

FVEAA NEWSLETTER

July 1994

President	Vice President & Editor	Secretary	Treasurer & Librarian	Director	Director
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NEXT MEETING - July 15 at 7:30 PM

Will be in Room 1048 in the Student Resource Center at
the College of DuPage, southeast corner of 22nd Street & Lambert Road

DISCUSSION TOPIC - Presentation on Employee Trip Reduction (ETR)
requirements by spokesman from either CATS or IDOT & FVEAA response.

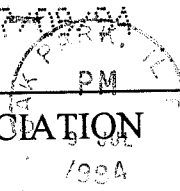
MEMBERSHIP INFORMATION

Any person interested in electric cars is welcome to join the FVEAA. The cost for a full year's dues is \$15 which will entitle the member to receive our monthly Newsletter which contains useful information about electric car components, construction, policies, and events. Dues for new members joining in August will be \$ 3.75

1 GMF, IL 601 19:33 07-09-94 #4

NEWSLETTER

FOX VALLEY ELECTRIC AUTO ASSOCIATION
308 South East Avenue
Oak Park, Illinois 60302

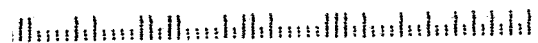


First Class

John Emde
6542 Fairmount Avenue
Downers Grove IL 60516

L

ADDRESS CORRECTION REQUESTED



PRESEZ

ComEd has responded to our proposal regarding testing of the Ford ECOSTAR by club members. The program that we proposed will be delayed until late summer because Edison has yet to receive delivery on their third ECOSTAR, and technical problems with one of the two EVs they have received. We are continuing to work with their public affairs people in arranging ECOSTAR appearances in events this summer throughout our area.

Club member and Triton College professor emeritus Ray Oviyach provided a \$5,000 smile on my face when he told me to drive my car; that the diagnosis of engine coolant leaking into the combustion chamber by Mr. Goodwrench was wrong. I had been angry that my GM car may have a nine-dollar gasket that the accounting department had selected rather than the eleven-dollar gasket that the engineering department had specified.

We have discussed The Clean Air Act of 1990 that mandates car pooling, public transportation or other means of achieving emission reductions. See article in this Newsletter. Our area is classified as a severe non-attainment area for ozone. A plan to achieve reductions must be submitted by the State of Illinois for EPA approval by November. California experience with this approach to clean air has not been pleasant. I propose the FVEAA become active in pointing out an electric car provides the freedom of movement, choice, and emission reductions without the hardships imposed by a governmental bureaucracy.

Ken

MINUTES OF JUNE 17 MEETING

The meeting in Room 1046 at the College of DuPage was called to order at 7:41 by President Woods. 17 members attended.

The May meeting minutes and Treasurer's report of \$ 726.75 in the checking and \$ 2106.62 in savings were approved.

President Woods reported on ECOSTAR Testing. See PRESEZ for details.

A possible FVEAA summer event was discussed. Repeating last year's event at COD would probably produce similar results. A one-day seminar-workshop event for the benefit of FVEAA members was discussed. Further action was postponed.

Members discussed the possibility of finding a location where EV conversions could be made, with experienced members giving on-site assistance to neophytes. Delmonico volunteered to try find a suitable space.

Member Clark checked out a copy of the SAE Book, "History of the Electric Automobile" thru the Downers Grove Public Library. If anyone wishes to examine the book it can probably be obtained thru a local library that is a member of the State library system.

Revisions were made to a draft copy of an EV ownership questionnaire.

There was a discussion of Employee Trip Reduction (ETR) requirements.

The meeting was adjourned at 10:10 PM

Dave Aarvold
Secretary

RECENT EV ARTICLES

PROTOTYPE VEHICLES

Hailing A Cab (Thailand Taxi); Chicago Tribune 5/24/94 (Brian Johns)

A San Francisco company, American Electric Car Technology, has designed a 3-wheeled electric taxi for use in Southeast Asia. The present engine-powered vehicles are called the tuk-tuk for the sound made by exhaust responsible for considerable pollution. The firm's founder, Chaz Haba, stated, "I have been around Detroit long enough to know the EV is not going to happen here in the US first". The taxi's power will be a series of thin-film batteries similar to those used to power portable computers.

Revved Up; Aurora Beacon 5/28/94 (Chris Julka)

Commonwealth Edison demonstrated a Ford Ecostar to local dignitaries in Aurora. Alderman Marc Roberts observed, "This is a big toy for big boys". Edison is spending \$1/2-million to lease EVs from Ford in order to test EV feasibility.

Future Acceleration; Chicago Tribune Section 2, Page 1 5/9/94 (Ted Gregory)

A demonstration of hybrid vehicles was given at Argonne lab last week. Three Ford Escort station wagons were a part of the Hybrid Electric Vehicle Challenge. Hybrid vehicles utilize a combination of battery power and energy derived from a small engine-generator on the car. Development of these prototypes by three universities; Uof I at Champaign, U of Wisconsin at Madison, and Jordan College in Grand Rapids, cost between \$ 25,000 and \$ 350,000.

PRODUCTION EV'S

U S Electricar cuts Japan Deal; Press Democrat (Santa Rosa CA) Page 1 6/10/94 (Dick Phillips)

The Sonoma County electric carmaker has formed a venture with a Japanese trading company. Itochu will sell converted Geo Prizm's and Chevy S-10 pickups which will be converted by US Electricar at three plants in Los Angeles, Redlands in CA and Palm Beach FL. The two firms struck a \$ 15-million deal in which Itochu received a 4.7% of U S Electricar and a 60% ownership of a joint company. U S Electricar gets 20% of the joint venture with the remaining 20% owned by Tokyo R&D, a Japanese car designer. Itochu will target 56,000 delivery trucks making food deliveries to thousands of small grocery stores in Japan for an EV replacement.

Electric Car Maker Plays Down Difficulties; Christian Science Monitor (CSM) Page 10 3/11/94

The largest manufacturer in the US, U S Electricar, has converted 220 cars and light trucks to date. Detroit argues that EVs cost too much and are impractical for the majority of US consumers. Converted Prizm's by Electricar can travel 80 miles between charges, have a top speed of 80 mph and can accelerate 0-50 in 12 seconds. Prices start at \$40,000.

COMPONENTS

More Interest Seen in Flywheel Battery; Knight-Ridder Newspapers (No Date or Author)

Richard Post, a physicist at Lawrence Livermore Lab in Berkeley, is working on a breadbox-sized flywheel energy storage system. His design begins with a wheel composed of carbon-graphite fibers spinning up to 100,000 rpm in a vacuum chamber. Magnets molded into the flywheel provide for adding or extracting energy. The design also incorporates magnetic levitation for the flywheel, a feature that solves the bearing problems usually encountered.

COMPONENTS - CONTINUED

Flywheel Technology May Give A Boost to Electric Cars; CSM 6/1/94 (Shelly Coolidge)

American Flywheel Systems (AFS) in Bellevue WA unveiled the AFS-20 that uses a flywheel energy storage system. The test system was built by Honeywell for AFS. Each flywheel module contains a 9-inch flywheel weighing about 30 pounds. About 20 of these modules would be required to power a car the size of the AFS-20. No further technical details were provided in the article.

Firm Kept Going to Build a Better Battery; Wall Street Journal (No Date) (Andrea Gerlin)

Electrosource in Austin TX says its Horizon advanced lead-acid battery can power a small EV for 140 miles. The battery features a method of bonding lead to fiberglass strands that is lighter-weight than the usual battery that has a lead grid supporting the active material. The Horizon battery pack weighs 800 pounds, about half that of the conventional battery. These batteries will be going into a 500 batteries a month at a new plant near San Marcos, TX. Investment in the company so far has been \$ 30-million. EPRI is supporting the development.

PUBLIC POLICY

The Promise of Electric Cars; Union of Concerned Scientists (UCS) April, 1994

Evs are an absolutely critical element in the battle to clean up pollution. Cars and trucks are responsible for more than half of hydrocarbons, carbon monoxide, nitrogen oxides, and particulate emissions. UCS recognizes that EVs are not likely to replace all gasoline vehicles but they are currently the most environmentally benign choice. Fifty eight percent of American families have two or more cars. An EV can be effectively used for short-range trips. The UCS supports the ZEV regulation adopted by CA.

Tomorrow's Adults Have Mixed Views on Evs; CSM 5/24/94, Page 12 (Brad Knickerbocker)

High school seniors in southern Oregon discussed EVs. Their opinion - these cars do not have the power, reliability, or convenience to be practically used in society. In Oregon driving long distances are commonplace.

When New Cars Go Electric; CSM 6/14/94, Page 18 (James MacKenzie)

California upheld its 2% Zero-Emission Vehicle Rule (ZEV) in the face of a lobbying barrage by automakers and oil companies. The battle is now moving east where 12 Northeastern and Mid-Atlantic states are considering a similar rule. The 190-million American autos annually are driven 2.2 TRILLION miles. Our oil-import purchases was \$ 60-billion in 1990. Present EV producers start with a conventional car, expend labor to remove the engine parts, invest additional labor to install expensive electric drive systems, and price their product at 3-7 times that charged for the original vehicle. Mass production should allow an EV to sell for about the same amount as conventional cars, but range will be continue to be limited. Environmental and economic considerations should be the major priority.

The Environment: Lions (International) Respond to the Challenge; The Lion April 1994, P-18

Lion member Michel Baury of Paris France in 1987 arranged EUROSOL87, the world's first electric vehicle race and in 1990 helped to organize another EV event. These activities are consistent with the LION's Club commitment to caring for the environment and accepting their role as stewards of the earth.

Events

Tour de Sol Results May 20-27

Results of the 1994 Tour de Sol provided by the NESEA may be found in this issue of the FVEAA Newsletter

S/EV 94 October 3-5 Rhode Island Convention Center (Symposium, Workshops & Exhibits)

Keynote speakers: Amory Lovins, David Freeman, and Robert Stempel

Workshops on Monday, Oct 3 include: 1 Business opportunities; 2 EV Tutorial; 3 Fuel Cells; 4 High Speed Rail Opportunities

Tue, Oct 4 and Wed, Oct 5 include: 1 Transportation Planning; 2 EV Policy; 3 Advanced Technology; 4 Fleets; 5 Supercars

Complete Agenda available in August

Northeast Sustainable Energy Association - 23 Ames Street - Greenfield MA 01301 (413) 774-6051

EVS-12 - 12th Biennial International Symposium - Anaheim Convention Center

SHO (Electric Power Research Institute) 167 South San Antonio Road, # 10 Los Altos CA 94022 (415) 949-2050

FROM OTHER EV NEWSLETTERS

The Eastern Electric Vehicle Club (EEVC) mentions an electric motorcycle built on a BMW R26 frame. It is powered by two Pacific Scientific motors, each rated 1HP, 36-volts which are toothed-belt driven to the BMW's driveshaft. The bike's top speed is 60-65 mph with an 80-mile range from four Trojan SC225 12-volt marine batteries. Curb weight is 570 lbs.

Vancouver Electric Vehicle Assn. (VEVA) Newsletter editor reports the ALCO 2200 4-year old batteries in his Jet Electricia still have a 1300 specific gravity when fully charged. Their research indicates that 40 Fiero's have been converted to EV's in eastern US & Canada. They also report an increasing interest in an ELECTRATHON. Finally, they stated that Peugeot might make an electric minivan available in the US for \$ 11,000.

The Aussies (AVEA) in their 12-page June Newsletter reported on a solar production procedure breakthrough that has the potential to reduce the cost to \$/peak watt (\$1000/kw) in ten years. They noted most EVs at the Los Angeles rally used Advanced DC motors, Curtis controllers, and either Trojan or US Batteries. Two electric busses were described: A 72-passenger vehicle being built by BlueBird, the world's largest school bus manufacturer, that has a Westinghouse electric system that uses a 200 Hp AC motor and 336-volt battery system composed of 112 12-volt gelcells. The second is 31-foot bus built by Advanced Vehicle Systems in Chatanooga TN that uses a pair of Hughes AC traction motors that provide a total of 80HP.

RESULTS: 1994 American Tour de Sol

Standing	DOE Prize ²	Adjusted Time ³	TOTAL miles ⁴	Range miles ⁵	Efficiency ⁶ wh/mi-kwh	Car #	Car name	Team name, town, state, contact name, (battery manufacturer and chemistry)
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COMMUTER CATEGORIES:

PRODUCTION CATEGORY

1	-	2:30	599	182		39	Ford Ecostar	PA Elec Transp. Council, Greensburg, PA: David Schmidt 412-838-6000 (ABB-NaS)
2	-	2:53	612	189*		23	Ford Ecostar	Ford Motor Company, Dearborn, MI: Howard Hampton 313-390-2310 (ABB-NaS)
3	-	3:59	548	162		53	ForceGT 4-Seat	Solectria Corporation, Arlington, MA: Arvind Rajan 508-658-2231 (SAFT-NiCad)
4*	-	8:22	338	81		34	Solectria E-10	NAVC, Boston, MA: Sheila Lynch 617-371-1420 (GNB-PbA)
5	-	12:50	286	63		26	Chrysler TEVan	JCP&L, Morristown, PA: Laura Grzanka 201-455-8676 (Eagle Picher-NiFe)
6	-	14:30	275	68		38	Chrysler TEVan	PECO Electric Co., Philadelphia, PA: Ken Quinly, 610-841-5220 (Saft-NiCad)

AMERICAN COMMUTER CATEGORY

1	-	2:53	659	214*	91@	54	ForceRS 2-Seat	Solectria Corp., Arlington, MA: Arvind Rajan 508-658-2231 (Ovonic-Ni metal hydrid)
2	-	2:58	572	175		63	Endura	U. C. Davis, Sebastapool, CA: David Swan 916-752-6548 (Powercell-Zinc flow)
3	1	5:49	464	142†		12	Solar Bolt	Bolton HS/Solar Bolt, Bolton, CT: Roger D Titus 203 643 2768 (Trojan-PbA)
4	2	7:27	426	114		25	Solar Flair	Greenwich HS Solar Team, Greenwich, CT: Sarah Schmidt 203-625-8041 (Trojan-PbA)
5	3	7:38	400	112		55	Solectria E-10	Solectria Corporation, Arlington, MA: Arvind Rajan 508-658-2231 (GNB-PbA)
6	-	8:10	361	87		45	RHAM Rod	RHAM Sci and Tech, Hebron, CT: Mary Monroe-Kolette 203-228-9474 (Trojan-PbA)
7	-	8:31	351	102		24	Genesis I	Genesis Team, Saginaw, MI: Mark Parthe 517-793-9103 (Trojan-PbA)
8	-	10:23	322	81		41	Lightening Volt	PHS/LCVTS EV Team, Orefield, PA: Bev Dominy 215-395-2021 (Trojan-PbA)
9	-	11:14	316	81		29	Project e-S-10	Mt. Everest HS, Sheffield, MA: Paul W. O'Brien 413-229-8734 (US Battery-PbA)
10	-	11:50	296	70		18	Kinetica II	Naugatuck Valley, Waterbury, CT: Prof. Don Narducci 203-575-8090 (Trojan-PbA)
11	-	12:26	306	73		50	Solar Delivery	Scott Isgar, Staten Island, NY: Scott Isgar 718-816-1126 (Trojan-PbA)
12	-	16:18	271	62		19	Dane Hovey	Dane Hovey Racing, Philadelphia, PA: Dan Radack 215-667-2160 (Exide-PbA)
13	-	16:56	260	73		51	Eclectic Taxi	SETS Racing Team, Enosburg Falls, VT: Ed Gaudette 802-933-4003 (Trojan-PbA)
14	-	21:54	219	63		20	ElecTruck	Dartmouth Solar Racing Team, Hanover, NH: Doug Fraser 603-646-3522 (Sears-PbA)
15	-	22:04	259	61		14	Brookdale Truck	Brookdale CC & JCP&L, Lincroft, NJ: Louise Horgan 908-224-2285 (Exide-PbA)
16	-	22:08	224	63		62	Potential Diff.	Trenton State College, Trenton, NJ: Norman Asper 609-771-2774 (US Battery-PbA)
17	-	25:01	260	61		43	Golden Gear	Reading-Muhlenberg, Reading, PA: Gerald Cunningham 610-921-7306 (Exide-PbA)
18	-	25:37	212	63		27	Electrical Storm	Lauzun Corp, Plaiston, NY: Eric Wragg 603-329-1158 (Genesis-PbA)

TOUR DE SOL COMMUTER

1	1	7:31	402	122*		30	Aztec	MIT Solar EV Club, Cambridge, MA: K Allen 617-253-6140 (Johnson Controls-PbA)
2	2	8:55	364	95		32	Sungoo	NHTI Solar Car Team, Concord, NH: Thomas P. Hopper 603-225-1825 (Sears-PbA)
3	3	27:59	206	44		52	Vortex	SETS Racing Team, Enosburg Falls, VT: Ed Gaudette 802-933-4003 (US Battery-PbA)

SOLAR RACING CATEGORIES:

TOUR DE SOL RACING

1	-	11:56	257	-	29@	48	Photon	Salisbury School, Salisbury, CT: Ann Corkery 203-435-2531 (Sears-PbA)
2	-	20:37	272#	-		21	Sunvox IV	Dartmouth, Hanover, NH: Doug Fraser 603-646-3522 (US Battery-PbA)
3	-	27:52	151	-	28@	67	Liberty Belle	U. of PA, Philadelphia, PA: Paul Shrater 215-573-5256 (Power Sonic-PbA)
4	-	30:16	124	-		33	Suntech	NHTI, Concord, NH: Thomas P. Hopper 603-225-1825 (Trojan-PbA)
5	-	31:38	172	-	28@	69	Mach 005	U. of VT, Burlington, VT: E. Dion 802-656-8323 (Johnson Controls-PbA)
6	-	33:02	176	56-		56	Patriot	Southwest VT, Shaftsbury, VT: D. Lassell 802-442-4957 (Trojan-PbA)

CROSS CONTINENTAL RACING

1	-	11:26	217	-		76	SunDragon IV	Drexel U., Philadelphia, PA: Dr. Fischl 215-895-2254 (Power Sonic-PbA)
2	-	17:59	260	-	36@	36	Northern Light	Mankato State, Mankato, MN: Peter Raeker 507-389-2523 (GNB-PbA)
3	-	18:6	266	-	43@	47	Spirit IV	RIT, Rochester, NY: Jacob Allison, 716-475-5521
4	-	35:28	194	-		37	Ottawa Orange	Ottawa Hills HS, Grand Rapids, MI: J. Frisbie 616-771-2921 (Exide-PbA)
5	-	49:40	51	-		68	Extreme	U of Quebec., Montreal, Que. Jerry Pawulski 514-987-3924 (Varta-PbA)

OPEN CATEGORY:

1	-	16:20	264	61		49	CityCat	Schiller Power Group, Germany: J. Chance 718-383-4895 (Motorcycle-Genesis-PbA)
2	1	18:58	299	107*		58	TNE II	Team New England, Cambridge, MA: R. Rabder 408-426-3783 (one person-Sears-PbA)
3	-	19:22	286	91		57	TIE-2	Team Forest, Sunderland, MA: Michael Zuschlang 413-548-9340 (2-wheel-Saft-NiCad)
4	2	21:24	199	63		16	Envirocycle I	Central CT State, New Britain, CT: Geri Radacsi 203-827-7385 (Motorcycle-PbA)
5	3	26:46	186	63		15	C-M Sunpacer	Cato-Meridian HS Cato, NY: Earl Billings 315-626-2121 (one person-Exide-PbA)
6	-	33:59	124	63		60	Hopper EV	Thomas P. Hopper, Concord, NH: 603-225-1825 (one person-Sears-PbA)
7	-	37:24	110	36		22	Envirocycle II	Naugatuck Valley, New Britain, CT: Geri Radacsi 203-827-7385 (Motorcycle-PbA)
8	-	41:58	92	34		64	Sun Cycle II	UFX Sun Cycle, Conshohocken, PA: Murphey 215-238-6155 (Motorcycle-Trojan-PbA)
9	-	46:57	61	35		11	Daystar	Apollo Ridge HS, Spring Church, PA: J Jones 412-478-1131 (one person-Trojan-PbA)
10	-	48:53	31	31		66	Solar Bullet	Unatego HS, Otego, NY: Paul Agolia 607-988-1047 (one person-Trojan-PbA)

Footnotes:

- 1 Standing based on adjusted time. First, second and third place teams received prizes from NESEA
- 2 Prizes offered by the USDOE to student-built cars in Commuter and Open categories. Prizes based on adjusted time
- 3 Sum of running time of required 60 miles per day, plus penalties for incomplete legs, minus time credits for extra miles driven
- 4 Total miles driven over the five day event # Prize given to the Solar racing car with the greatest range over the five day period
- 5 Miles driven on a single battery charge. * prize given for car demonstrating the "greatest range" in each category
- 6 Efficiency measured in watt hrs/mile and miles per kwh. Each kwh costs about 10 cents. @ Received daily efficiency prizes from NESEA or DOE
- † Prize given for best car using lead acid batteries, and /or car with the best range using lead acid batteries.

ELECTRIC VEHICLE OWNERSHIP QUESTIONNAIRE

The purpose of this questionnaire is to assemble information about electric cars that are used by individuals who have converted or purchased EVs. The FVEAA intention is to create a computer-based database on EV conversions, costs, use, battery life experience, insurance, and other relevant data. This data will be available on a floppy disk and can be shared or presented to governmental units concerned with electric car possibilities.

Owner's Name _____

Address _____ City _____ ZIP _____

My EV was: 1. Converted by me ___ 2. Converted by others ___ 3. Purchased new ___ or 4. Used EV _____

BASE VEHICLE: 5. Make _____ 6. Model _____ 7. Year _____ 8. Cost \$ _____

ELECTRICAL COMPONENTS: 9. Motor manufacturer _____ 10. Model _____ 11. Cost \$ _____
12. Rating a. Volts ___ b. Amps ___ 13. Series (S), Shunt (SH) ___ 14. RPM _____

15. Controller manufacturer _____ 16. Voltage _____ 17. Current _____
18. Type (Transistor- T, switched -S, other-O) _____ 19. Cost \$ _____

20. Batteries a. Type (Lead acid?) ___ b. (Other) _____ 21. Cost (each) \$ _____
22. Rated voltage (each) _____ 23. Rated current _____ amps for _____ minutes
24. Number used in propulsion system _____ 25. Manufacturer _____

26. Battery charger manufacturer _____ 27. Model _____ 28. Cost \$ _____
29. AC supply voltage _____ 30. AC supply current _____

CONVERTED VEHICLE 31. Year converted _____ 32. Weight _____ (lbs) 33. Final Cost \$ _____

PERFORMANCE 34. Single-charge range in urban traffic _____ miles. 35. Top speed _____ mph
36. Average energy use per mile _____ KWH/Mile 37. Battery life _____ years

USE: 38. Short-trip driving _____ 39. Job commuting _____ 40. Other _____
41. Total miles as EV _____ 42. Annual driving _____ miles

ANNUAL COSTS (CURRENT YR) 43. Insurance \$ _____ 44. License & City stickers \$ _____ 45. Electricity \$ _____
46. Maintenance \$ _____ 47. Battery Amortization \$ _____ @ _____ cents/mile
48. Repairs \$ _____ 49. Other \$ _____ 50. Total \$ _____

COMMENTS: _____

RETURN COMPLETED FORM TO : WILLIAM H SHAFER - FVEAA
308 SOUTH EAST AVENUE
OAK PARK, IL 60302-3412

JUNE 25, 1994

EMPLOYEE TRIP REDUCTION (ETR) LEGISLATION

The genesis for mandating a change in commuting habits was the Federal Clean Air Act amendments of 1990 (Act). This measure was debated in the Congress for a considerable time before passage. The legislation imposed strict limits on pollution. A part of the Act required states to institute programs that would correct pollution in areas where the air quality did not meet federal standards. To make sure the states would take action the Act placed federal highway construction funds in jeopardy for non-compliance. Since these funds are the source for many lucrative construction and repair projects in the states, and since road upgrading (including pothole repair) is popular, this was an effective prod to action.

States were allowed to develop their own means to attain compliance with the standards and allowed regions different lengths of time to reach target standards depending on how bad the air quality was. However, each state plan must be approved by the US EPA. The Northern Illinois area violated the ozone standard on three days during the test year. This caused the region to be designated to be a severe non-compliance area.

The Illinois response was contained in Illinois Public Act PA 87-125, providing for employee trip reductions, was enacted by the Illinois Legislature and signed by the Governor in March of 1993. The measure calls for every employer in the Chicagoland region with 100 or more employees to cut by 25% the number of commuting trips those workers make in their own cars during the morning rush hours. The US EPA has rejected a crucial point of the plan because the formula specified in the legislation to be used to calculate how many car trips employers would have to reduce.

As passed, the Illinois legislation called for affected employers to reduce the number of cars their employees drive to work so the average number of passengers during rush hour would be 25% ABOVE the average number of passengers in ALL Chicagoland cars. This worked out to be a target of 1.36 riders per car. Current commuter occupancy is 1.09. The US EPA has said the target set by the state is too low because the formula DOES count employees using public transportation in computing an average, but DOES NOT count those same riders in regional averages. This matter has not yet been resolved.

Changing workers solo commuting habits will not be simple. It will mean intruding on the individual's right to freedom of movement. Also, there may be a question of equal protection since employers with less than 100 employees at a site are not affected.

I noted in a recent trip to California that large parking lots are to be constructed along the freeways where commuters can drive from home and assemble to ride share for their continued trip to a common work site. Also, the left-hand lane of some freeways are marked by a diamond and reserved for vehicles with more than a single occupant during rush hour. A solo commuter using this lane is fined \$ 500 - and the regulation is enforced.

The Illinois legislation does not consider other measures that could reduce pollution, but not reduce congestion. Electric cars are one measure. Should the FVEAA become active here ?

VISIONS OF FUTURE TRANSPORTATION

This will summarize the material contained in two articles that provide a future vision for cars. The first is the Aug 93 issue of a publication by the Rocky Mountain Institute whose Director is Amory Lovins. The second is an article by Christopher Lavin, Research Vice President for World Watch, entitled "JUMP START" appearing in the July-Aug 93 issue of World Watch.

The articles point out that automobiles are primarily responsible for most air pollution that now sickens the world's cities. There are an estimated 450-million automobiles in the world's car fleet. The total annual mileage is estimated to be 223 TRILLION miles. Annual oil consumption amounts to 3 BILLION barrels of oil.

The typical production car of the 1990's weighs 3180 pounds, has an aerodynamic drag coefficient of 0.33 produced by a frontal area of 20 square feet, has an engine-powertrain efficiency of about 20%, and achieves 28 miles per gallon of petroleum fuel. The typical engine is 100-200 horsepower which is required to achieve a 0-60 mph acceleration in 7-9 seconds. (It is acceleration that sells cars off showroom floors. - ED) Power required for highway cruising is typically less than 20% of peak power. In city driving the peak power is required just 4% of driving time, unless the driver has a lead foot away from the red light.

The initial innovation toward a future cars took place with the Switzerland's "TOUR de SOL held in 1985. At that event an odd assortment of 58 odd-looking vehicles participated in a 230 mile race; 27 finished the event. The only energy source permitted was the sun. Subsequent TOURS there and in the US have stimulated automotive technology that have the potential to replace the present steel-bodied car. The race also pointed out limitations of photovoltaic energy. There are about 50 square feet of photocells that can be placed on a solar car roof. These will generate, at peak, about 500 watts of electrical energy. The power for these solar cars, even when using batteries, is typically 2 Kw forcing builders to reduce weight and maximize efficiency.

The eight annual TOURS have produced cars that evolved from contraptions to vehicles which incorporate the latest synthetic materials to reduce weight, aerodynamic design derived from jet fighters, efficient electric motors, and advanced electronic controllers. The latest TOUR cars can achieve over 200 miles on a single charge, have a top speed of 90 mph, and can travel almost 7 miles on a single Kwh of electricity. These cars are extremely expensive to build and may be no more than a novelty. (But like Indy race cars they may define future trends more accurately than concept cars exhibited annually at auto shows - ED).

Innovators have used the TOUR experience to construct 2-passenger EVs with a range of 30-50 miles and a top speed of 30-60 mph. Concept cars have been built and tested by Horlacher, Swatch, VW, BMW, Mercedes, and others. Their efforts have been reported. The Rocky Mountain Institute designed a "SUPERCAR" which has a moulded composite body, a 7-15 Kw electric motor drive system. The vehicle is described in their publication "Supercars, The Coming Light-Vehicle Revolution", Publication, T-93 for \$ 8.

CONTINUED ON PAGE 2 (OVER)

VISIONS OF FUTURE TRANSPORTATION (CONTINUED) Page 2/2

There are comments on measures which conceivably could prod the commercial introduction of SUPERCARS. Efforts to use alternative fuels such as ethanol derived from corn and sugar cane, vegetable oils, high-cost methanol derived from natural gas, and engine modifications often yield unsatisfactory results. Mandates such as California's 2% ZEV sales by 1998, ETR, and other strategies have not succeeded in convincing the Big 3 automakers they should launch serious (and expensive) programs to turn their concept cars into consumer products. Financial incentives and tax breaks are unlikely to be effective in hastening the arrival of the "Green Car".

The Big 3 may be justified in their arguments that the consumer will not buy commercial versions of their EV concept cars. GM's experience with the IMPACT which was exhibited in 1990 is a case in point. This EV was purpose-designed, uses an impressive combination of aerodynamics and composite materials to achieve weight reduction, and had good range and performance characteristics. It encountered problems when it came to turning the concept car into a consumer product. GM didn't have a manufacturing facility to mass-produce a composite based body. The car was a 2-seater which limited its acceptability. It was a rather spartan product lacking amenities such as air conditioning, that consumers demand. Chrysler and Ford are relying on EV adaptations of their standard product line. Ford's ECOSTAR is a conversion of a European van. Chrysler is experimenting with EV conversions of their minivan line.

The first article presents the case for composite bodied EVs. This technique allows significant weight reductions. In mass production the manufacturing cost is likely to be only slightly higher than for present production cars, but a huge up-front investment would be required. Composite bodied cars can be just as safe as steel-bodied. (One only has to view filmclips of Indy cars, which have composite bodies over a safety frame, disintegrate in a racing accident with the drivers usually walking away with minor injuries. Of course there is no mixing of steel and composite bodies on the track, as there would be on the highway - ED)

The most promising SUPERCAR progress has originated in countries not having an established auto manufacturing industry. For example Switzerland, the home base of Brown-Boveri, has developed and tested a brushless DC, switched-reluctance motor that looks promising for EV use. There are now 2000 EVs operating on Swiss roadways, most of them imported. Swiss parking lots have already been equipped with opportunity-recharging electric plugs.

Both articles conclude that cost, environmental, and oil-supply considerations will ultimately cause the SUPERCAR advent.

Neophyte journalists in school are advised to make certain the following questions are answered in each of their stories; "What, Where, When, Why, How, and Who". These articles cover the What and Why questions. The other 4 remain unanswered.

Bill Shafer
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