Minnesota Regional Transit Board: Records.

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REGIONAL TRANSIT BOARD
Mears Park Centre, 230 East 5th Street
St. Paul, Minnesota 55101
229-2700

REPORT OF THE ADMINISTRATION AND FINANCE COMMITTEE

At its meeting of May 11, 1992, the committee approved the following recommendations:

Financial Statements - January, February and March, 1992

That the Regional Transit Board receive the January, February and March 1992 financial statements and direct that they be placed on file.

Request for Proposal for Management Audit of Metropolitan Transit Commission

That the Regional Transit Board authorize the executive director to issue a Request for Proposals for consulting services to conduct a management performance audit of the Metropolitan Transit Commission as described in the staff memorandum dated May 5, 1992.

Other Business

The committee reviewed the budget assumptions for 1992 and 1993. No action was requested.

The meeting was recessed to conduct a joint meeting with the Finance and Administration Committee of the MTC to review the quarterly financial statements, progress on cost containment, marketing and farebox recovery rates.

Ruth Franklin
Chair

5/11/92
mff

REGIONAL TRANSIT BOARD
Mears Park Centre, 230 East 5th Street
St. Paul, Minnesota 55101

MEETING OF THE REGIONAL TRANSIT BOARD

Mears Park Centre Chambers
May 18, 1992
4 p.m.

AGENDA

A. CALL TO ORDER AND ROLL CALL

B. APPROVAL OF AGENDA

C. APPROVAL OF MINUTES

1. Policy Committee Meeting, April 27, 1992

2. Regional Transit Board Meeting, May 4, 1992

D CHAIR'S REPORT

E. MEMBERS' REPORTS

F. EXECUTIVE DIRECTOR'S REPORT

G. REPORT OF THE ADMINISTRATION AND FINANCE COMMITTEE (Ruth Franklin, Chair)

1. Financial Statements - January, February, March 1992

2. Request for Proposal for Management Audit of Metropolitan Transit Commission

H. OTHER BUSINESS

I. PUBLIC COMMENT

Michael J. Ehrlichmann
Chair

REGIONAL TRANSIT BOARD

ROLL CALL AND ATTENDANCE SHEET

DATE: 5/18

BOARD OR COMMITTEE: Board

Member Name	Present	Vote	Vote	Vote	Vote	Vote	Vote	Vote	Vote
ISSUE									
Mike Ehrlichmann	✓								
Maryann Campo									
Doris Caranicas	✓								
Sharon Feess	✓								
Ruth Franklin	✓								
Val M. Higgins	✓								
Sandra Hilary	✓								
Ruby Hunt	✓								
Tom Sather									
Don Scheel	✓								
Tom Workman									

Visitors

Staff

hb, dw am jh
se, jh

m f f

REGIONAL TRANSIT BOARD
Mears Park Centre, 230 East 5th Street
St. Paul, Minnesota 55101
612/229-2700

Minutes of the Meeting of the POLICY COMMITTEE April 27, 1992

MEMBERS PRESENT: Sandra Hilary, Chair; Maryann Campo; Ruby Hunt; Val M. Higgins; Tom Workman

OTHERS PRESENT: Michael J. Ehrlichmann, Ruth Franklin, Doris Caranicas, Don Scheel, Tom Workman, Sharon Feess, RTB Members; Mike Robertson, RTB Legal Counsel; Dick Graham, DARTS; Sara Lenz, Ebenezer Society; Morgan Grant, Transportation Accessibility Advisory Committee; Beverly Auld, Metropolitan Transit Commission; Emil Brandt, Metropolitan Council, Gregory L. Andrews, Judy Hollander, Howard Blin, Ed Kouneski, Barbara Quade, Cynthia Curry, Debra Funk, Len Simich, Randy Rosvold, Suzanne Hanson, Mary Fitzgerald, RTB staff

CALL TO ORDER AND ROLL CALL

Committee Chair Hilary called the meeting to order at 4 p.m. and roll was taken.

APPROVAL OF AGENDA

Hunt and Workman moved approval of the agenda. The motion was unanimously approved.

OTHER BUSINESS

Ehrlichmann announced that Brian Clymer, Administrator, Federal Transit Administration, U.S. Department of Transportation, will be the luncheon speaker on May 5 at the Transportation Research Conference sponsored by the Center for Transportation Studies. He urged members to attend the reception to demonstrate to Mr. Clymer that transit also drives this region.

Copies of a press release were sent to members announcing that Ehrlichmann will represent transit providers before Congress next week.

REPORT TO THE LEGISLATURE ON METRO MOBILITY CUSTOMER SERVICE QUALITY

Funk presented the report dated April 15, 1992. Franklin moved and Hunt seconded:

> That the Regional Transit Board approve the submittal to the Legislature of the Report to the Legislature on Metro Mobility Customer Service Quality, dated April 27, 1992.

The motion was unanimously approved.

METRO MOBILITY 1993 SERVICE PLAN

Kouneski reviewed the major points of the plan as outlined in the staff report dated April 21, 1992. Staff has been studying new concepts in service delivery to respond to the inadequate funding and service quality problems, such as aging vehicles and unmet trip requests.

Ehrlichmann said, since the paratransit program was restructured in 1986, the intent has been that competition among providers for riders would drive the system, but now the providers are choosing those trips that are most advantageous and the economies of scale have not been realized.

Responding to questions, Kouneski said the timetable calls for issuing the Request for Proposals (RFPs) in May, proposals would come in late June or July and a contractor could be selected in September. The start of service with the new provider will be January 1, 1993. After the public meeting in May a final proposal will be presented to this committee. ADA regulations are based on all-day, regular route service.

Ehrlichmann said the core area is mandated for service by the Americans with Disabilities Act. Trips could be prioritized to ensure that medical and employment trips are delivered, but it will not be possible to provide everything.

Hollander said it is important to understand that a primary objective is to get comprehensive geographic coverage but service area cuts or trip prioritizing may be necessary. Without new funding, RTB cannot provide the same service as we do today. Franklin asked that a list of providers in the outer areas be developed for members to allow them to react to questions from their constituents.

There was discussion of the experience with centralized dispatching under the old system and the possibility that new technology could correct those problems.

The chair said the May 7 meeting will deal with how individuals will be affected; she asked how that will be communicated to those who cannot attend. The most mobile people will come, but some other people cannot and the board should have some understanding of their situation and factor it in. Kouneski said there is a packet of information available. Hilary said the 350 daily trips outside the core area should be analyzed to see how those trips are handled now. She suggested that information be developed on the effect of each alternative.

Members of the audience said the Metro Mobility Administrative Center uses bulk mailing, which can encounter a three-week delay in handling, and they often do not receive notice of meetings until the day before or on the same day as the meeting. RTB must deal with the problem. After discussion of the timetable, Hilary directed that the next committee meeting to held up two weeks to permit time for the TAAC to make its recommendations and to receive written comment.

REGIONAL TRANSIT BOARD STRATEGIC PLAN

Andrews introduced the memorandum on the RTB strategic plan, dated April 16. Campo said she met with Mike Robertson last week to ask questions about the RTB governance authority. Strategic planning was referred to frequently and she asked legal counsel to comment. Robertson said they discussed the implementation plan as being the relevant reference from the legislative standpoint. Andrews said this plan deals with the next year or two and areas upon which RTB must focus.

Hollander said that as the document was put together, it was clear that RTB has many strengths: it has good board members who are accustomed to making hard decisions and good technical and public information people. On the staff level, the conclusion was that the agency must show immediate results to illustrate the importance of transit. It is difficult to do with no new funding for services, but some results can be shown through bonding dollars. She reviewed the primary objectives. Feess suggested that the Northtown Hub be upgraded. The cost would be minimal.

The chair said members have discussed arranging more contact with constituents and those events should be programmed. They should include the MTC representative from the each area because a lot of questions will relate to bus service. She said that is a board responsibility and a way should be found to do it. For nine years she has held breakfast meetings in her ward in Minneapolis because they give people a place to make contact. Hunt commented that meetings in the various jurisdictions should include the appropriate legislators.

Hollander asked members to comment at this meeting or bring their comments to the next meeting of the board.

REGIONAL TRANSIT BOARD FIVE-YEAR TRANSIT PLAN

Blin reviewed the process for formulating the Five-Year Transit Plan. The Legislative Audit Commission directed that RTB increase suburban service and improve monitoring of service throughout the Region. At times that is a contradiction because service in outlying areas is often the least productive. Rosvold reviewed the graphs he distributed before the meeting. Franklin said it would be helpful to know the numbers of hours. Rosvold said RTB has per program/per hour figures and can determine revenue for hours of service by each provider. A passenger hour is the same as a revenue hour. Blin said there will be a series of presentations over the next few months. Hilary said MTC progress should also be factored in.

OTHER BUSINESS

There being no other business, it was moved, seconded and carried unanimously that the meeting be adjourned.

I hereby certify that the foregoing constitutes a true and accurate record of the Regional Transit Board's Policy Committee meeting of April 27, 1992.

Respectfully submitted,

Mary Fitzgerald
Secretary

Approved this 18th day of May 1992.

REGIONAL TRANSIT BOARD
Mears Park Centre, 230 East 5th Street
St. Paul, Minnesota 55101
612/229-2700

Minutes of the Meeting of the REGIONAL TRANSIT BOARD May 4, 1992

MEMBERS PRESENT: Michael J. Ehrlichmann, Chair; Maryann Campo; Doris Caranicas; Sharon Feess; Ruth Franklin; Val M. Higgins; Ruby Hunt; Tom Sather; Don Scheel; Tom Workman

MEMBERS ABSENT: Sandra Hilary

OTHERS PRESENT: Arnie Entzel, Amalgamated Transit Union; Sara Lenz and Joel Wagner, Ebenezer Society; Gregory L. Andrews, Howard Blin, David Jacobson, Sherry Munyon, Mary Fitzgerald, RTB staff

CALL TO ORDER AND ROLL CALL

The chair called the meeting to order at 4:05 p.m. and roll was taken.

APPROVAL OF AGENDA

Franklin moved and Feess seconded that the agenda be approved. The motion carried unanimously.

APPROVAL OF MINUTES

Feess moved and Caranicas seconded approval of the following minutes:

Administration and Finance Committee Meeting, April 13, 1992
Regional Transit Board Meeting, April 20, 1992

The motion was unanimously approved.

CHAIR'S REPORT

Driver of the Month Award

Higgins presented the Driver of the Month award to Joel Wagner of the Ebenezer Society and stressed that the Metro Mobility drivers are the most important contact the riders have with the service.

The chair reported on his meeting at the Capitol regarding Metro Mobility. Scheel expressed his disappointment at the attendance at that meeting, noting that only one out of thirty representatives from District H was present. The chair said that when we have a final plan we will hold a meeting, invite legislators, and explain to them how it will affect their constituents. Hunt said they should be invited to make recommendations on how to handle the issue.

The chair noted that the time of the luncheon at CTS has been changed. An MTC bus will take a tour through the new I-394 corridor and the Third Avenue Distributor (TAD) parking garages in Minneapolis.

Last week the chair was in Washington D.C., met with other agency heads, and made a presentation for the American Public Transit Association for other transit authorities before the Transit Subcommittee.

MEMBERS' REPORTS

Workman said that as Chair of the Legislative Committee he will call the committee together to discuss some of the finer points of the legislative program. The chair asked him to schedule that meeting with the board secretary and staff.

EXECUTIVE DIRECTOR'S REPORT

Andrews said the Minnesota Department of Transportation's public hearing on the Environmental Impact Statement for I-35W and comments on the temporary lane proposed south of the river will be held at Richfield High School. The chair said he has asked Maryann Campo to take the lead on this issue in interfacing with this board. She has worked on the issue for a long time and represents that district.

Travlink Project

Blin distributed a memorandum, dated May 1, regarding the status of the Travlink automated vehicle location (ALS) project. It is a joint project with Mn/DOT, MTC and RTB. The system can supply real-time information so people at the hubs can be told exactly when their buses will arrive. If the Federal Transit Administration approves funding, the staff will return to the board with a recommendation.

Hunt said this project was discussed at the last MTC meeting and questions were raised as to what would happen if federal funds are not available: should this be picked up by local property taxes and would it be advisable to do so? Blin said staff is proposing a demonstration project about 18 to 24 months long and would then consider whether it is feasible for the entire MTC fleet. The test would have to be done first and so far the RTB is not committed to anything. Higgins questioned how practical or worthwhile it is to know these things. Blin said currently there are people on the streets to determine if buses arrive on time, but the data has never been transmitted back to the riders. This systemcould improve the reliability of transit. In response to Hunt's question, the chair said the policy decision on this project was made in the Vision for Transit bonding decision. This is one of the projects Brian Clymer came to the Twin Cities to discuss. Higgins said he is very skeptical of projects with such high figures. While he sees the value of the project, Workman agreed with Hunt and Higgins. Franklin said at some point this system could replace supervisors on the street and there should be some analysis of the potential savings. In response to Campo's question, Blin said that given favorable response from FTA, staff will come back to the board for approval of a grant application, which will not commit the board to this project. Campo asked for more information on the system.

Entzel said he is pleased this will be a demonstration program. The security aspect, given the situations that confront drivers, makes it especially worthwhile. Higgins said that aspect would be more important to him, but does not see how much help this system

would give. He is interested in knowing more about the practical applications. No action is necessary at this time.

REPORT OF THE POLICY COMMITTEE

Workman reviewed the report of the committee's meeting of April 27, 1992. He moved and Higgins seconded:

Report to the Legislature on Metro Mobility Customer Service Quality

> That the Regional Transit Board approve the submittal of the Report to the Legislature on Metro Mobility Customer Service Quality, dated April 27, 1992.

The motion was unanimously approved.

OTHER BUSINESS

Hunt said she toured the MTC last week and was very impressed with several things, including their effort to be more consumer-oriented. If a bus leaves the bus barns more than 15 minutes late, the farebox is covered the next day to demonstrate MTC's regret at failing to maintain the schedule. There are a number of other techniques they are using as well.

Ehrlichmann said the Light Rail Transit Governance Bill was pocket-vetoed by the Governor. Metro Council Chair Mary Anderson will meet with Commissioner Denn and Chief of Staff John Riley and he will ask her to report on this meeting to the RTB. There has been confusion about the contents of the bill. It did not contain any funding and the agencies can proceed as though the bill had not been vetoed. There are funds available to do the analysis.

Andrews reminded members of the open house and public meeting on the proposal to restructure Metro Mobility. The purpose of the meeting is to answer rider's questions about the restructuring and then take public suggestions and comments. This is not a formal public hearing.

Campo asked Entzel to clarify his statement in the last sentence, fourth paragraph, Page 2, in the minutes of the April 20, 1992 board meeting. Entzel said the sentence should have been "...opposition from big government."

There being no other business, Workman moved and Caranicas moved that the meeting be adjourned. the motion was unanimously approved; the meeting adjourned at 4:50 p.m.

I hereby certify that the foregoing constitutes a true and accurate record of the Regional Transit Board's meeting of May 4, 1992.

Respectfully submitted,

Mary Fitzgerald
Secretary

Approved this 18th day of May 1992.

REGIONAL TRANSIT BOARD
Mears Park Centre, 230 East 5th Street
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Ruth Franklin
Chair

5/11/92
mff

REGIONAL TRANSIT BOARD

Mears Park Centre
230 East Fifth Street, St. Paul, Minnesota 55101
292-8789

DATE: May 18, 1992

TO: Members of the Regional Transit Board

FROM: Mike Kuehn, Community Relations Coordinator MK

SUBJECT: MTC Appointment Process

This is to inform members of the RTB of the tentative timeframe that has been established for appointment of the two expiring positions on the Metropolitan Transit Commission (MTC). The two positions that expire are the Metropolitan Area at-large seat (currently held by Ray Waldron) and from the transit service area of the commission, but outside of Minneapolis and St. Paul (currently held by Bruce Nawrocki). These terms expire on August 1, 1992, and are both three-year terms. Members would continue to serve past their expiration date if the RTB does not act to reappoint current MTC members or appoint new members until after that date.

Here is a tentative schedule for making appointments:

- May 20 - Secretary of State's Office, Open Appointments Section, notified as required by law, of pending expiration of terms.
- June 1 - Notification of pending vacancies published in **STATE REGISTER.** Secretary of State's Office notifies other metro area newspapers and media of vacancies.
- June 23 - Open appointments law minimum application deadline to apply for MTC appointment.
- July 10 - RTB imposed application deadline. This will allow time to have materials and background information submitted and distributed to Board members in advance of public meeting.
- July 20 - RTB holds public meeting to receive public comment on appointments. (This is an interview session with all applicants.)
- August 3 - RTB acts to appoint to fill expiring MTC terms.
- August 10 - MTC appointees can be sworn in at first MTC meeting held after this date.

Prior to July 20 interview session, the RTB will be provided with all applications, background information and recommendations received in support of each applicant.

The applicants are notified prior to this date to be prepared to appear before the RTB for a ten-minute presentation on their qualifications and desire to serve on the MTC. Board members may ask questions of each applicant.

If Board members are contacted by interested individuals regarding the appointments, they may be informed that applications can be obtained by calling the Open Appointments Section of the Secretary of State's Office at 297-5845.

If you have any questions about the appointment process, which the RTB has used for the last several years, please feel free to contact me at your convenience.

REGIONAL TRANSIT BOARD

Mears Park Centre
230 East Fifth Street, St. Paul, Minnesota 55101
612/292-8789

DATE: May 18, 1992

TO: Chair and Members of the Board

FROM: Stephanie Eiler, AICP
Sr. LRT Development Planner

SUBJECT: E-TRAN Electrical Vehicle and Roadway System

A young inventor from the Twin Cities has patented an electric vehicle system which he believes will change the way we think about transportation. Nick Musachio has named his invention "E-TRAN", and has been demonstrating it for Twin Cities legislators, transportation policy makers, and the news media for several months.

I had the opportunity to attend an E-TRAN demonstration last month. The system uses an electrified roadway and an electric vehicle. An electrical power strip is imbedded in the pavement of the center of the driving lane. The power is activated when a vehicle with front and rear electrical contacts is driven over it. The vehicle can be a regular automobile, a bus or a truck. The power is activated only when a moving vehicle is directly above the strip embedded in the road. As the vehicle moves, the power moves with it. The literature desribes the effect as an E-TRAN vehicle riding the crest of a vehicle-induced power wave.

The beauty of this system is that normal traffic can share the roadway, and the power strip in the road is inert--which makes it safe for pedestrians. While it does not solve congestion or capacity problems, it may offer energy-saving power options. It is also likely to be consistent with some of the principles of IVHS (Intelligent Vehicle Highway Systems), the current "hot" national transportation issue.

E-TRAN demonstrations are held regularly, and can be specially scheduled for a group such as RTB members. I will be happy to set something up at the pleasure of the Board.

Infromation from the E-TRAN marketing brochure is attached.

E-TRAN—The Electric Vehicle Roadway

E-TRAN is a patented electric vehicle system that will change the way we think about transportation. It is economically and technologically feasible as an alternative to gasoline powered cars. Development of E-TRAN will bring cleaner air, greater energy independence, and cheaper transportation. And we can obtain these benefits without sacrificing the flexibility and convenience of the personal automobile.

What is E-TRAN?

E-TRAN is an electrified roadway and electric vehicle system that functions as an endless extension cord. The vehicles interact with the road so that power is supplied only when a vehicle is present. The system is safe for pedestrians and works in all types of weather. E-TRAN vehicles would be lightweight, powerful and have unlimited range while on the E-TRAN system.

Recent advances in electronics and solid state switching devices make E-TRAN possible now. The E-TRAN concept is a breakthrough, but not because it is radically different. Much more significant, it is a breakthrough because it is compatible with our existing vehicles, roads and driving habits. E-TRAN can be installed on existing highways, today's cars can be converted, and E-TRAN and other traffic can mix on the same highway.

Major Benefits

Economy. E-TRAN costs less and delivers more than any transportation alternative. E-TRAN will stimulate our domestic economy while saving its users money by providing cheaper, more reliable transportation.

Energy. Lightweight, reliable and highly efficient, E-TRAN vehicles will use far less energy per mile than gasoline or battery powered cars. In addition, the switch from gasoline to domestically produced electricity will help free us from our increasing dependence on foreign oil.

Emissions. Drawing their power from the road, E-TRAN vehicles will be clean and quiet. Conversion of gasoline powered cars to E-TRAN will eliminate the major source of urban air pollution, as well as reduce total carbon dioxide emissions.

Made in America. E-TRAN is an American invention, developed for American roads and driving habits, and well suited to be built and produced by American workers.

E-TRAN has the potential to improve our lives and environment far beyond its costs. The technology is available. What is needed now is the will to proceed.

E-TRAN is an electrified roadway and electric vehicle system that functions as an endless extension cord.

Nick Musachio, *Inventor*

★★★

The Electric Vehicle Roadway

E-TRAN is an electrified roadway system that provides direct electrical power to a moving electric vehicle. It is a safe way for an electric car to *plug into* the road. E-TRAN accomplishes this through a unique interaction between the vehicle and a modified existing road.

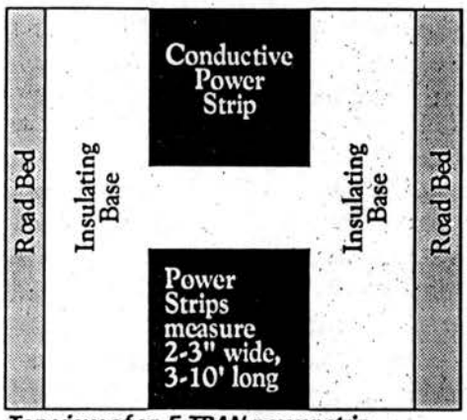
The system provides direct constant power to an electric vehicle for locomotion as well as for recharging the electric vehicle's batteries. The system can be installed on any roadway without major construction. Once it is installed, normal traffic can share the roadway, and the system is safe for pedestrians, tamper proof and highly reliable.

The E-TRAN Road

The E-TRAN electric highway allows an E-TRAN vehicle to directly access power through signal controlled power strips embedded in the road. An E-TRAN vehicle has two electrical contacts, one at the front and one at the rear of the vehicle. The vehicle's contacts ride on top of a single line of conductive power strips.

The main power for the system is safely embedded beneath the roadway surface. This power is fed to the power strips only when a moving vehicle is directly above the strips. As the vehicle moves, the power moves with it. Picture it as an E-TRAN vehicle riding the crest of a vehicle induced power wave.

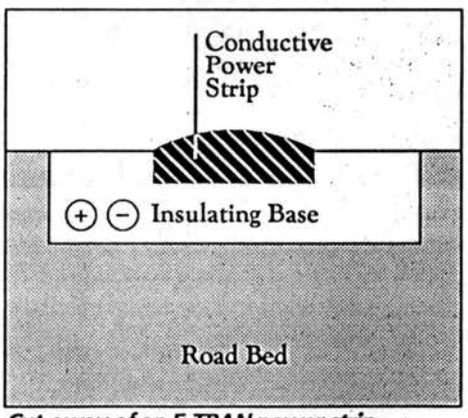
The whole system takes up little space on the road. The power strips are substantially flush with the surface, only about 2-3 inches wide, and one



Top view of an E-TRAN power strip.

half inch deep. They appear as metal strips lined up end to end, embedded in rubber, and running down the center of the driving lane.

The strips are connected to buried power lines by solid state power controllers. These power controllers switch on only when a vehicle tells them to. In other words, they are signal controlled. In the absence of a signal from an E-TRAN vehicle directly overhead, they are completely safe. You can walk barefoot on them.



Cut-away of an E-TRAN power strip.

E-TRAN Vehicles

E-TRAN vehicles are hybrid. That is, they are capable of travelling on their own power or by accessing an E-TRAN electric highway to obtain power directly from it. Because the vehicles are hybrid, only freeways and main traffic arterials need to be electrified.

Driving an E-TRAN vehicle will be like driving your car, except it will be cleaner, quieter and more reliable. Because of their light weight and unlimited power from the road, they will have snappy acceleration and good maneuverability—without the smell, vibration and noise of gasoline or diesel powered vehicles.

As the vehicle approaches an E-TRAN electric highway, the push of a button will lower the contacts onto the power strips. As the strips respond to the vehicle's signals, each strip emits a pulse of power to the vehicle, and then returns to its safe neutral state. Engineers might recognize E-TRAN as a linear electric motor, or more precisely, a linear electric commutator.

E-TRAN vehicles use wide floating contacts that allow the vehicle to maneuver just as an ordinary car. As long as the vehicle is over the power strip, it will be powered from the road. E-TRAN vehicles can swerve, pass or change lanes just as ordinary vehicles do. Changing from road power to battery power is automatic and instantaneous.

The wide floating contacts stay in contact with the power strips by the use of a catenary device that is spring loaded to maintain tension and contact with the strip. A different method for maintaining contact with the power strip that can be promising for high speed applications is radio or optical signal guidance.

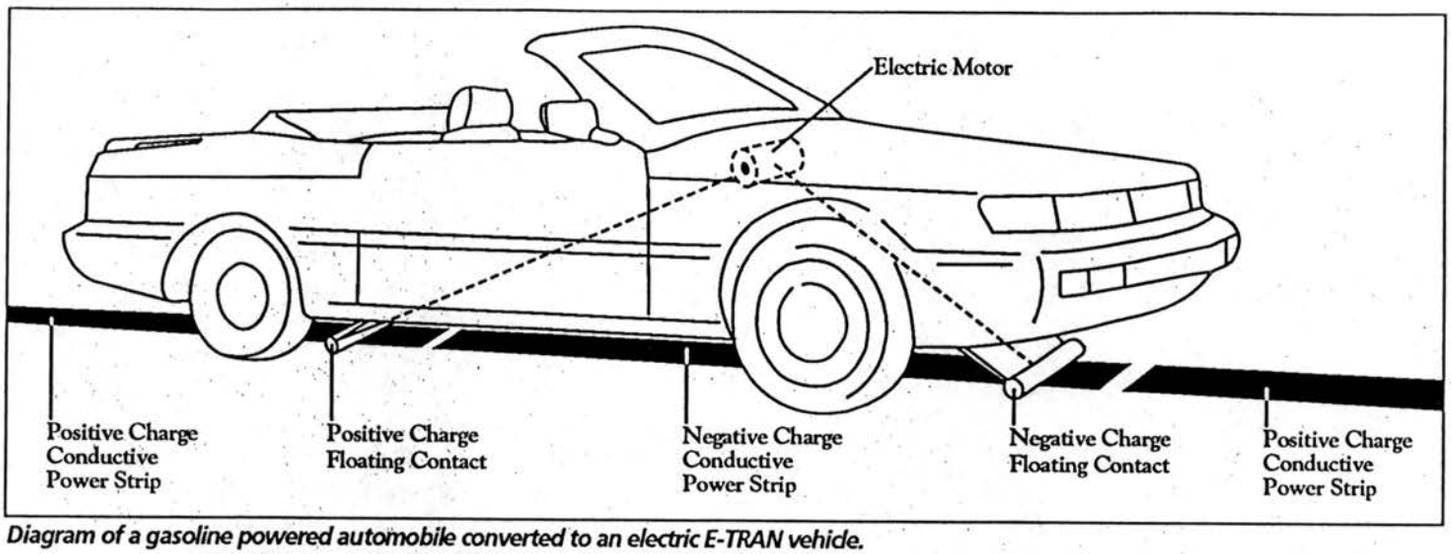


Diagram of a gasoline powered automobile converted to an electric E-TRAN vehicle.

Enhancements

As E-TRAN is developed for widespread public use, many enhancements will likely be added to the basic system. These might include some of the following:

Electronic Vehicle Guidance. The use of radio or optical guidance for the power strip contact will lead quickly to electronic guidance for the entire vehicle. *Smart* highways are a logical partner for E-TRAN, and would provide the additional benefit of greater highway safety.

Regenerative Braking. In urban traffic, as much as 30% of a vehicle's energy is lost to braking. E-TRAN can recapture much of that wasted energy. By using the electric motor as a brake, it becomes a generator of electricity. This electricity can go back into the system, saving the energy that is normally wasted.

Solar "Boosters". Solar cells can be added to E-TRAN vehicles to provide as much as a fourth of the power they need. For vehicles that use batteries for auxiliary power when off the E-TRAN system, solar cells can keep the batteries charged, extend range, and reduce the number of batteries required.

E-TRAN For Freight, Personal and Mass Transit

The E-TRAN system is adaptable and can be used for many types of transportation. For example E-TRAN systems can be developed for personal transportation, mass transit, freight hauling, indoor people movers, and mobile robotics. In each case E-TRAN offers many of the same advantages of safety, economy, efficiency, quiet and cleanliness.

In most urban areas a single E-TRAN installation can serve several transportation needs. For example, an E-TRAN system installed on existing freeways can be shared by mass transit, taxis, personal automobiles and trucks. Such a system would be much more extensive and receive far more use than a single purpose roadbed of the same cost developed for light rail transit.

The adaptability of E-TRAN is one of its major attractions because it will enable us to evolve, moving forward from our existing base of investment in highways and vehicles. It does not require us to abandon those investments.

E-TRAN systems can be developed for personal transportation, mass transit, freight moving, indoor people movers, and mobile robotics.

Nick Musachio, *Inventor*

★★★

E-TRAN Economics

E-TRAN's capital costs are less than 5% of typical light rail transit estimates, and the electric highway will be available for all to use.

Nick Musachio, *Inventor*

★★★

Every transportation system has costs. The massive investment in our interstate highway system and fleet of vehicles illustrates the resources we devote to transportation. By comparison, E-TRAN is a very low cost system because it moves us forward by building on what we already have.

Low Capital Costs

The cost to convert an existing road to E-TRAN is estimated at approximately $400,000 per mile—or less than $1 million per mile for two E-TRAN lanes, one for each direction. These costs are likely to be significantly lower, once E-TRAN components are in mass production. To put this in perspective, our net deficit for imported oil can fund conversion of the entire national interstate highway system in less than three years.

In comparison, the estimated cost for building a light rail transit corridor is $15- $25 million per mile, and the recent construction of I-394 in Minneapolis cost $40 million per mile. E-TRAN's capital costs are less than 5% of typical light rail transit estimates, and the electric highway will be available for all to use.

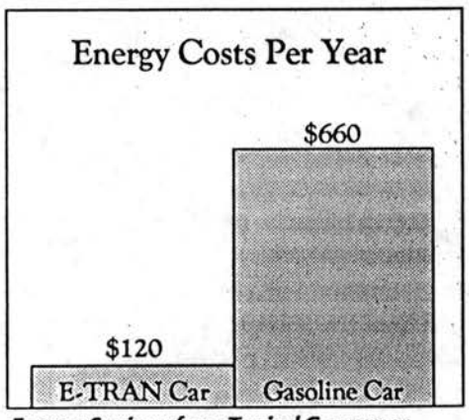
The vehicles are the second component of the E-TRAN system. E-TRAN vehicles are lighter, more reliable and have fewer moving parts than gasoline powered cars. Once in mass production, E-TRAN vehicles should also be less expensive to produce. Since existing vehicles can be converted and E-TRAN can mix with normal traffic, no sudden unaffordable expense for replacing our vehicle fleet will be incurred.

Lower Energy Costs

Electrically powered vehicles are inherently more energy efficient than internal combustion engines which produce large amounts of heat, noise, vibration and other wasted energy even when the vehicle is not moving. E-TRAN vehicles have an added advantage by being powered directly from the road. This enables an E-TRAN vehicle to use all of the power for locomotion. Battery powered cars carry 1,000 pounds or more of batteries, and they lose over 50% of the electrical energy in the battery charging cycle.

Based on studies done with battery powered cars, and an estimate of E-TRAN's efficiency advantage, it is likely that the energy used by an E-TRAN passenger car will cost less than 1¢ per mile.

At $1.10 per gallon of gasoline, a gasoline powered car will need to get over 100 miles per gallon to have an energy cost this low. For a typical car owner who gets 20 miles per gallon and drives 12,000 miles per year, the E-TRAN cost savings for energy alone will be over $540 per year. If a million vehicles were converted, these savings to the consumer will total $540 million per year. The potential cost and energy savings nationwide are enormous.



Energy Savings for a Typical Consumer

Other Economic Benefits

E-TRAN's relatively low costs are only one of its advantages. Some other important economic benefits are summarized below:

A Healthier Environment.
Cars are the major contributor to urban air pollution. The American Lung Association estimates the cost of health damage due to air pollution at $30 billion per year. E-TRAN will reduce this pollution, and the damage to our land, water and the world's oceans caused by the inevitable oil spills.

Less Reliance on Foreign Oil.
We now import over 50% of our oil. This compares to only 25% at the time of the 1973 oil embargo. E-TRAN will use domestically produced power and will reduce the reliance on foreign oil. For example, conversion of only 1 million vehicles to E-TRAN will reduce gasoline consumption by nearly 600 million gallons per year.

Re-energizing America's Automobile Industry.
For the first time in modern industrial development, the automobile industry and the mass transit industry will be able to merge technologies and investments. E-TRAN provides America the opportunity to regain leadership in this field. Development of new E-TRAN vehicles and conversion of existing cars can re-energize America's auto industry.

The E-TRAN Environment

Clean, Quiet, Healthful.
These adjectives describe the E-TRAN environment when many of us take the *E* to work rather than gasoline or diesel powered cars and buses. E-TRAN vehicles are emissionless, and virtually silent compared to the internal combustion engine.

The auto-induced pollution problems of southern California are known around the world. The New York Times recently reported a persistent *haze blob* along the entire eastern half of the United States. From 60% to 90% of these massive pollution problems are automobile related—adding billions in health costs every year.

E-TRAN can begin to reduce these and other environmental problems. E-TRAN vehicles contribute nothing to urban air pollution. Since they are vastly more efficient, they also will reduce total carbon dioxide emissions nationally, thus contributing to a solution to the greenhouse effect.

Finally, because E-TRAN does not rely on oil for power, it will reduce the environmental damage associated with the use and transportation of oil. As oil supplies begin to diminish, pressure to exploit the remaining resources and international tensions over their allocation are inevitable. Perhaps by reducing demand, we can avoid future disasters.

For the first time in modern industrial development, the automobile industry and the mass transit industry will be able to merge technologies and investments.

Thomas Harens, *Earth Day International*

★★★

The E-TRAN Advantages

The chart below compares E-TRAN to some of the existing transportation alternatives, including gasoline powered cars and light rail transit. The chart shows that E-TRAN has several key advantages over each of these alternatives.

E-TRAN Advantages Over Alternative Transportation

CRITERIA	E-TRAN	Gasoline Vehicle	Battery Powered Vehicle	Solar Powered Vehicle	Light Rail Transit
Destination to Destination Flexibility	Yes	Yes	Yes	Yes	No
Energy Efficiency Compared to Gas Car	5 times better	N/A	same	N/A	depends on use
Reduces Reliance on Imported Oil	Yes	No	Yes	Yes	Yes
Freight Hauling Capacity	Yes	Yes	No	No	No
Heat, Air Conditioning, Etc.	Yes	Yes	No	No	Yes
Carbon Dioxide Reduction	Yes	No	No	Yes	Yes
All Weather Vehicle	Yes	Yes	not in cold weather	No	Yes
Adequate Vehicle Performance	Yes	Yes	No	No	N/A
Can Convert Existing Vehicles	Yes	N/A	No	No	No
Utilizes Existing Roadways	Yes	Yes	Yes	Yes	No
Vehicle Costs Compared to Gasoline Cars	same	N/A	2-3 times more	5 times more	N/A

The E-TRAN Advantages

E-TRAN Versus the Gasoline Powered Car

The advantages of E-TRAN over the gasoline powered car include better energy efficiency, zero emissions, lower cost, and reduced reliance on imported oil. The gasoline powered automobile is at the heart of many of our urban environmental problems. E-TRAN offers a solution.

E-TRAN Versus the Battery Powered Car

Compared to E-TRAN vehicles which take their power directly from the road, battery powered vehicles have several significant disadvantages:

- ★ Higher energy consumption because of losses during the battery charging cycle.
- ★ Poor performance and lower energy efficiency because of the weight of the batteries and the structure needed to support them.
- ★ Poor battery performance during cold weather.
- ★ Pollution and other environmental hazards associated with battery production and disposal.

E-TRAN Versus Solar Powered Vehicles

With today's solar cell technology, solar powered cars are not a realistic or feasible alternative. The solar cells that can be mounted on a car cannot power a vehicle with useful weight carrying capacity and performance. Of course, solar power does not work at all at night or in inclement weather.

However, solar power may be a useful add-on to E-TRAN vehicles, to supplement the power from the road or to charge internal batteries. Solar cells could provide as much as a fourth of the power needed to run an E-TRAN vehicle when it is off the system. This will extend vehicle range and internal battery life.

E-TRAN Versus Light Rail Transit

E-TRAN is an entirely different concept than light rail transit because it can be used by automobiles, trucks and other vehicles, in addition to mass transit. The flexibility and low cost of E-TRAN are its major advantages. The inflexibility of light rail corridors, and its high cost, are light rail's biggest disadvantages.

E-TRAN mass transit will appeal to many people because it will offer clean, quiet and flexible transportation. The flexibility of routes and stops will be similar to existing bus routes, except that the vehicles will offer a cleanliness and quietness unknown in most transit systems.

Development of E-TRAN mass transit corridors is possible at a small fraction of the cost of light rail transit. Development of these corridors can eliminate the need for light rail transit and become the skeleton and framework for a more extensive E-TRAN system for personal use.

The gasoline powered automobile is at the heart of many of our urban environmental problems. E-TRAN offers a solution.

Keith Langseth, *Minnesota State Senator*

★★★

Questions & Answers About E-TRAN

...it is estimated that a fleet of one million E-TRAN vehicles will increase electric consumption by only 7.5% of Northern States Power's current production.

Nick Musachio, *Inventor*

★★★

Will E-TRAN Operate in Rain or Snow?

Rain poses no problem for an E-TRAN electric highway. The resistance of rainwater is high and rain will not interfere with the operation of the system. For example, consider that electric trains and transit systems powered through the rails operate unimpeded even during heavy rainstorms.

Snow and ice will be melted with heating cables imbedded in the power strips. Testing of snow removal techniques is part of E-TRAN's next development phase.

How Will Consumers be Charged for the Power They Use?

E-TRAN vehicles will be equipped with tamper proof electric meters. The meters will be of the off-peak power type, so that electricity will cost more during peak traffic times and less at off-peak times. This will enable some control and leveling of power consumption and traffic using pricing as a traffic controller.

Will the E-TRAN Roadways be Safe?

E-TRAN was designed with safety as a number one priority. The strips are powered only when a vehicle is directly over them. The system is deactivated by braking or when the vehicle is at rest, thus preventing the danger of shock when leaving the vehicle or in case of accident. Solid state design of the power controllers assures that any failure of the controllers is a safe failure with power off.

If the E-TRAN concept is enhanced with electronic vehicle guidance, E-TRAN will be the beginning of a safety revolution, including collision avoidance systems and optimum traffic flow controls. Although these safety advances are not a part of the basic E-TRAN concept, E-TRAN will provide the basis and foundation for their widespread implementation.

Will E-TRAN Require New Electric Power Plants?

It is likely that an entire E-TRAN system could be run on electricity that is now just wasted.

For example it is estimated that a fleet of one million E-TRAN vehicles will increase electric consumption by only 7.5% of Northern States Power's current production. Of course, this will not happen overnight. As vehicles are converted and added to the system this amount of energy can be made available by expanded energy conservation and the natural replacement of old electric appliances with newer more efficient models.

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