incomplete.

In 1965, with the end of the Vietnam war already in mind, many experts were plotting responses to expected impacts. They generally agreed that more effective selling of existing nonmilitary products would not alone close the predicted gap in business activity and engineering employment. What was needed was new markets, led by needs-driven market research and technical developments that matched those findings. Such likely areas of development included: process control computers, air-traffic control systems, ocean engineering, pollution control, and medical electronics. A few specific areas were overlooked or discounted, among them videocassette recorders, local-area networks, and nuclear power.

In the post-Vietnam years, great hope was placed in public projects, like rapid transit, health care, and education.

Planners during that period emphasized the difference between marketing high technology to the civilian public sector and contracting it to the military or private sectors. They noted that factors tending to delay technological innovations in the former were not based principally on technology, but were contingent more often on uncertainties of public policy. When such doubts occur, they counseled, the profit motive to innovate in the public sector is frequently missing, or is voided by high investment risks during the early stages. Political forces, pressure groups, and the whims of the public are all recognized threats.

One of these planners, William L. Garrison of Northwestern University, Evanston, Ill., then went on record to advocate that some mechanism—perhaps Federal support—be set up to take some of the risk as well as some of the reward from civilian public projects. Under Garrison's scenario, failed projects would not be the sole burden of the investors, and successful ones would share their technology with other civilian ventures without fee.

Though military contractors had not waited until war's end to attempt diversification, many of their efforts failed. Analysts attributed these failures largely to marketing deficiencies—the lack of market intelligence and a good sales organization—especially for companies with annual sales under $400 million. Several other companies sought diversification through acquisition, but these were not universally successful. Too many diversification programs were pursued half-heartedly, not aggressively enough to guarantee success, analysts concluded.

In retrospect, many of these post-Vietnam observations seem completely valid today.

—Donald Christiansen

Scientists charged up over plastic batteries

By Jon Van

Revolutionary new technology promises that miniature batteries, thinner than a piece of paper, should be on the market within a few years, researchers predict.

These ultrathin batteries, which replace traditional acid electrolytes with plastic film, are likely to compete with button cell batteries to power small consumer electronics items, such as wristwatches, calculators and cameras and may be used in new applications.

"Smart" credit cards equipped with a tiny computer chip to keep track of a user's banking records as well as such other information as medical history are being test-marketed in Europe and Japan. These cards probably will be powered by plastic batteries as soon as they become available, said Boone B. Owens, a University of Minnesota chemical engineer and battery consultant.

Other new uses could include putting tiny solid-state batteries on an integrated circuit to provide onsite power for compute memory chips.

In many applications, the plastic film batteries may be linked to a small array of solar cells that will generate low levels of current when exposed to light, recharging the batteries.

"What this technology really does better than any other is to provide for miniaturization of batteries," said Owens.

Though the first commercial applications of plastic batteries will likely be to power electronics equipment with very low power demands, researchers are scaling up this technology so large versions of plastic batteries will be available eventually to power electric automobiles.

Their light weight, durability and lack of corrosiveness also make plastic batteries natural candidates for space flight, and the National Aeronautics and Space Administration is interested in developing the technology.

Traditional lead-acid batteries are made from plates of lead and lead peroxide immersed in a sulphuric acid solution, called an electrolyte. Charged atoms, called ions, flow through the acid within the battery from one plate to another, setting up an electrical imbalance that causes electrons to flow through wires attached to the battery terminals and completing a circuit.

These batteries are heavy and tend to corrode, said Mark Ratner, chairman of the chemistry department at Northwestern University.

"When automobile batteries fail, it's because lots of pieces of lead are chipped away from the plates and fall to the bottom," said Ratner.

The new technology, which has attracted widespread research attention in this decade, works on the same principle as traditional batteries, but the acid solution is replaced by an electrolyte made from a thin plastic film treated with a salt.

The plastic film conducts ions between plates typically made from lithium and vanadium oxide.

In concept, plastic batteries offer several advantages over batteries made with liquid electrolytes. Plastic batteries tend to hold their charge longer and can be recharged many times without corroding or degenerating. They also operate over a broader temperature range than batteries with electrolytes made from liquids, which may freeze in extreme cold or boil in extreme heat.

Some batteries on the market use a gel or a solution suspended in plastic as their electrolyte, but none is totally solid state.

At Northwestern, chemistry professor Duward Shriver and graduate student Peter Blonsky pioneered development of plastic films with high electrical conductivity at room temperature. Though current plastic films are about 10 times less conductive than liquid electrolytes, they still could run cardiac pacemakers, smart credit cards or other electronics that don't use large amounts of power, said Shriver.

Most plastics are electrical insulators rather than conductors, said Shriver. The idea of using plastics as significant conductors is relatively new.

In 1973, a British researcher, Peter Wright, first noted that some plastics could conduct significant amounts of current. The idea of using this property to make batteries wasn't proposed until 1979 by Michel Armand, director of a French research center, said Shriver.

"When it was discovered," he said, "a lot of people considered it a real revelation."

Ratner is working with Shriver to understand how plastic films conduct charged particles so they can develop new designs to enhance that conductivity.

Though the process of plastic conducting ions is still imperfectly understood, plastic batteries appear very close to being marketed. A division of Mead Paper Co. in Ohio has developed a plastic battery intended to be commercially viable and is offering to sell the technology, said Shriver.

Owens, the Minnesota battery researcher, said that a Japanese firm soon will produce plastic film batteries for test-marketing, according to a report at a recent international meeting.

Several federal agencies have been pushing the new technology. At Northwestern, research funds have been supplied by the National Science Foundation, the Department of Energy and the Navy.

In Canada, work to produce wide arrays of plastic batteries especially suited for electric-powered vehicles is a high priority at the Institute of Research of Hydro-Quebec, the research arm of Quebec's electrical utility.

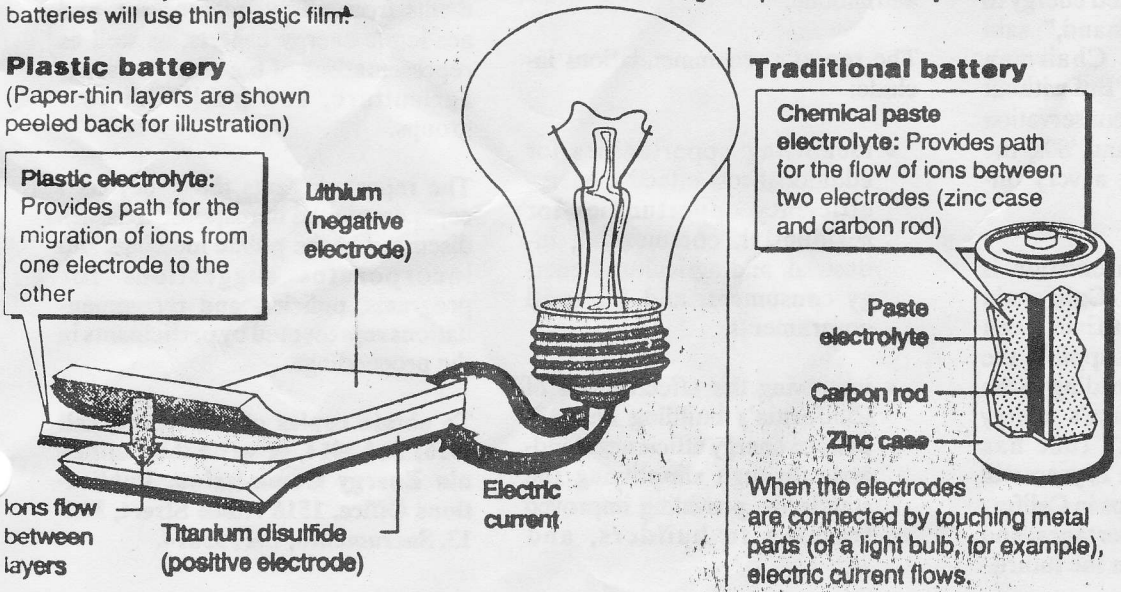
Michel Gauthier, chief researcher for the Canadian effort, said that his group, which has worked with Armand in France, hopes to have a plastic battery capable of powering a vehicle ready for demonstration within five years.

"We will probably first prepare a battery to power a wheelchair," he said, "and then scale up from that."

As in other countries, work in Canada on small batteries suitable for powering electronics equipment is much farther along. Hydro-Quebec is negotiating with a battery manufacturer and a thin film plastics company for rights to take the technology to market, Gauthier said. An agreement is expected this year, he said.

New plastic batteries

A battery has three basic components: two metals, or electrodes, and an electrolyte, which separates the metals and allows charged subatomic particles (ions) to flow between them. The charge imbalance set up by ions inside the battery causes a current of electricity (negatively charged electrons) to flow from the battery. Traditional batteries have used an acid solution, gel or paste as electrolytes; new batteries will use thin plastic film.



Advantages of plastic batteries:
■ Miniaturization ■ Lightweight ■ Flexible
■ No corrosion ■ Tolerate temperature changes

Chicago Tribune Graphic by Megan Jaegerman and Jacqueline Combs. Sources: Chemical & Engineering News, "Usborne Introduction to Physics"

California Making Big Strides In Energy Conservation

California energy conservation programs have saved consumers $1.9 billion in electricity costs and $1.1 billion in natural gas costs since 1977, according to a comprehensive report issued recently by the California Energy Commission.

The state Energy Commission's *1988 Conservation Report* indicates that California used 10 percent less electricity and 13 percent less natural gas in 1988 than it otherwise would have because of successful energy conservation programs. In addition, California saved almost 1,800 megawatts of electricity as a result of building and appliance energy efficiency standards – enough electricity to run two utility-size power plants. (A utility-sized power plant equals about 900 megawatts of electricity.)

According to Commission estimates, by 1999 these building and appliance energy efficiency standards, combined with utility company energy conservation programs, are expected to conserve more than 11,000 megawatts of electricity or the equivalent of 12 utility-size power plants.

"California will enter the 1990s with enough reasonably priced energy to supply a growing demand," said Energy Commission Chairman Charles R. Imbrecht. "But without the successful energy conservation gains of the late '70s and '80s, the state would be facing a very different situation."

Practicing energy conservation is essential to keeping California economically competitive, even with adequate energy supplies, the report concludes. According to the report, slowing the state's energy conservation activity that has developed over the past 15 years will lead to serious hardships in California should energy shortages and price increases occur in the future.

"The less businesses and industries pay for energy, the more funds they have available to modernize plants, produce more competitive goods and services, and increase profits," Imbrecht commented. "Energy costs must also be kept manageable for residential consumers to ensure that their purchasing power for other products and services is sustained."

The report indicates that increasing the energy efficiency of California's agricultural sector and transportation network, as well as improving air quality and traffic congestion problems, are also fundamental to the state's economic and environmental well-being.

"Transportation energy use may prove to be the state's most difficult energy challenge," said Energy Commissioner Richard A. Bilas, Presiding Member of the Commission committee that prepared the report. "We must take immediate steps to reduce the demand for oil through improving transportation system management, developing new, travel-reducing land use and work patterns, and providing incentives to reduce California residents' traditional dependence on the automobile."

The report's recommendations include:

- identifying opportunities for additional cost-effective energy efficiency opportunities for residential, commercial, industrial, and agricultural energy consumers, and for local governments
- improving the effectiveness of California's building and appliance energy efficiency standards through simplifying the standards, providing improved training to builders, and developing incentives to design buildings that exceed the energy efficiency standards
- developing a comprehensive plan with state and local government agencies to resolve overlapping transportation problems such as energy use and air pollution, actively promoting use of alternative fuels such as methanol, and supporting research and demonstration of advanced transportation technologies
- improving coordination of efforts by utility companies and government agencies to increase energy efficiency through cooperative research among government, utilities, and the private sector
- supporting cost-effective conservation in all forums where energy resource decisions are made as an alternative to increasing energy supplies

The report, developed after a series of public workshops and hearings held throughout California in 1988, was prepared by the Energy Commission's Conservation Programs Committee. The committee solicited a wide variety of comments from utility, government, and academic energy experts, as well as representatives of business, industry, agriculture, and public interest groups.

The report presents the policy concepts developed in response to issues discussed at the public meetings and incorporates suggestions for programs, policies, and recommendations represented by participants in the proceedings.

To obtain copies of the report, call (916) 324-3014, or write the California Energy Commission, Publications Office, 1516 Ninth Street, MS-13, Sacramento, CA , 95814.

CAR MUSEUM ELECTRIFIED!

Electric Car on Display

The Towe Ford Museum just rediscovered electricity thanks to a unique donation by Bill Williams of Saratoga, California.

Written up in several regional and national publications, including Popular Mechanics (October 1979, pg. 97), the converted 1972 Datsun has provided Mr. Williams with electric powered commuting transportation for more than a decade. The car is the result of a pressing need to have an alternative to the gasoline shortage in the early 1970's.

The final decision to convert the 1972 Datsun to electric power occurred when it blew it's head gasket, needing major repair. Bill joined the local Electric Auto Association (EEA) club in Santa Clara which provided him with the resources of knowledge and support needed to complete the 17 month project.

The car has 14 batteries which power a 1950's government surplus aircraft electric motor. Bill Williams also assisted in the field testing and debugging of the first solid state controller, the Willey Model 7.

Bill Williams now drives a Honda car to work every day, He did not, however, give up his electric transportation. He converted the Honda to electric power as well, continuing to enjoy the money saving alternatives every time he drives past a gas station and notices the ever-rising prices of gasoline " some 40,000 miles later," Williams adds. His Electric Honda has won several national awards.

"There is no comparison between the maintenance of a complex gasoline powered and a simple, silent,and clean electric one," Commented Williams during a visit to the Towe Ford Museum. "The only maintenance I've had to do on my electric Honda has been things like fixing a window handle or putting air in the tires." He added that the general public misunderstands the use of electric vehicles, which should not eliminate the use of gasoline powered engines, but instead, be used in conjunction with other modes of transportation. For trips and hauling freight, gasoline powered vehicles and other modes of transportation are more practical. For commuting and getting around town, the 40-50 mile range of an electric car has proved quite sufficient. The electric vehicle has the advantage of eliminating exhaust fumes in the metropolitan area and costing less for gas and maintenance. For example, Mr. Williams drove the 100 miles from San Jose to the Towe Ford Museum in his gasoline powered car, but commutes to work during the week in his electric powered Honda. "The Museum will utilize this gift as an educational opportunity to discuss energy alternatives of the past and future,"Explains Museum Director , Ernest Hartley.

There is a local chapter of EEA in Sacramento. Members will assist anyone in purchasing or converting to an electric powered vehicle. The electric car has become more and more attractive to the average consumer due to improvements in the technology of such items as batteries, electric motors, controllers, and photo-voltaic solar cells. Perhaps the most innovative system particular to electric vehicles is the regenerative braking mechanism. It uses the kinetic energy generated while stopping or going down grades to recharge the batteries.

Bill William's Electric Datsun has a top speed of 65 mph, cruises at 45 mph, and has a range of about 40-50 miles per charge. Stop by the Museum and get an idea of how one man converted a common gasoline powered car to an electric one! The 1972 Electric Datsun has just been placed on permanent display at the Towe Ford Museum, which has the most complete collection of antique Ford Automobiles in the World, as well as rotating exhibits of other vehicles.

Anti-CAFE Bill

WASHINGTON — Legislation to abolish the federal CAFE fuel economy standards has been reintroduced by Rep. Bob Carr (D. Mich.)

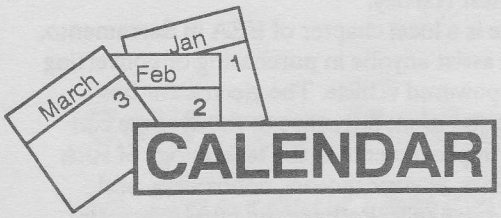
Rep. Carr asserted that the CAFE requirements give an unfair advantage to offshore producers of small cars, saying those manufacturers can import low-mileage large models that are offset by their base of high-mileage offerings.

As part of his argument against the CAFE standards, Rep. Carr cited "overwhelming technological accomplishments giving car buyers a varied selection combining fuel economy, performance and comfort."□

High-Risk Pollutants Get Little Attention

Radon, indoor air pollution and pesticide residues on food are the environmental hazards posing the greatest health risk, but the government spends the least amount of money on those problems, said a study issued yesterday.

The Environmental Protection Agency study, which compared the risks of about 20 different environmental problems, said toxic waste dumps and leaking underground gasoline storage tanks present relatively low health risk but receive most of the money and attention from the EPA.



ASME Jan. 14-18 Energy Sources Technolgy Conference and Exhibiton, New Orleans, La. ASME-Dallas (214)437-1194

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

January 1990
23rd Hawaii International Conference on Systems Sciences (COMP); Jan. 3-6; Kona, Hawaii; I. Luqi, Computer Science Department, Navel Postgraduate School, Monterey, Calif. 93943; (408)646-2735

Fifth Annual Battery Conference on Applications and Advances (IEE/AIAA/ECS); Jan. 16-18; Cal.State Univ., Long Beach, Ca. Julie Allison, Annnual Battery Conference, Department of Electrical Engineering, Ca. Stat Univ. 1250 Bellflower Blvd. Long Beach, Ca. 90840; (213)985-4605

Integrated Photonics (IEEE/LEOS); March 26-28; Hyatt Regency, Hilton Head, S.C.; IEEE/LEOS, 445 Hoes Lane; Box 1331, Piscataway, N.J. 08855; (201)562-3895

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

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

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