FVEAA NEWSLETTER

OCTOBER 1986

MEETING NOTICE

The next meeting will be friday OCTOBER 17th, at *CRAGIN FEDERAL SAVINGS & LOAN* 333 W. Wesley St. Wheaton, Illinois. - Time - 7:30 P.M. *sharp.* Guests are welcome and need not be members to attend the meeting.

Raffle Car

An important decision was made at the last meeting which affects the Raffle Car. The group decided to permit members to use the car so each member will have a better understanding of electric car characteristics. Car use will be assigned by the President. It will begin as soon as titling, license, and insurance have been arranged. Assignment is expected to continue until next Spring when the Raffle can take place at an optimum time.

Next Meeting

The technical discussion at October 17, 1986 meeting will be led by Member Newton who will present his analysis of a Hybrid. This looks like a good project for the group to consider.

A draft copy of the "Owners Manual" will also be distributed for comment during the November meeting.

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

FIRST CLASS

ADDRESS CORRECTION
REQUESTED

FIND THE WORDS

PUZZLE NAME : OCT-FVEAA

AMMETER	BATTERY	CURRENT	DISCHARGE
ELECTRIC	GENERATOR	MOTOR	NEGATIVE
POSITIVE	REGENERATE	TRANSISTOR	ELECTROLYTE
CHARGER	WIRE	TERMINAL	HORSEPOWER

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H E P A H R O N E G A T I V E G A M W E
R A A O M B G R E L E C T R O L Y T E O
L H A E S M G N R I T E T G H R S T M E
I O T N I I E T W E A E L R L R L E E L
H G N R G E T T E A I C R E G E I S E O
E E A T A E A I E E M M O R C G B H O I
E C E O W N N I V R I U T M T T R R P E
S W I R E R S E B E L E B R H C R H T P
G C G R E E S I R A M M A P A E E I P H
E L S L M A O O S A T E L R H R S G C L
A E S C U R R E N T T T O N T A R B A E
G O T C O G M E B E O O E R B H N L R M
E E C E E S M H L E E R R R W B T E W O
E C E W O S M R T E O O T I Y T G B P T
I E R T H R E G E N E R A T E R O P R O
E H O R S E P O W E R I M R A L A S O R
T C R H C M I E M R G E E H W M I E T A
E R M O M M N G C E H N C E R V A R E R
G O T E R M I N A L A E O G G S R M O A
I L P O I S C H A R G E O E R G G E G W
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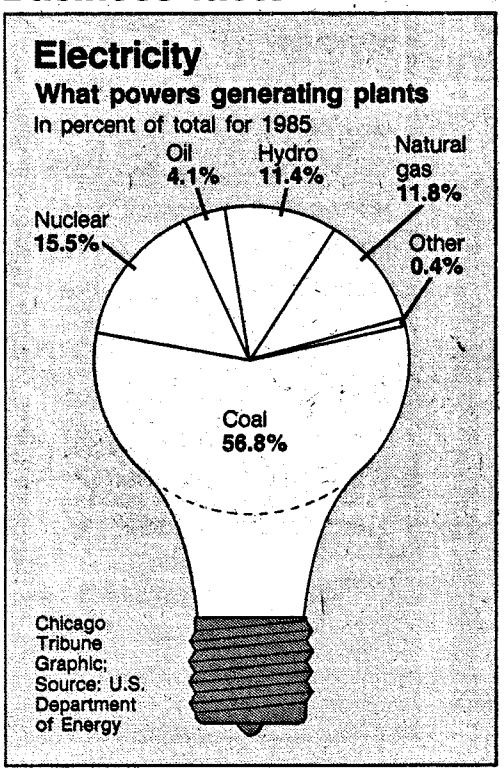
SOLUTION NEXT MONTH

Business facts



HAMFESTS 1986

Oct. 12 SWAPFEST Waukesha County Expo Ctr. Hwys. FT & J Waukesha, Wisc. 8:00 AM $3.00

Oct. 18-19 CONVENTION/HAMFEST Norris Sports Center St. Charles, Ill. 8:00 AM $4.00

Nov. 2 HAMFEST Lake Co. Fairgrounds Rts 45 & 120 Grayslake, Ill. 7:00 AM $3.00

Times are when gates open to the public. Prices are 'at gate' prices and may or may not include both days on two day events. Some advance ticket sales may be discounted.

CLUB PARTICIPATION

PUTTING PERFORMANCE IN YOUR ELECTRIC CAR-PART VI

In Part V, we covered three factors which affect battery life; peak currents, depth-of-discharge, and partially-charged standing time. We will now consider battery charging. There is no more-important factor in EV ownership satisfaction than battery life, and this is influenced by recharging practices.

Battery Efficiency

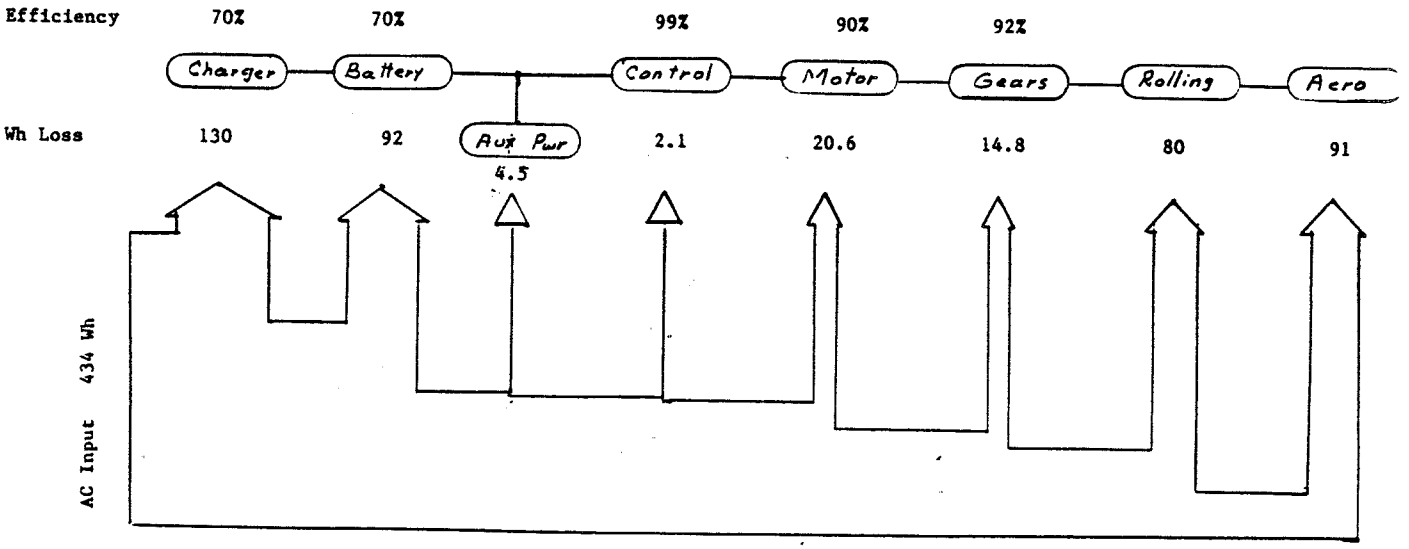
Most EV electric system losses occur in the battery during discharge and recharge. Battery efficiency is about 90% during discharge and under 80% during charging, for an overall cycle energy efficiency of about 70%. Losses caused by the battery's internal resistance produce heating of both the plate structure and electrolyte. Heating can be locally severe, lead to accelerated grid structure corrosion, and can significantly affect battery life.

One way to control the destructive effects of battery losses is to provide cooling, especially to battery modules surrounded by other units. This suggests battery placement should allow at least one inch between units to facilitate heat dissipation. Forced ventilation will also help, but this extracts an energy penalty.

Charger Efficiency

The usual charger is not very efficient, although at start-of-charge it may approach 90%. Tests conducted by Lester found a typical ferro-resonant charger was 68% efficient and SCR-type chargers attained 80%. Half of the AC energy supplied may be converted to heat in the battery and charger.

When the energy flow diagram at 55 mph steady speed introduced in Part IV includes the AC source, it looks like this:



Energy Flow in Wh/Mile @ Steady 55 mph Speed

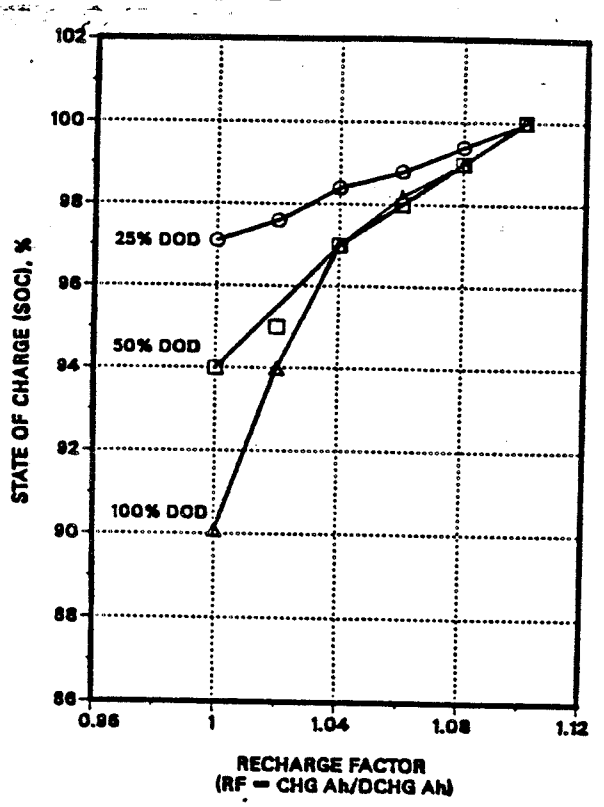
Charging Methods

Careful control of charging is essential for battery longevity. The ideal method is to tailor recharge for each individual cell. This is not possible for golf-cart batteries since they have two intercell connectors internal to the battery case.

The second-best method is to individually charge each six-volt unit. To do this, each unit must be electrically isolated which can introduce component complexity and increase cost. Member Ken Meyers individually charged each battery unit in his car and achieved a four-year battery life.

The most-usual arrangement employs a single charging unit having a regulated voltage output equal to 2.3 to 2.4 times the number of cells, 83 volts for our project. This arrangement requires recharging compromises. Some cells may not be fully charged while others may be subjected to overcharge. Repeated overcharge of an individual cell can accelerate corrosion and shorten cell life. Repeated incomplete recharging can result in cell sulfation.

Some overcharging is necessary to provide electrolyte mixing and cell equalization. A 1985 study by Argonne Laboratories (ANL 85-68) found a 10% overcharge was required for a standard type GC-2 golf-cart battery. The increase in the state-of-charge with more overcharge for three levels of discharge depth, is illustrated by this data plot. As the curves show, the battery does not readily accept additional charging after reaching the 98% level. This suggests the EV owner should apply an equalizing overcharge about once per week depending upon car use.



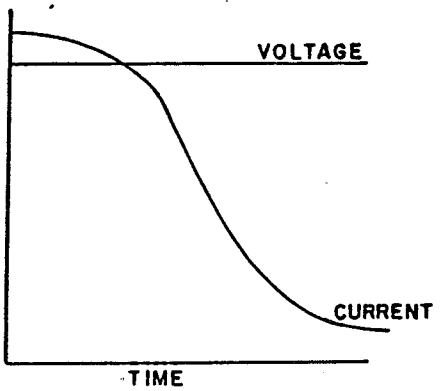
Gassing

A cell can be charged at any rate that does not produce excessive heating or gassing. Gassing begins when cell voltage exceeds 2.39 volts. Once a cell attains this voltage, recharge is complete and the electrolyte has been returned to its pre-discharge value. Further charging will produce gassing with no increase in available capacity.

The Argonne tests indicated 0.34 milliliter of water is converted into gas for each ampere-hour of cell overcharge. For our 72-volt, 36-cell system, a 10% overcharge of all cells would consume about 1.2 pint of water and generate 12 cubic feet of hydrogen gas.

Charger Design

The charger for an EV battery must be more than a simple transformer-rectifier-timer combination. It should recognize cell recharge behavior. As it is charged, the cell develops a counter-emf that increases with time, and charging current is reduced. This is illustrated by the accompanying figure. Initially, the cell receives a constant-voltage recharge which continues until the current drops to about 5 amps for a typical golf-cart battery. The charge should then be held at this "finishing charge" rate until cell voltage rises to 2.39 volts, the onset of gassing. A "trickle" charge of 0.1 - 0.2 amps at this point will maintain the cell in a fully-charged state and compensate for self-discharge.



Constant Voltage Charging

Battery recharging requires a balancing of conflicting requirements; the need for cell equalization, need to add water, the destructive effects of heating, and the extra consumption of electrical energy. The additional effort and money put into a sophisticated charger system can be recovered many times over through extended, battery life and better performance.

While the EV owner avoids the "tune-up" requirements of a conventional car, he must take on the care of his EV battery. This is an unfamiliar duty because the battery of a conventional car is a highly-engineered, well-designed unit that starts and runs the car with little attention. The EV battery care task can be minimized by accessible module placement, a one-point watering system, electrolyte recirculation, and (most importantly) use of a properly-designed battery charger.

W. H. Shafer
September 18, 1986

1796e

ADVANCED VEHICLE NEWS

P. O. Box 5200
Westport, Conn. 06881
Tel: 203-226-4600

August, 1986

Dear AVN Readers:

It is with great sadness that the Porter Corporation must announce the temporary suspension of the publication of Advanced Vehicle News.

In the February issue of AVN we acknowledged the sudden death of G. Rogers Porter, founder and publisher since 1972. While looking back at his life, we also looked forward to the seemingly clouded future of the alternative fuels industry; at the drop in OPEC prices (which have now indeed hit the pumps), and at the lessening concern of governments and businesses to find alternatives to the ever dwindling supply of oil.

Unfortunately, those broad concerns have come to hit our industry. Two leaders in the field have ceased operation since the beginning of the year. And what troubles leaders in the industry also troubles the publisher. AVN has been affected by the downturn in the industry that has hit its supportive group of subscribers and advertisers.

Roger Porter saw this problem looming. He continued to publish AVN not as a business, but as a labor of love and out of the sincere belief that a cleaner, more cost effective means of transportation must be found.

His family shares that belief, and we are looking for a way to continue to serve the alternative fuels industry. But we are also coming to realize, as Roger Porter had known, that Advanced Vehicle News cannot continue to publish in its current form.

We ask our readers for patience as we try to find a way to honor our subscriptions. And we ask that you bear with us as we undergo yet another change at AVN. To all our readers, thank you for your continued support.

THE PORTER FAMILY

Rev. Dec. 1984

MEMBERSHIP

A MEMBERSHIP IN THE FOX VALLEY ELECTRIC AUTO ASSOCIATION (FVEAA) IS OPEN TO EVERYONE. CURRENTLY THERE IS ONLY ONE GRADE OF MEMBERSHIP REGARDLESS OF THE MEMBERS DEGREE OF PARTICIPATION IN ASSOCIATION ACTIVITIES. MEMBERSHIP IN THE FVEAA IS CONTINGENT UPON PAYMENT OF THE ANNUAL MEMBERSHIP FEE. THE MEMBERSHIP FEE CAN ONLY BE WAIVED BY SPECIAL VOTE OF THE BOARD OF DIRECTORS. EACH MEMBER IN THE FVEAA RECEIVES A COPY OF THE FVEAA NEWSLETTER EACH MONTH. THEY ARE ALSO ENTITLED TO ATTEND AND VOTE AT ALL ASSOCIATION MEETINGS.

ALL MEMBERSHIPS IN THE FVEAA RUN FROM NOVEMBER 1st TO OCTOBER 31st OF THE FOLLOWING YEAR. THE DUES ARE $15.00 PER YEAR PAYABLE AT THE NOVEMBER MEETING. **NEW** MEMBERS JOINING AFTER NOVEMBER SHALL ONLY PAY $1.25 FOR EACH MONTH REMAINING BEFORE THE FOLLOWING NOVEMBER. (see chart below)

NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.
15.00	13.75	12.50	11.25	10.00	8.75	7.50	6.25	5.00	3.75	2.50	1.25

THE FOLLOWING FORM MAY BE USED TO APPLY FOR MEMBERSHIP OR TO RENEW YOUR MEMBERSHIP.

cut----------cut

APPLICATION FOR MEMBERSHIP OR RENEWAL

DATE _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE # _____

- ☐ JUST INTERESTED IN ELECTRIC VEHICLES
- ☐ I HAVE AN ELECTRIC VEHICLE (describe) _____
- ☐ I WISH TO BUILD AN ELECTRIC VEHICLE

AMOUNT ENCLOSED $_____ FOR _____ MONTHS.

MAKE CHECKS PAYABLE TO: FOX VALLEY EAA

MAIL TO: MR. VLADIMIR VANA, FVEAA TRES.
5558 FRANKLIN
LA GRANGE, ILL. 60525

FVEAA CLUB ITEMS FOR SALE

BATTERIES

2	6 volt	7" x 12" wet	$5.00 ea.
1	6 volt	7" x 12" dry	$10.00 (new)
1	6 volt	7" x 16" wet	$5.00

Unless otherwise stated, these batteries are slightly used (if at all) and are not E.V. (golf cart) type. These are what is left. If you want one or more, let me know before the meeting and I will bring your order to the meeting.

OTHER STUFF

Solid brass battery connectors #00 & 000 pos. or neg.	$ .75 ea.
Steel laminated choke core for shunt motors.	$5.00 ea
Black heat shrink tubing 3/4" shrinks to approx. 1/2"	$ .50 foot
200 Amp relay 24-28 volt coil Only 2 left.	$15.00 ea.
400 Amp relay 12 volt coil Limited supply.	$45.00 ea.

Above items may be purchased at the meetings or place your order with me to ship U.P.S.

John Emde 968-2692
Temporary keeper of the club stuff

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