ELECTRIC AUTO ASSOCIATION NEWS

May 1989 Vol. XXI No. 5

Texas team gets results in tabletop-fusion quest

Dallas Morning News

COLLEGE STATION, Texas — Texas A&M University researchers have duplicated a University of Utah experiment that reportedly achieved nuclear fusion using a relatively simple process, a college spokesman said Sunday.

A news briefing to announce the confirmation was scheduled for this morning on the A&M campus in College Station.

In March, Dr. B. Stanley Pons of the University of Utah and his British colleague, Dr. Martin Fleischmann, announced that they had produced fusion at room temperature in a jar of "heavy water" — water in which the hydrogen is a heavy form called deuterium.

Fusion is the combination of lightweight atoms, such as those of hydrogen, into larger atoms, a process that releases energy. It differs from nuclear fission, used in nuclear power plants, in which heavy atoms break apart to release energy.

The Utah announcement generated excitement and skepticism from the scientific community. For decades, most scientists trying to tame fusion — the energy source of the stars and the hydrogen bomb — have assumed that it would take high pressures and temperatures near 100 million degrees Celsius to initiate the reaction.

Texas scientists say their experiment gave off more energy than it required, possibly indicating fusion.

Pons and Fleischmann, though, merely passed an electric current between two electrodes immersed in the heavy water. Deuterium atoms, the researchers said, collected in one of the electrodes, made of the precious metal palladium. The deuterium atoms apparently clustered together so tightly that they began to fuse, the scientists said.

Heat given off in the process, they said, exceeded the amount of energy used to generate the initial electric current. Producing more energy than needed to start the reaction has long been a goal of conventional nuclear fusion researchers, but they have not succeeded.

A&M scientists now say they have observed the excessive heat production in a similar apparatus.

"But we are not saying that the heat is the result of fusion," Dr. Frank Cheng, a chemist on the A&M team, said in a telephone interview Sunday.

Cheng said the A&M team, using a different method of measurement from that of the Utah researchers, found that the energy released was at least 5 percent greater than the energy input. He said the scientists expect that refined measurements will show a much larger release of excess energy, perhaps as high as 80 percent greater than input.

A telltale sign of fusion would be the production of neutrons, subatomic particles that carry no electrical charge. Cheng said the A&M researchers had just begun to look for neutrons.

Scientists at Brigham Young University in Utah have also reported fusion in a similar apparatus, but say the amount of energy produced in their experiments is far less than the amount needed for the electricity needed to start the reaction. Some scientists have speculated that an unknown nuclear reaction is contributing to the extra energy released in the Utah experiment.

Pons and Fleischmann are scheduled to discuss their findings Wednesday in Dallas at the national meeting of the American Chemical Society, which begins today.

Jeff MacNelly — Chicago Tribune

Winds of Change

International talks address human effects on climate

Spurred by a scientific consensus that significant greenhouse-effect warming will occur in the early decades of the next century, delegates from 46 countries at a Conference on the Changing Atmosphere held in Toronto have called for an urgent action plan. The conferees, who included scientists and policymakers (but no senior U.S. Government official),recommended that governments initially reduce emissions of carbon dioxide—thought to play a major role in greenhouse warming—by 20 percent before the year 2005. (from Scientific American Sept. 1988)

The east bay chapter of EAA on Sat. April 8, 1989 had a very interesting speaker on the subject below.

ANALYSIS AND PLANNING

for

CO/2 REDUCTION

and

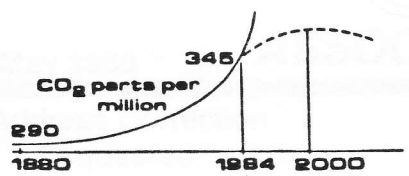
CLIMATE STABILIZATION

by

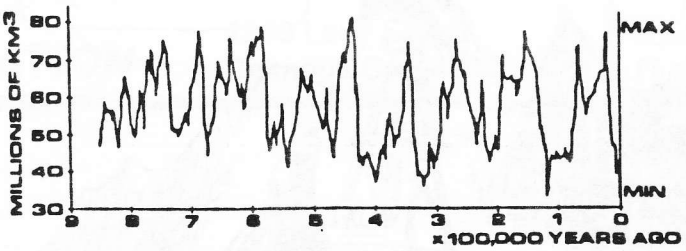
Alden Bryant

CO_2 & CLIMATE

Published by the Earth Regeneration Society, Inc.
1442A Walnut Street #57 Berkeley, CA 94709



ATMOSPHERIC CARBON DIOXIDE INCREASE AND PROPOSED REDUCTION



VARIATION OF GLOBAL ICE VOLUME

A NEWSLETTER ABOUT CYCLES OF GLACIATION, THE NEGATIVE EFFECTS OF AN INTERGLACIAL/GLACIAL TRANSITION ON LIVING SPECIES, AND A COUNTER PROGRAM.

250

Subject: Vehicle vs Powerplant emissions
From : Leonard L. Byers, New Mexico Power Service, Santa Fe NM

The 1987 model year federal emission standards for cars are :

CO2: 3.4 grams/mile R. C. Cudney
Hydrocarbons: 0.41 g/mile
NOx: 1.0 g/mile

When the EGR valve clogs on a car, NOx emissions get very large, and the EGR valve never gets fixed, because the vehicle runs just fine.

For a typical pulverized coal fired power plant, emissions for the same parameters are:

CO2: 0.14 g/kwhr
HC: 0.01 g/kwhr
NOx: 2.2 g/kwhr

I understand that a typical electric car uses about 0.6 kwhr/mile, and the electric vans use 1.0 kwhr/mile, measured at the charger meter. Thus :

	CO2	HC	NOx	
1987 Fed.	3.4	0.41	1.0	grams/mile
elect. car	0.08	0.006	1.32	
elect. van	0.14	0.01	2.2	

The 1987 federal gasoline powered vehicles have a slight edge in NOx, while new. In all other parameters, the electric vehicle has lower emissions.

There are some additional factors, as well. Sulfur is not a regulated emission from vehicles, and is dependent on sulfur content of the fuel. Sulfur is closely regulated for power plants, however. Typical emissions for coal fired power plant are about 2.7 grams/kwhr. Supposedly, gasoline contains no sulfur, but diesel fuel does(0.4-0.7%). Sulfur is thus an unknown.

One factor to consider is that the power plant emissions occur as a bouyant plume, released at 400' to disperse, not at ground level, and in a rural area, not at the *city center.*

The Ford ETX-II is expected to use 0.25 kWh/mi. So this van could go 4 X 18.5 or 74 miles on the equivalent of a gallon of gasoline! For more information on this report: Contact J. A. Marks, EPRI, P.O. Box 10412, Palo Alto, Ca. 94303. Phone 415-855-2294.

ELECTRICITY COSTS FOR ELECTRIC HONDA (about 2900 lbs) Bill Williams
(June 17, 1982 to May 1, 1984)
Miles: 8,790. KWH: 3,342. KWH/Mile: 0.38 cost/KWH (D7 Rate): $0.05178 cost/mile: $0.0196

MPG Equivalance	At cost/gallon
53.33	1.05
55.87	1.10
58.41	1.15
60.95	1.20

Bill Williams has just donated his Datsun electric car to: The TOWE FORD MUSEUM in Sacramento, Ca. located on Front Street. The museum has been set up by Earnest Hartley on the history and future of alternate transportation. Any donations would probably be appreciated.

All dressed up and no way to go

I am becoming dismayed and frustrated with the direction ot automotive electronics in the United States. Ronald K. Jurgen's article, "New frontiers for Detroit's big three" [October 1988, p. 32], begins with a statement that "electronics continues its inexorable replacement or enhancement of mechanical and electromechanical car functions."

The November 1988 issue of Home Mechanix describes methods for using the car's computer to help diagnose problems. I could perhaps find out, starting from a "check engine" warning and then pursuing the investigation electronically, that my new computer-controlled car has a temperature control problem or a variable-assist steering problem.

We have lost sight of the original purpose of a car, and its normal maintenance has been relegated to single-system diagnostic equipment and technicians. I believe it is time for the consumer to let Detroit know that "enough is enough." I want a car that will take me where I want to go, in reasonable comfort and safety, with economical operating costs, for an affordable price.

We need fuel-efficient, safe, economical, reliable transportation. It appears to me that if we expended these levels of resources on the physical engineering principles involved in basic automotive design, we would not need these band-aids to cover up the deficiencies of an automotive design that was adequate 80 years ago but does not meet the needs of modern society. One of the basic truths of design—the simpler, the better—has been misplaced.

IEEE SPECTRUM January 1989 Page 9

Carl Fedako
Berwick, Pa.

TID BITS

April 18 & 19 Stanford Students will be awarded $5000. to build a solar car for 1990 run across U.S. Florida to Detroit. Sponsored by General Motors

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Please return the vidio tapes "Running with the Sun" if you are through with them, so others may see it.

BROWN BOVERI expects to open a 10,000 battery per year plant to make Sodium-sulphur batteries.

Senator Bill Leonard is sponsoring S.B 155 to set up emission charges on both vehicles and fuels based upon the pollution they produce. These charges would be attached to the registration fee and the price of fuel.

Rapid recharge of batteries

A new technology for rapid recharge of batteries combined with an extensive network of charging stations could make various electric road vehicles (EVs) practically independent of the limitations of the battery. Large sectors of the transportation system could thus be revolutionized both technically and economically, as well as environmentally.
This is the enthusiastic conclusion of the Swedish Institute of Microelectronics (IM) in Stockholm in a study on rapid recharge of batteries. According to the study, which has been supported by STU, batteries, when cooled, can be fully charged in 30–45 minutes.

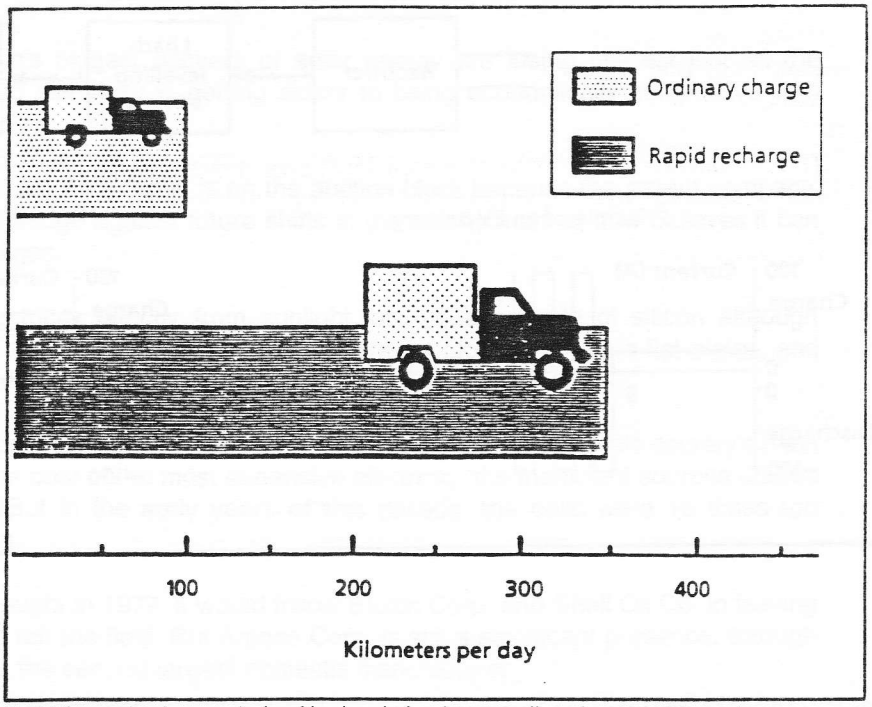


Fig 2. The rapid recharge method enables the vehicle to be repeatedly recharged and thus make several trips a day.

While the practical limitations of electric cars and similar vehicles is the "action radius" – approximately 70–80 km on a work day, rapid recharge under cooling can increase the radius 4–5 times to 300–400 km – approximately the distance a regular commercial automobile travels in city traffic on a work day.
The greatest technical limitation today is primarily the temperature rise in the battery during charging and discharging, which limits storage capacity.
The experiments at IM, made use of a lead-acid battery of nominally 143 Ah, equipped with a cooling coil encased in plastic and placed in every cell. By cooling the battery with water at about 1 l/min and letting the charging current decrease in direct proportion with time, several charging and discharging cycles could be performed, typically 4–5 during 8 hours, while maintaining the battery temperature below 45°C. Every rapid recharge of approx. 45 minutes resulted in a minimum efficiency of 95 % Ah.
During the preparations for the actual experiments, an initial current of approx. 150 A was run, and gradually reduced after about an hour to 50 A. This yielded an almost constant input loss during the charging cycle and this charging method continued to be used during the subsequent experiments.
In addition to cooling, theoretically, stirring the electrolyte is also supposed to enchance the charging conditions. Electrolyte stirring with air bubbles of 1 l air/minute did not result in any noticeable differences in the experiments.
Trials with pulse charging, where the battery rested for a period of 1 min, 2 min and 30 seconds every 10 minutes over the 45 min charging cycle, did not yield any substantial advantages, compared with the decreasing current method.
On the other hand, positive results were obtained for short-term charging under cooling. "Opportunity charging", as it is also called, means that the battery is always being charged during the time when the vehicle is not in use. Short-term charging should also be able to substantially contribute to increase the availability of the electric road vehicle. For example, a 12 minute charge according to the above described procedure, thus resulted in a 35 Ah charge, with a possible output of approx. 30 Ah or about one third of the total one hour capacity. Systematic trial series confirmed the value of this kind of short-term charging.

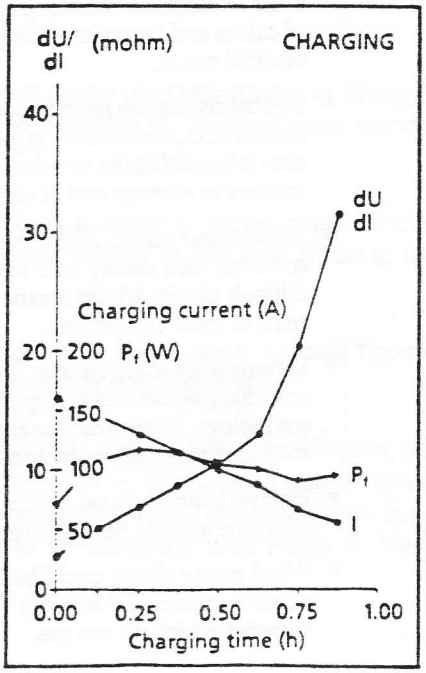


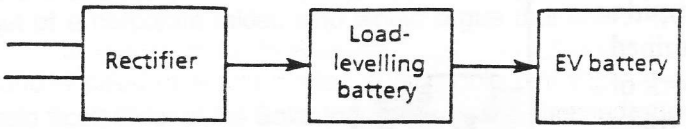
Fig 1. The figure (to the left) shows a typical charging curve. There is a sharp rise in the resistance towards the end of the charging period. If the current starts at 150A and drops to 50A after one hour, it can be seen that the power loss P_t is almost constant

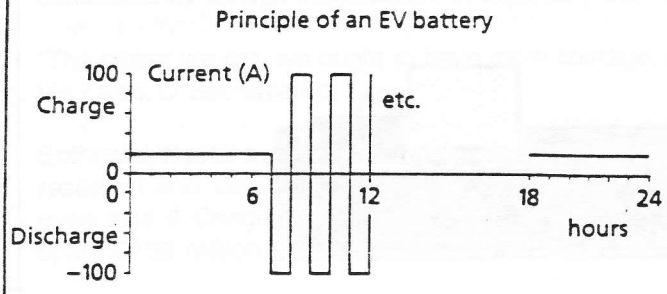
Load-levelling battery with double effect

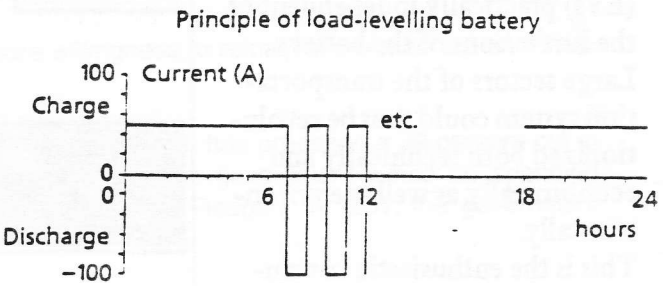
Another idea, of a load-levelling battery with a double capacity, was launched at IM as a way of limiting the power output of the network, and to be able to use a smaller charger. Thus the load-levelling

Load-levelling battery

In order to limit the power output of the network and be able to use a smaller charger, a concept was tested of a load-levelling battery that is charged as the EV battery is being discharged.







battery can be charged while the "working battery" is in service and the network output limitid to a diurnal average value. The main part of the study dealt with the lead-acid batteries, but additional experiments on nickel-iron batteries have shown that these too can go through several charging cycles over a work day, provided that some form of cooling is supplied. During life cycle tests with rapid recharge of batteries, use was made of a so-called KTH battery with pasted positive and standard negative lead electrodes, and a new type of low resistance separator surrounding the positive electrode. The battery passed 300 complete cycles before one cell had a minor short circuit. The Ah efficiency of 27 arbitrarily sampled cycles was 98,5 percent.

Preparatory trials

Figure 1 shows a typical charging curve. Observe how the inner resistance sharply leaps upwards towards the end of the charging period. If the current, as shown here, starts at about 150 A and drops to about 50 after an hour, it can be seen that the power loss $Pf = R_i I^2$ will be almost constant throughout the charging period. This is why this charging method was used in subsequent trials, and it can be said that the chances of succeeding with the 1 h-charging given a constant or nearly constant current – time dependence are very small.

Summarizing the report, the researchers list seven areas where this charging method can be applied:

- Rapid recharged battery-operated city buses. The bus can be easily connected to a charging station at final stops or to another type of terminal. It should be easier to arrive at a technical solution since the driving cycle is well known.
- Cable buses can be more economical, since joint use is being made of a less widespread, smaller capacity and thereby inexpensive network of cables and batteries. Computorized monitoring is required for an optimal result.
- Electric trucks can have a wider range of application. One example is mine trucks, where extra rapid recharge is required since the charging time is limited to the standstill outside the mine area. Industrial wheel tractors in harbors and at airports are other examples.
- Trackbound traffic. Here, charging can take place during certain stretches via a trolley line, and cables do not have to be pulled over difficult places, which means lower investments and maintenance costs of fixed equipment.
- Various work tools, such as fire escape trailers, defrosting equipment and charging devices at airports can advantageously make use of this technology. Street cleaning equipment, refuse collection trucks, park maintenance equipment and cementry vans are also suitable.
- Electric hand tools are becoming increasingly commonplace, and many are already being driven by batteries suited for rapid recharge.
- Wind power plants could be able to make use of higher wind velocities by means of a suitably dimensioned system of load-levelling batteries which do not gas.

U.S. interest in solar power starts to dim

New York Times

NEW YORK — Some of the nation's biggest backers of solar energy are losing interest just as the technology to transform sunlight into electricity is getting closer to being economically competitive with some conventional power sources.

The world's largest maker of solar cells, Arco Solar, is on the auction block because the parent company, which once saw its investment as a hedge against future shifts in the energy market, now believes it can put its money to better use in oil and gas.

Photovoltaic cells, which make electricity directly from sunlight, are usually made of silicon although manufacturers are experimenting with a variety of materials in different shapes: Some are flat plates, and others are installed under lenses that magnify the sun's rays.

The cells are still about four times too expensive to compete with coal-powered plants, this country's main source of electricity, and still triple the cost of the most expensive electricity, the inefficient sources utilities turn to at hours of peak demand. But in the early years of this decade, the cells were 16 times too expensive, and the price is still falling.

If Arco sells the solar subsidiary it bought in 1977, it would follow Exxon Corp. and Shell Oil Co. in leaving the business. Motorola Inc. has also left the field. But Amoco Corp. is still a significant presence, through its Solarex Corp. subsidiary, which is the second-largest domestic manufacturer.

Experts say the waning interest of U.S. companies may mean that if the photovoltaic industry becomes a giant, it will be dominated by Japan, which has a lead in production of low-technology solar cells. West Grermany is also a contender. Potential bidders for Arco Solar include Japanese and German companies.

The problem, many in the field say, is that big corporations in this country do not see a sure enough prospect of big returns on their investment to spend years on further development of solar power. They would rather put the money in their core business of oil and gas.

People in the industry believe that sometime in the next decade solar cells will provide cheaper electricity than some generators that consume oil or gas. It could then become a multibillion-dollar industry. The problem is that no one knows how soon that will occur. Making business plans that depend on accurately predicting the timing is "probably not a prudent thing to do," said James H. Caldwell, a 23-year veteran of Arco who was president of Arco Solar until late last year, when he left to try to assemble investors to make a bid for it.

The possible sale troubles some. "It will shake the Department of Energy's program to its roots if this sale is concluded to a foreign country," said Kenneth B. Zweibel, who manages the federal research contract with Arco Solar.

Zweibel said Arco Solar was developing a material called copper indium diselenide, which he calls "the best hope of photovoltaics in the United States in the next three to five years." Arco, he said, "has the global leadership in this technology."

A spokesman for the company, Stephen K. Lowe, said, "Arco's hope is that we'll find a buyer that will continue Arco's world-class development of this technology."

The world market for solar cells is now only about $125 million a year, of which Arco has about $30 million. But if the cost of solar cells continues to fall — or if oil and natural gas rise in price — the technology will have real economic importance in a few years, utility experts agree. But U.S. corporations are "too tied up in short-term profits" to stick with the investments, said Philip K. Verleger Jr., an energy economist at

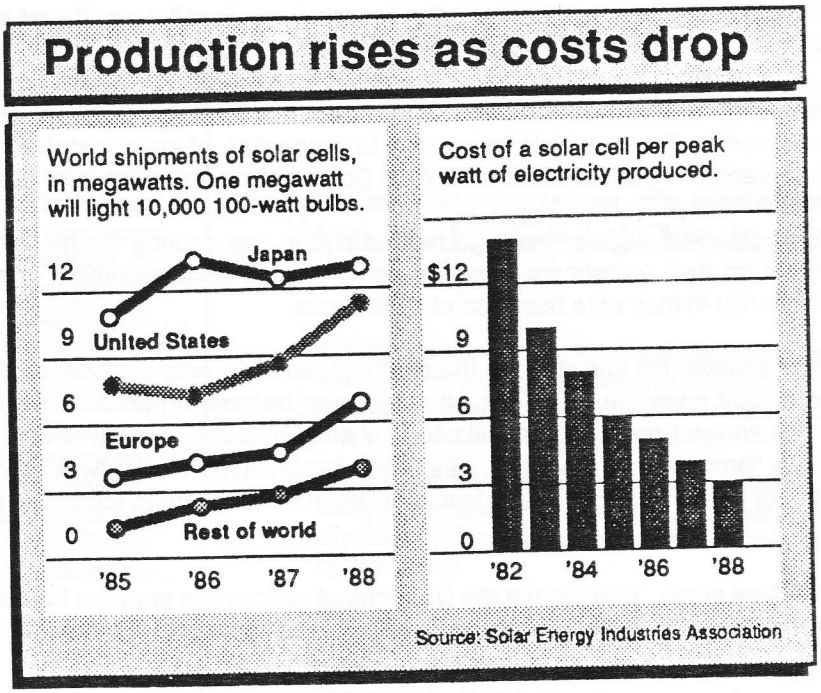
Charles River Associates, and a publicly held company that invested heavily in solar technology would probably become the target of a corporate raider, who would argue that shareholders' money could get quicker profits elsewhere.

"It's the VCR syndrome," said Scott Sklar of the Solar Industries Association, a trade group in Washington. The technology to make videocassette recorders was largely developed in the United States but is now dominated by foreign manufacturers, especially the Japanese.

"The closer we get, we ought to have more courage, more willingness to remain in the market," said Rep. Vic Fazio, D-Sacramento.

Enthusiasm also seems to be waning in the Bush administration, which has proposed a 30 percent cut in research and development funds from the current $35.5 million. The government would be spending even less if Congress had not restored cuts proposed by President Reagan. In 1981, the government spent $155 million.

Last year, for the first time, the governments of West Germany and Japan spent more on research and development than Washington did, according to the Solar Energy Industries Association.



The Stanford Solar Car Team... A Student's Perspective.

It was just over four months ago that I saw a flyer in my dining hall inviting anyone and everyone to get involved with the Stanford University Solar Car team. I, and many other students, responded. As it turns out, I learned that the solar team has existed at Stanford for over two years. As a new member I was readily welcomed into the group, and my opinions and ideas were given as much consideration as any other team members. A sense of cooperation encompassed the whole organization, and I soon found out why: without that cooperative effort, we would never get anywhere.

The first order of business for the organization was producing a proposal that would, in less than 60 pages, convince General Motors that we were a viable competitor for the 1990 GM Sunrayce. The Sunproject computer BulletinBoard was established, an electronic mail list drawn up, and the scramble was on. After numerous meetings, several all nighters by some of the most dedicated group members, and the minimal possible amount of absolute frustration, the proposal was done. We mailed just in time for the GM deadline, and then reorganized our forces for the next stage of the battle.

When we got back from spring break, the news leaked out. The word. . . from General Motors. . . on our proposal . . . was . . . YES! On April 19th, one advisor, Dr. John Reuyl, and the student coordinator of the group, Stefan Heck, will be travelling to the General Motors facility in Detroit to pick up the initial capital provided to all the teams, $5000 from GM and a $2000 grant from the Department of Energy. Now that we are, quite definitely, entered in the race, our next great hurdle is funraising. The development costs for the vehicle are expected to be in the neighborhood of $200,000. The entire sunproject team has been divided into three major categories, at least for the moment. With a top-down organizational structure, we have Stefan Heck as the group general coordinator. Stefan has already committed a vast amount of effort to the project. Underneath we have the Fundraising branch (the largest part of the group right now), the Design team (who will be working closely with fundraising in the pursuit of specific equipment and funding for construction, and the communications branch that makes sure everyone has access to as much of the team information as possible.

What difficulties await our team? There are the immediate time constraints of "Where are we going to get the money?" and "How can we build a truly GREAT car in time for the race?" As with any larger organization, there are also problems with keeping small decisions from getting bogged down in a bureaucratic quagmire while still making sure that everyone has appropriate input. And for some of the team members there are the questions of "Can I really do all this and still take a 20 unit load?" But the Stanford Solar Race Team is on its way. Despite any difficulties, we are confident that we will be a formidable contender in the 1990 GM Sunrayce. Then it's on to Australia for the World Solar Challenge II...!

Phillip F. King

SENATE BILL No. 155

Introduced by ~~Senator Leonard~~ *Senators Leonard, Kopp, and Rosenthal*
(Coauthors: Assembly Members Bane, Chandler, Farr, Speier, and Woodruff)

January 9, 1989

An act to add ~~Part 4.5 (commencing with Section 9601) to Division 2~~ *and repeal Sections 6051.5 and 6201.5* of the Revenue and Taxation Code, and to add ~~Sections 9272 and 9273 to~~ *Section 9273 to, and to add and repeal Section 9272 of,* the Vehicle Code, relating to air pollution.

LEGISLATIVE COUNSEL'S DIGEST

SB 155, as amended, Leonard. Air pollution: ~~emission charges~~ *sales and use tax: vehicle registration.*

Existing law ~~imposes motor vehicle registration fees,~~ taxes the distribution and use of motor vehicle fuel, ~~and~~ regulates emissions of air pollutants by motor vehicles; ~~Existing law authorizes~~, *including authorizing* the payment of emission nonconformance fees by vehicle engine manufacturers, and ~~authorizes~~ *imposes motor vehicle registration fees, including authorizing* an additional $1 ~~vehicle~~ registration fee in certain counties from January 1, 1990, to January 1, 1995, for air pollution purposes; ~~but~~. *Existing law* does not impose charges on registration of motor vehicles, or the use or distribution of fuel, based on ~~the amounts of pollutants emitted~~ *whether the fuel meets standards related to the control of air pollution.*

This bill would *enact the California Clean Transportation Act of 1989. The bill would, until December 31, 1999,* impose *an* emission ~~charges~~ *charge* on motor vehicles, *in connection with the registration of vehicles and based on the fuel on which the vehicle can operate,* and ~~fuels~~ *a sales and use tax on specified motor vehicle fuels,* at designated rates based on *whether the fuel meets* specified ~~pollutants emitted, as determined by the State Air Resources Board~~ *standards.* These provisions would impose a state tax within the meaning of Article XIII A of the California Constitution. The revenues would be deposited in the Clean Emission *Fund and the Clean Transportation* Fund, which the bill would create, and would be available for specified purposes upon appropriation.

Vote: ⅔. Appropriation: no. Fiscal committee: yes. State-mandated local program: no.

The people of the State of California do enact as follows:

~~SECTION 1. Part 4.5 (commencing with Section 9601) is added to Division 2 of the Revenue and Taxation Code, to read:~~

~~PART 4.5. EMISSION CHARGE~~

~~9601. (a) Beginning January 1, 1992, an emission charge is imposed on all motor vehicle fuels, including fuels subject to taxation by Part 2 (commencing with Section 7301) and Part 3 (commencing with Section 8601), including, but not limited to, fuel purchased by governmental entities.~~

~~(b) The amount of the charge shall be determined by the State Air Resources Board on the basis of the emission characteristics for each of the following pollutants: reactive organic gases, oxides of nitrogen, carbon monoxide, and particulate matter. The state board shall convert this charge to an appropriate rate for those fuels and energy sources not sold on a gallonage basis.~~

~~(c) The charge shall be paid in addition to, at the time of, and in the same manner as, applicable taxes under Part 2 (commencing with Section 7301) and Part 3 (commencing with Section 8601). In cases subject to this section in which no tax is applicable under that law, the State Board of Equalization shall adopt rules and regulations to provide for the collection of the charge pursuant to the procedures contained in that law.~~

~~(d) Revenues from the emission charge shall be deposited in the Clean Emission Fund established by Section 9273 of the Vehicle Code.~~

~~SEC. 2.~~

SECTION 1. (a) This act shall be known and may be cited as the California Clean Transportation Act of 1989.

(b) The Legislature finds and declares as follows:

(1) That existing ambient air quality standards include limits on carbon monoxide, oxides of nitrogen, and hydrocarbon emissions from automobiles, and attainment of these health-based standards is necessary to protect public health.

(2) That it is in the public interest that compliance with these standards be attained at the earliest practicable date.

(3) That most urban areas of the state are not in compliance with ambient air quality standards required by federal law, and imposition of federal sanctions, including denial of building permits for plants and factories, withholding of federal highway trust funds, and imposition of private vehicle driving restrictions, among others, can therefore be imposed under current federal law.

(4) That current state law also requires the use of cleaner engines and fuels as soon as practicable, because it is neither economically feasible nor practicable to modify engines or fuel combustion systems on the state's existing automobile inventory.

(5) That the production of cleaner-burning fuels that are completely compatible with today's existing vehicle engines and fuel systems would be a significant step towards achieving reductions in pollutants.

(6) That there exist today clean operating vehicles utilizing electricity, alcohol, and gaseous fuels, including compressed natural gas and propane.

(7) That it is both impractical and infeasible in the near future to effect substantive changes in transportation control measures, such as vehicle trips, vehicle use, vehicle idling, traffic congestion, housing patterns, or mass rapid transit systems.

(8) That the most effective way to encourage the production, marketing, and use of clean-burning fuels in California is to impose charges on fuels and vehicles which do not meet the standards imposed by this act.

SEC. 2. Section 6051.5 is added to the Revenue and Taxation Code, to read:

6051.5. (a) In addition to the tax imposed on the sale of motor vehicle fuels pursuant to Section 6051, there is imposed upon all retailers an additional tax for the privilege of selling nonconforming gasoline and all diesel oil fuels at the rate of 3 percent of the gross receipts of any retailer from the sale of all nonconforming gasoline and all diesel oil fuels sold at retail in this state on and after January 1, 1990, and to and including December 31, 1992, and at the rate of 6 percent on and after January 1, 1993, and to and including December 31, 1999.

(b) As used in this section, "conforming gasoline" means a motor vehicle fuel that meets any of the following standards:

(1) Contains not less than 2.7 percent oxygen by weight with the base gasoline having a Reid vapor pressure of at least one pound per square inch less than the pressure specified in Section 2251 of Title 13 of the California Code of Regulations.

(2) Contains not less than 2.7 percent oxygen by weight with the base gasoline having not more than the maximum Reid vapor pressure specified in Section 2251 of Title 13 of the California Code of Regulations and no multi-alkyl-benzenes.

(3) Contains not less than 3.5 percent oxygen by weight with the base gasoline having a Reid vapor pressure of at least one-half pound per square inch less than the pressure specified in Section 2251 of Title 13 of the California Code of Regulations.

(c) As used in this section, "nonconforming gasoline" means a motor vehicle fuel that does not meet the standards specified in subdivision (b).

(d) Notwithstanding any other provision of law, this section shall not become a part of any sales tax ordinance

adopted pursuant to Part 1.5 (commencing with Section 7200).

(e) Notwithstanding Section 7101, all fees, taxes, interest, and penalties imposed and all amounts of tax required to be paid under this section shall be paid to the board, and the board shall transmit the payments to the Treasurer for deposit in the Clean Emission Fund, which is hereby created. Money in the fund is available, upon appropriation, for making refunds under this part and for the following purposes:

(1) To subsidize the purchase of low-emission vehicles by public agencies.

(2) To subsidize the purchase of low-emission vehicles for individuals who own vehicles of 1971 model year and earlier which have been registered to the same owner for at least the past five years and who relinquish them to the state.

(3) To fund research projects which will enhance the development and use of clean emission energy sources for transportation and of clean emission vehicles.

(f) This section shall remain in effect only until January 1, 2000, and as of that date is repealed, unless a later enacted statute, which is enacted before January 1, 2000, deletes or extends that date.

SEC. 3. Section 6201.5 is added to the Revenue and Taxation Code, to read:

6201.5. (a) In addition to the tax imposed on the storage, use, or other consumption in this state of motor vehicle fuels pursuant to Section 6201, there is imposed an additional tax for the storage, use, or other consumption in this state of nonconforming gasoline, as defined in subdivision (c) of Section 6051.5, and all diesel oil fuels at the rate of 3 percent of the sales price of the fuel on and after January 1, 1990, and to and including December 31, 1992, and at the rate of 6 percent on and after January 1, 1993, and to and including December 31, 1999.

(b) Notwithstanding any other provision of law, this section shall not become a part of any use tax ordinance adopted pursuant to Part 1.5 (commencing with Section 7200).

(c) Notwithstanding Section 7101, all fees, taxes, interest, and penalties imposed and all amounts of tax required to be paid under this section shall be paid to the board, and the board shall transmit the payments to the Treasurer for deposit in the Clean Emission Fund. Money in the fund is available, upon appropriation, for making refunds under this part and for the purposes set forth in subdivision (e) of Section 6051.5.

(d) This section shall remain in effect only until January 1, 2000, and as of that date is repealed, unless a later enacted statute, which is enacted before January 1, 2000, deletes or extends that date.

SEC. 4. Section 9272 is added to the Vehicle Code, to read:

9272. (a) In addition to any other registration fee specified in this code, ~~beginning January 1, 1992~~ *from January 1, 1990, to December 31, 1999, inclusive,* an annual emission charge on motor vehicles shall be paid at the same time and in the same manner as other registration charges, or, if none is applicable, at the time of registration or renewal of the vehicle.

(b) Subdivision (a) applies to all motor vehicles, regardless of age, including, but not limited to, publicly owned vehicles, and any other vehicles required to be registered under this code but exempt from the payment of fees therefor.

(c) The charge shall be ~~based upon the certified emissions for that vehicle model and type, as determined by the State Air Resources Board, and shall be set at the rate of twenty/five dollars ($25) per gram per mile for each of the following emissions: reactive organic gases, oxides of nitrogen, carbon monoxide, and particulate matter.~~

~~SEC. 3.~~ *as follows:*

(1) For vehicles that can operate only on nonconforming gasoline or on any diesel oil fuel, the annual charge is fifty dollars ($50), and commencing January 1, 1993, the annual charge is one hundred dollars ($100).

(2) For vehicles that can operate only on conforming gasoline, the annual charge is twenty-five dollars ($25), and commencing January 1, 1993, the annual charge is fifty dollars ($50).

(3) For vehicles that can operate on conforming gasoline, gaseous fuels, or neat alcohol fuels, the annual charge is twelve dollars and fifty cents ($12.50), and commencing January 1, 1993, the annual charge is twenty-five dollars ($25).

(4) For vehicles that can operate only on electrical power, there is no annual charge.

(d) For purposes of this section, "conforming gasoline" and "nonconforming gasoline" have the same meaning as defined in subdivisions (b) and (c) of Section 6051.5 of the Revenue and Taxation Code.

(e) Revenues from the emission charge shall be deposited in the Clean Transportation Fund.

(f) This section shall remain in effect only until January 1, 2000, and as of that date is repealed, unless a later enacted statute, which is enacted before January 1, 2000, deletes or extends that date.

SEC. 5. Section 9273 is added to the Vehicle Code, to read:

9273. (a) Notwithstanding subdivision (a) of Section 42270, revenues collected pursuant to Section 9272 shall be deposited in the Clean ~~Emission~~ *Transportation* Fund, which is hereby created.

(b) Money in the fund shall be available, upon appropriation, only for the following purposes:

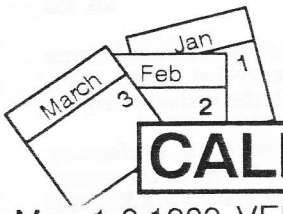
(1) To subsidize the purchase of low-emission vehicles by public agencies.

(2) To subsidize the purchase of low-emission vehicles ~~by individuals owning vehicles of 1971 model year and earlier which have been registered to the same owner for at least the past five years.~~

~~(3) To fund research projects which will enhance the development and use of clean emission energy sources for transportation and of clean emission vehicles.~~ *for individuals who own vehicles of 1971 model year and earlier which have been registered to the same owner for*

at least the past five years and who relinquish them to the state.

(3) To fund research projects which will enchance the development and use of clean emission vehicles.



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May 1989

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