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16. Abstract

To meet the nation's transportation demands for the 21st century, innovation and technological advances in the transportation field will be essential. The public transit workshops were designed to expose and advance state-of-the-art research on four major themes: (1) energy efficiency as a transportation objective, (2) the impact of changing public policies on urban transportation, (3) the role of public transit in an intermodal transportation system, and (4) the advanced technology systems as they apply to public transportation. The workshops highlighted in this compendium focus on disseminating data analysis and research findings from the projects underway related to potential energy savings techniques. For example, energy efficiency, as a transportation objective, can be addressed in many ways: (1) technological innovation, such as more efficient transit vehicles and routing methods, (2) reduction of vehicle miles through increased transit use and carpooling, and (3) improved land use planned in cities to reduce the need for automobile travel. Achieving improved energy efficiency through any one of the above methods will have the added benefit of reducing U.S. dependency on imported fossil fuels. By conducting this workshop series, a forum was provided for academic and professional participants to dialogue on transit topics. Secondly, the workshops encouraged the application of current research to service providers and policy formulation in the community. By stimulating existing partnerships, between academics and professionals, the conference series offered a conducive environment for information exchange and the opportunity to forge new relationships.

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Public Transit Workshop Compendium

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DISCLAIMER

ABSTRACT

To meet the nation's transportation demands for the 21st century, innovation and technological advances in the transportation field will be essential. The public transit workshops were designed to expose and advance state-of-the-art research on four major themes: (1) energy efficiency as a transportation objective, (2) the impact of changing public policies on urban transportation, (3) the role of public transit in an intermodal transportation system, and (4) the advanced technology systems as they apply to public transportation. The workshops highlighted in this compendium focus on disseminating data analysis and research findings from the projects underway related to potential energy savings techniques. For example, energy efficiency, as a transportation objective, can be addressed in many ways (1) technological innovation such as more efficient transit vehicles and routing methods, (2) reduction of vehicle miles traveled through increased transit use and carpooling, and (3) improved land use planned in cities to reduce the need for automobile travel. Achieving improved energy efficiency through any one of the above methods will have the added benefit of reducing U.S. dependency on imported fossil fuels. By conducting this workshop series, a forum was provided for academic and professional participants to dialogue on transit topics. Secondly, the workshops encouraged the application of current research to service providers and policy formulation in the community. By stimulating existing partnerships between academics and professionals, the conference series offered a conducive environment for information exchange and the opportunity to forge new relationships.

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OVERVIEW: PUBLIC TRANSIT WORKSHOPS

To meet the nation's transportation demands for the twenty-first century, innovation and technological advances in the transportation field will be essential. Researchers and practitioners are focusing human and financial resources on the identification of mechanisms that respond to the challenges facing the industry. Air quality problems, diminishing domestic fuel reserves, gaining public acceptance of new technologies, and incorporating a changing workforce into the transportation arena are some of the issues that must be addressed by transportation officials. The Center for Transportation Training and Research, as part of the Southwest Region University Transportation Center, sponsored a series of workshops from November 1992 to October 1995 which advanced the state-of-the-art on the aforementioned issues. FTA Administrator, Gordon Linton, offered expanded parameters by which transportation administrators and university researchers viewed study findings and considered experiential knowledge. The five conference themes were as follows:

1. *Traditional and Non-Traditional Approaches to Conservation*
   November 1992 - Houston, Texas

Topics included state-of-the-industry experiences regarding CNG and LNG utilization, saving fuel through more efficient bus service programming, and methods of energy conservation in the marine transportation sphere.

2. *Exploring the Impact of Changing Policies on Urban Transportation Systems*
   April 1993 - Austin, Texas

The early nineties marked a period of substantial policy changes for transportation. The Americans with Disabilities Act and Clean Air Act

Amendments mandated revisions in the standard operating procedures for transportation agencies across the nation. Heightened awareness of ethnic and gender changes in the workplace encouraged increased sensitivity in transportation decision-making.

3. *Intermodalism and Opportunities to Improve Mobility*
   September 1993 - Dallas, Texas

Congestion management has been a transportation priority for several decades; conference participants examined whether the concept is elusive or is attainable. The potential role of intermodalism in achieving national goals was also explored.

4. *Best Practices for Saving Energy and Reducing Congestion*
   October, 1994

Despite ongoing transportation planning, vehicle miles traveled are increasing in the U.S. Many strategies are having an impact on a small scale in communities across the country. This seminar focused on the causes of increasing congestion and highlighted selected individual responses.

Because the issues of transportation are interactive, many of the topics that were basic foci of one conference were cross-cutting issues at other sessions in the workshop series.

5. *Alternative Fuels Requirements Mandated in Texas School Districts*
   October - 1994

Alternative fuel is a significant component of energy conservation efforts mandated by the Texas Legislature. Texas schools were directly affected by the impacts of Senate Bill 740 – which required that schools with 50 school buses or more switch to some form of alternative fuel. In response to these concerns, The Center for Transportation Training and Research sponsored a conference to

examine the issues associated with the Government Bill, and its effect on the Texas school districts.

The workshops for regional mobility development issues were designed to advance the state-of-the-art on a variety of public transportation issues. The workshops focused on technology and expertise, for the purpose of fulfilling national transportation goals of safety, efficiency, imagination and creativity, along with opportunities for applying new knowledge and ideas. The issues addressed were linked to related problems such as multimodal linkages, economic growth and development. Since innovation and new technologies are central to sound management of capital and human resources, the research specifically addressed how to best disseminate basic research findings to a variety of users in the public transit industry, business industry, and community organizations/agencies.

This report is a compilation of the remarks made by speakers at all five workshop sessions. The comments made by workshop speakers may have linkages to concepts of other workshops in the series. Therefore, the remarks are organized by topic for contextual consistency and increased readability. Full conference agendas are in Appendix A.

REGIONAL MOBILITY DEVELOPMENT CHALLENGES

The industry is constantly changing. Transportation officials must be open to new ideas and innovation in improving mobility while simultaneously improving energy efficiency.

◆ ESTIMATING ENERGY & AIR QUALITY IMPACTS OF PARK & RIDE AND HOV FACILITIES

Katherine Turnbull, Texas Transportation Institute at Texas A&M University, related the effect of Energy and Air Quality on High Occupancy Vehicle facilities. She stated that the focus of high occupancy vehicle lanes (HOV's) is to improve travel time for the commuter. Turnbull, further explained that there are currently 45 HOV projects in 21 metropolitan areas in the U.S. and more are anticipated. Not only is the continuation of HOV Programs expected, Turnbull states that the current 350 miles will increase to 1,000 miles by the year 2000.

Houston's HOV's serve four purposes: HOV's first purpose is to address regional mobility concerns, secondly, to increase Park & Ride participation. Thirdly, to decrease the travel time and increase reliability of bus service, and finally, Houston's HOV's increase the overall person movement in the corridor.

Turnbull, indicated that efficient movement of people and buses is known to improve energy efficiency; however, she added that "the overall benefit that this movement has on total air quality and conservation requires additional research."

◆ IMPACTS OF TRANSIT TERMINALS: ISSUES AFFECTING ENERGY EFFICIENCY

Mark Euritt, Research Associate in the Center for Transportation Research at University of Texas in Austin, noted that there were many avenues in transportation that, if improved, could have an extremely positive impact on energy conservation. One such area is the energy impacts of transit terminals.

Euritt stressed some major areas of improvement include: improving vehicle operations, improving roadway operations, improving spatial arrangement, improving land use, upgrading traffic management and stimulating the use of public transit. He also highlighted comparatively small efforts that have a potentially large effect on our community.

Simply choosing another mode of transportation, such as occasionally cycling to work or school, could greatly impact air pollution and energy consumption. Individual drivers can save time and energy by adding a fellow coworker or classmate on selected routes. An imposing obstacle to one-driver automobiles is stiff environmental, energy and economic policies. Fuel efficiency is another factor directly affecting energy conservation in our nation. Euritt argued for increasing utilization of alternative fuels in the transit industry.

Euritt also discussed the Texas Social Cost Index. The index serves as a guideline for issues related to energy conservation. Some factors included in the derivation of the index were clean air, energy efficiency and economic growth. The policy items are weighted with rates as follows: clean air (50), energy savings (35), and economic growth (15). The social cost index could be rated relative to gasoline prices.

♦ A METHODOLOGY TO DETERMINE OPTIMAL TRANSIT SPACING

Jacqueline Bonds, Graduate Research Assistant, reported on methods to determine optimal transit terminal spacing. Bonds highlighted transportation modes for examination: Buses and Light Rail Transit.

Bonds stated that to make the best determination, overall cost should be assessed, clearly examining both operational cost and user cost. Operational costs consist of actual financial expenses such as, maintenance, fuel and operator wages; whereas, user cost is estimated by the amount of time spent. Time used to get to the terminal, time spent waiting on vehicle, in-vehicle time, would all be examples of user cost. Bonds concluded that the ideal method is one that significantly reduces both the user cost and the operational cost .

ENERGY EFFICIENCY: STATE-OF-THE-INDUSTRY ADVANCES

♦ UTILIZING TECHNOLOGICAL ADVANCES AND PROVEN TECHNIQUES FOR ENERGY EFFICIENCY

Energy efficiency may be obtained in a variety of ways including the use of alternative fuels, changes in travel behavior (including telecommuting), and improved operational efficiencies.

Zane Goff and **Dock Burke** discussed The Texas Transportation Energy Data Base which is a modal energy data base for transportation. Unfortunately, Texas has the highest per capita rate of energy consumption in the country. This is one of the reasons TTI developed the Modal Energy Base. The primary objective is to achieve a comprehensive energy data base for the transportation sector of Texas. TTI's data base is similar in concept to the national data base maintained by the Oak Ridge National Laboratory.

♦ TELECOMMUNICATIONS, TRANSPORTATION AND ENERGY INTERACTION

Hani Mahmassani discussed telecommunication in Transportation and Energy Interaction. With the increasing role of personal computers in energy savings, Mahmassani called attention to the growing use of "telecommuting strategies" in business and industry. Telecommuting strategies are exhibited in the increase of people working at home, using faxes and modems, or by commuting short distances to satellite office centers that are equipped to allow employees to work in a business environment while simultaneously saving time and energy over a longer commute to the principal place of employment.

Furthermore, communication technologies are also essential in the transportation industry. Mahmassani discussed how telecommunications can be used to control traffic congested thoroughfares by displaying information on a real-time basis for individual vehicles.

Similarly, JoAnn Pratt echoed the importance of telecommunications in transportation. She noted that by promoting and practicing telecommuting, the nation's energy consumption would decline considerably. Pratt elaborated on the 7.2 million people that currently telecommute in the United States which resulted in a 20% decrease in work trips.

ENERGY EFFICIENCY: UTILIZING EXISTING RESOURCES

◆ ALTERNATIVE FUELS: COMPRESSED NATURAL GAS AND LIQUEFIED NATURAL GAS

Jason Smitherman, Alternative Fuels Program Administrator for the State of Oklahoma, acted as moderator for one energy efficiency workshop. He pointed out that the topic of energy efficiency was an appropriate subject since the public transportation industry is under a mandate to show significant conversion of vehicles to alternative fuels.

Panel discussions highlighted various statutes by public agencies designed to promote the use of alternative fuels. Smitherman, used a video presentation to exhibit Oklahoma's fuel conversion program to Compressed Natural Gas (CNG). Tulsa also has additional programs aimed at reducing fuel costs, it is estimated that they have saved approximately $800 - $1000 annually in fuel costs per vehicle. Additionally, Oklahoma is attracting private sector companies to participate in the program by offering financial incentives.

Globally, America is dependent on outside sources for 50% of its fuel supply. Clearly, there is an urgency to improve the nation's dependency status. Smitherman challenged the audience with the statement, "We no longer control our oil; it controls us."

Rocky Burke discussed CNG as an alternative fuel for transit. He utilized data from the Austin Capital Metro CNG Alternative Fuels Program as the basis of his remarks regarding energy conservation. Burke, Director of Vehicle Maintenance for Austin Capital Metro, reviewed over two years of personal experience with CNG (Compressed Natural Gas).

Natural gas is almost non-polluting when compared to traditional fuels, such as diesel fuel and gasoline, which are detrimental to the air quality and environment. Compressed Natural Gas has minimal impact on the earth's environ. Furthermore, CNG is the safest of all alternative fuels due to its low volatility and density. CNG is also a plentiful resource in Texas and substantially cost-effective. CNG runs approximately $.39 per gallon as opposed to traditional fuel which can escalate to over $1.25 per gallon.

Burke noted that both state and federal legislation have implemented policies to ensure that mass transit authorities convert to alternative fuels. Texas law requires that by 1998 90% of transit groups should be using alternative fuel. Moreover, by year 2000 the entire Texas Public Transit community should be converted to a form of alternative fuel. **(The Texas Legislature has since repealed this requirement.)*

- A SURVEY OF COSTS ASSOCIATED WITH FUEL CONVERSION BY SELECTED PUBLIC TRANSIT SYSTEMS: A REPORT OF PRELIMINARY DATA

Dr. Naomi Lede', professor of Transportation at Texas Southern University, and research assistant Mohammed Hamid addressed issues associated with fuel conversion participation, in a study entitled, *A Survey of Costs Associated with Fuel Conversion by Selected Public Transit Systems: A Report of Preliminary Data.* Lede' and Hamid stated that surveys indicated that over 61% of transit operations are using alternative fuels, and the majority of these companies are doing so on a voluntary or experimental basis. It was also determined that 55% of transit companies are using CNG (compressed natural

gas), while 22% use liquefied natural gas (LNG), the remaining utilize methanol and other fuels as primary sources. In addition, there are a wide range of costs and other issues involving logistics, longevity, fueling time, and engine related problems that must be assessed to determine the effectiveness of alternative fuels.

- FOCUS ON ISSUES ASSOCIATED WITH ALTERNATIVE FUEL UTILIZATION

Ben Gomez, Assistant General Manager of Capital Metro in Austin, made the decision to use CNG in Capital Metro vans. Issues of importance were the location of a compatible fuel provider, swiftly learning the particulars of CNG operation, and the cost involved in converting. There were some critics of the endeavor who were concerned about the reliability of CNG fueled vehicles. Subsequently, Capital Metro bought extra buses to ensure stable service.

R.K. Rogers, Director of Quality Assurance, Training and Safety for Dallas Area Rapid Transit, stated that DART is dedicated to energy conservation. Rogers said that DART has committed to replace 90% of their transit fleet with CNG for fuel. They are also increasing bus sizes to 40 feet to hold more passengers. Other areas of conservation initiated by DART are recycling efforts -- water, paper, and anti-freeze.

Duane Huckabay of the Finance and Administration Department at the City of Houston, updated the group on the city's four year demonstration project testing compressed natural gas (CNG). Contingent on project results, a policy on alternative fuel utilization will be developed. He noted that the City of Houston is impressed with the availability of natural gas and the fact that public refueling stations will become available in the near future.

ENERGY EFFICIENCY: IMPROVING UTILIZING EXISTING RESOURCES

♦ LEGISLATIVE EMPHASIS

William Jernigan, Technology Transfer Specialist for the U.S. Department of Energy (DOE) Dallas Support Office, revealed that energy savings, economy associated with more efficient fuels, and pollution reduction are all prevailing issues confronting the DOE. Jernigan predicted that by 2002 private sector transportation fleets will be required to use alternative fuels if the Clean Air Act objectives have not been met. He reminded listeners that the Secretary of Energy has the right to mandate tougher restrictions if the desired conservation goals have not been obtained. In the future, alternative fuel usage will expand to include non-road vehicles.

Alan Clark, Transportation Planning Manager for Houston Galveston Area Council (H-GAC), discussed the impacts that the Clean Air Act Amendments will have on the eight counties in the Houston Galveston region. Employers are submitting proposals to significantly reduce employee-miles-traveled by 1996. Ultimately, the amendments will result in greater energy efficiency for the area.

♦ OPERATIONAL IMPROVEMENTS

Francis Britton, Assistant General Manager for the Metropolitan Transit Authority of Houston, discussed various methods of using existing facilities and services more efficiently. Britton stated that there are components of energy efficiency that can be achieved through "working smart." More

importantly, these methods can be implemented while simultaneously lowering costs. Target marketing and experimental pricing are strategies which can be used to improve efficiency. Improving the load capacity of vehicles is another. Additional facility-related strategies for energy efficiency are bus facilities operating slightly over capacity designs.

Similarly, David Hitchcock, with Houston's Advanced Research Center for Global Studies, informed the audience that there have been various research studies on the scenarios of energy futures, stating that high, medium, and low projections were developed. He explained that high projections were "business as usual", medium projections were changes in technologies without changes in lifestyle, and low projections were changes in lifestyle and changes in fuel utilization technologies. He noted that the United States has exceeded in conservation even under the low projection scenario.

Houston Metropolitan Transit Authority's (METRO) general manager, Robert MacLennan, spoke on the major efforts METRO was putting forth for energy efficiency. MacLennan noted that 36% of Houston's air pollution comes from mobile sources such as automobiles, diesel buses and trucks. Automobiles contribute to pollution the most, but buses and trucks add their share as well. To remedy this, METRO concentrates on cleaning its diesel operation in addition to converting to alternative fuels. The agency also conducted an emission test on the exhaust systems of their buses. The test results sparked several clean air programs at METRO. It also initiated engine adjustments that increased fuel efficiency by 3/10 of a mile per gallon. While this amount may seem insignificant initially, it equates to a weighty $250,000 in savings annually!

Anthony Kouneski, General Manager at Capital Metro, echoed their efforts toward energy efficiency. Like Houston, Austin also has an extensive recycling program which recycles water waste, paper and anti-freeze. Other areas of conservation include the exciting possibility of using electric buses in the future. They have energy saving programs for lighting their facilities as well. Burning clean diesel and running emission tests regularly is standard at Capital Metro. From a service-oriented perspective, Metro is focusing on improving their overall bus service to attract more customers thereby reducing the fuel wasted in single occupant vehicles. Capital Metro also sponsored a free fare program to encourage ridership. Attention is also being centered on feeder and transfer center services to streamline operations. Creative innovations are being initiated such as comprehensive bikeway planning, subsidized vanpools and a 30-mile light rail plan.

S. Thomas Kornegay, Executive Director of Port of Houston Authority discussed the success of portway transport. Kornegay reminded the audience that waterborne transport is the most energy efficient mode of movement, using a mere one gallon of fuel per 300,000 miles of transport. Kornegay also revealed that simple remedies such as cleaning the vehicle and using special paints can greatly improve vehicle efficiency. Of particular interest were actions of Japanese water transporters who have recently added sails to their vessels taking advantage of the wind and improving efficiency.

Raul Regalado represented the City of Houston's Aviation Department. The Aviation Department operates four facilities in Houston, William P. Hobby, George Bush Intercontinental, and Ellington Field airports as well as the helioport located in downtown Houston. Regalado noted that the most important areas of

cost containment is energy and fuel. Aviation uses an automated management system which regulates and monitors energy used in each facility. Additionally, preventive maintenance, flexible lighting systems and improved ground transportation are all efforts toward energy efficiency. Recently implemented programs such as alternative fuel use, employer-trip-reduction programs, and the use of more energy efficient materials and measures are underway. Regalado concluded by stating that new air traffic control systems will save 98.9 million in costs.

EXPANDING TRANSPORTATION'S TRADITIONAL SCOPE

♦ INTERMODALISM CONSIDERATIONS

Gordon Linton, Administrator for the Federal Transit Administration, challenged planners to improve mobility. He noted that the Federal Transit Administration (FTA) is supporting efforts for change. The FTA, Federal Highway Administration (FHWA) and Federal Aviation Administration (FAA) all have missions to meet the challenge to improve mobility with a focus on balanced resources. Linton suggested the need for "humanizing" public transit, and emphasized that the quest is to connect people with their opportunities.

Martin Kelly, Urban Transportation Planner for the Federal Highway Administration, spoke on the nation's dilemma of the rising number of vehicles on the road and the effects that they will have on energy consumption. Kelly noted, that in the next 20 years the national population will rise by 20%. The number of licensed drivers will increase by 48%. Furthermore, the VMT (Vehicle Miles Traveled) will increase by 84%. At the same time, the average vehicle occupancy (AVO) will decrease by 15%. Clearly, these components will have a devastating impact on energy efficiency in the country.

Jim Lomax, of Texas Tranportation Institute, stressed a need for practical applications of Transportation Systems Management (TSM). TSM improvements are achieved through such activities as roadway upgrades and signal progression to facilitate the movement of vehicles. Lomax noted that a TSM objective is to match capacity needs with the mobility needs in the community.

Tony Mendoza, Manager of Commuter Services for Dallas Area Rapid Transit, expounded on the purpose and focus of Transportation Demand Management (TDM). TDM's intent is to decrease the number of vehicles on the roads. Mendoza introduced several methods for reducing road congestion. He stated that by enhancing commuter carpooling and upscaling public transportation, congestion problems would subsequently be reduced. Also, TDM's focus is on creative movement of people, such as, staggering work hours, flex-time, and compressed work week. Finally, corporate transportation incentives like preferential treatment for carpoolers, transit fare subsidies, and guaranteed rides to residents would increase participation.

♦ REVISING OUR PARADIGMS

Milton Dietert, District Engineer for Texas Department of Transportation, raised the issue of transportation paradigms and the need to revise them. Dietert, defined paradigms as definitions, boundaries, and limits. He urged transportation management to exercise flexibility when establishing such paradigms. By keeping an open mind, the industry will not limit the future technological advances that might benefit the industry overall.

Dietert used the Swiss watch industry as an analogy. The Swiss watch makers once controlled 90% of the industry with a stellar reputation for the finest watches in the world. When the Quartz crystal was invented and presented to the Swiss -- they rejected it because their paradigm for a quality watch was that it have a mainspring and bushings. Today, the Swiss control only 10% of the watch-making industry.

Dietert challenged transportation professionals not to limit their thinking when working towards energy efficiency. He urged them to expand their thinking to benefit the entire community. For instance, the utilization of telecommunications for working and shopping and reduce miles driven by employees and students, and other trips.

He concluded by challenging the industry leaders to examine the paradigms they are operating within to allow for other alternatives to produce energy efficiency in transportation.

BEST PRACTICES: SAVING ENERGY AND REDUCING CONGESTION

♦ ENERGY CONSUMPTION: ALTERNATIVE FUEL DEVELOPMENT

Public agencies and private sector employers are in the process of assembling data and developing plans to respond to clean air, energy and ISTEA mandates with the objective of reducing congestion and improving air quality. Employers have begun to implement carpool/vanpool programs, subsidize public transit or otherwise encourage employees to abandon the single person automobile for the journey to work. Transportation professionals are vigorously encouraging employers to assess the mobility needs and habits of their workforces in anticipation of requirements to increase average vehicle occupancy. For instance, Houston area employers with more than 100 employees at a single worksite are encouraged to participate in local efforts to increase Average Vehicle Occupancy (AVO) from approximately 1.2 to over 1.4. The goal is to reduce the miles traveled to work and the first increment is to be achieved by 1996. A variety of mechanisms are available to reduce the miles traveled to work. These include rideshare incentives, supporting public transit usage, telecommuting, and financial incentives.

Dan Deaton, Deputy Director of the Dallas Regional Support Office for the U.S. Department of Energy, commented on the nation's energy concerns. Deaton stated that energy consumption is an insidious problem, and noted, "our world is experiencing a silent crisis." He noted that 75% of the energy we consume is lost as waste and that only 25% does useful work. Deaton used the automobile as an example, stating that only 13% of the energy in gasoline goes toward moving the wheels, the remaining 87% is wasted.

automobile as an example, stating that only 13% of the energy in gasoline goes toward moving the wheels, the remaining 87% is wasted.

Deaton cogently argued that we [the nation] cannot bring about any significant improvement in the global environment -- nor prevent serious new degradation -- without major changes in where we get our energy from and how we use it. He reminded the audience that the majority of energy consumption costs are not counted and remain hidden. Hidden costs were identified as health costs from air pollution (10 billion dollars per year), traffic congestion (100 billion dollars per year), automobile accident costs (359 billion dollars per year), and national energy security costs (more than 25 billion dollars a year). Deaton notes that if these hidden costs were reflected the gas prices would increase by $3.84 a gallon. It was Deaton's contention that alternative fuels could mitigate much of the environmental, economic, and energy consumption problems we now face.

Deaton pointed out that transportation accounts for much of the energy use in the U.S. He estimates that 13% of U.S. household budgets is spent on transportation. The miles traveled per year is constantly increasing. Even though our modern vehicles are more efficient -- our appetite for energy continues to intensify. Fortunately, alternative fuels have the potential to control pollution without restricting transportation usage. Deaton advised that this will change the U.S. transportation equation for the better. Furthermore, he stated that alternative fuel technologies can help the U.S. balance of trade through reducing imports and providing new technologies for export, thus, increasing jobs and improving global competitiveness.

Deaton also stated, that in the future many states will adopt regulations relevant to alternative fuel use. One example of this has already been implemented in California. The California Low Emissions Vehicle Program targets TLEV (Transitional Low Emission Vehicles), LEV (Low Emission Vehicles), ULEV (Ultra-Low Emission Vehicles) and ZEV (Zero Emission Vehicles).

Other agencies are also attempting to increase alternative fuel vehicle (AFV) usage. The Texas Governor's Ethanol Coalition is one such group. The federal government is also attempting to set an example by utilizing AFV's. They have implemented the Big 3 Federal Program. The Big 3 program provides methanol, ethanol and CNG sedans, vans and pick-up trucks. Overall, there are over 30,000 CNG, 12,000 methanol, 500 ethanol and 300,000 on/off-road propane vehicles operating in the United States.

Similarly, Deaton states that in partnership with the "Big 3 Program," automakers and other manufacturers are working to produce a car that is three times as efficient as those on the road today. The future automobile will get at least 80 miles to a gallon of gasoline, emit 80% less greenhouse gases, and by 2010 it is speculated that the new vehicle can increase the gross national produce by 20-50 billion dollars per year -- which will create one-half million new jobs in addition to reducing oil imports by 7 billion dollars a year !

♦ NEW TECHNIQUES

Marishca Love, a graduate student, presented evidence of successful Transportation Demand Strategies and Transportation Systems Management. Her presentation was entitled, *The Effects of Telecommuting on Air Quality,*

Energy, and Congestion. Love stressed that Telecommuting means moving the work, not the worker. By utilizing telecommuting techniques, less fuel will by expended and the cost of efficiency improvements will be offset by fuel savings. Love cited benefits and case studies of telecommuters. She also documented energy and travel time savings, as well as improved employee morale.

Tyrone Hamilton, a graduate student, focused on Intelligent Transportation System application. He discussed various State-of-the-Art technologies designed to save energy, reduce congestion, improve air quality, and make roadways safer for all motorists. Hamilton gave an overview of procedures for applying current technology in areas such as Commercial Vehicle Operations (CVO) and Advanced Travel Information Systems (ATIS). CVO technologies help simplify permitting and weigh-in which in turn allows safer highways for motorists. ATIS has the capability of warning drivers of hazardous road conditions by *enhanced vision* which cuts through fog, dust, and darkness, showing drivers the pathway that lies ahead. Electronic Collision Detectors identify the severity, size and location of accidents -- giving paramedics vital details to treat potential victims readily; ECD's also provide motorists with alternative routes to travel.

♦ ALTERNATIVE FUEL APPLICATION: CONVERSION MANDATE FOR SCHOOL DISTRICTS

Khosro Godazi, Associate Director of the Center for Transportation Training and Research, focused on an evaluation of Texas' mandated alternative fuel requirements on selected school districts in the state. The utilization of alternative fuels is considered an important component in a list of strategies to

reduce U.S. dependence on fossil fuels and to reduce emissions. Consistent with these strategies, in 1991, the Texas Legislature adopted Senate Bill 740 which required that local school districts with more than 50 school buses convert to alternative fuels. Fifty (50) percent of the fleets were to be converted by September 1996. However, a survey distributed by the Center for Transportation Training and Research at Texas Southern University in early 1994 received very poor response. Subsequent communication with the school districts determined that they were converting to alternative fuel use at only a minimum level and the process was proving burdensome.

In December, 1994, CTTR sponsored a symposium to discuss this requirement. Representatives from twenty-one (21) school districts in the greater Houston-Galveston area attended the session. Comments principally centered on the difficulties of meeting the mandate. In essence, the districts concurred that they lacked the financial resources to vigorously pursue the alternative fuel directive. The technology was not advanced enough to have a supply of vendors providing necessary equipment and ancillary support at cost-effective rates. Further, district operations and maintenance staffs had not been fully trained in the servicing requirements of alternately fueled vehicles. And importantly, shifting to more alternatively fueled fleets demanded additional financing the districts had not allocated for transportation funding. One participant summarized by stating that the objective of school boards is educating students. Transporting them is a means to that end. Shifting to alternative fuel use requires substantial financial commitments, but does not

support the district's principal objective, and thus is of low priority to school boards. *

Note: The 1997 State Legislature will consider rescinding the alternative fuel mandate for school districts.

* Video tape available on this particular conference. Contact CTTR or Technology Transfer Department for more information.

GENDER AND ETHNIC AWARENESS

Attention to ethnic and gender awareness and pursuit of increased representation in government and business have been sought in America's workplaces for the past several decades. While advances have been made, there are still intense feelings on the part of African-Americans, Hispanics and other minorities that opportunities are limited to them due to racial factors. More recently, women have made strides in a historically male business world. Women, too, sense that greater accomplishments could be made by their group if opportunities were equally afforded to men and women. The response of business and transportation organizations, in particular, to issues of ethnicity and gender were the subject of an April 29, 1993 workshop session. Transportation professionals from a broad spectrum of backgrounds discussed ethnicity and gender awareness issues and their impact on the industry's workforce.

The panelists focused on the challenges and opportunities facing managers and transportation firms in the nineties. In addition to the daily struggles of women and minorities, work-related concerns and problems were topics of discussion. The many situations in which companies seemingly have placed the proverbial glass ceiling above certain individuals and obstacles which seems to prohibit further advancement were major issues. The speakers encouraged the conference participants to not be dissuaded by the lack of recognition that may befall women and minorities. "The greatest challenge is to continue to commit to excellence and a superior work ethic," noted one speaker. Minority and women owned businesses were encouraged to view higher levels of participation in the marketplace as a business issue, rather than a moral or ethical issue.

In addition to the historical forms of discrimination, minorities and women must be sensitive to charges of reverse discrimination from white males who insist that they are being unfairly denied employment and promotions due to affirmative action practices. Recent legislation (*Crosen v. the City of Richmond*) has required that proof of past discrimination be documented before agencies can set goals for inclusion of women and minorities.

◆ PUBLIC AND PRIVATE SECTOR RESPONSE

Charles Bailey, Director of the Civil Rights Division at Texas Department of Transportation, outlined the significant changes in progress regarding gender and ethnic awareness within TxDOT. Bailey stated that TxDOT is addressing gender and ethnic issues now, as opposed to the year 2000. Because TxDOT is a governmental state agency, it must set the standard. Bailey noted that these changes are to ensure gender, ethnic, and cultural diversity throughout recruiting, selection, training, and promotions at TxDOT.

A principal goal is to ensure equity and business opportunity enhancements for the thousands of minority and female owned business enterprises that have historically been under-utilized in our community. Bailey affirmed that, "We, at Texas Department of Transportation, face challenges in two separate but inextricably intertwined areas - employment and business."

TxDOT is extremely concerned with businesses in the community. TxDOT generally contracts over 1 billion dollars a year. Through the Disadvantaged Business Enterprise (DBE) Program, TxDOT takes into consideration the gender and ethnicity of companies with which they do business

with. Other agencies refer to this as Historically Underutilized Businesses (HUBs). Bailey stated that for "virtually every contract TxDOT initiates, an analysis is made of the availability of minority and women owned companies to do the work or provide the goods and services required." By doing so they have contracted out 10.1%, over $1.8 billion dollars, of service to minority and women owned businesses. The DBE Program is structured to host free training and consultant services which are provided to help each company grow.

Bailey foresees even greater opportunities for minority businesses in the future. He feels that higher DBE goals on TxDOT contracts will be common-place in the near future. TxDOT is becoming more and more sensitized to gender and ethnic concerns and challenges. He concludes that equity and fairness must become the hallmark of both the public and the private sector employers.

Similarly, Sharon Cosgrave discussed Agency Preparation for Emerging Gender/Ethnic Awareness: Creating Opportunities for Minority-and-Women-Owned Businesses. Cosgrave focused on the fact that the United States Department of Transportation (USDOT) has proposed an amendment to the rules guiding participation by Disadvantaged Business Enterprises in USDOT Programs. The purpose of the DOT's policy is to "encourage the growth of new and existing DBE's by providing the maximum practical opportunity to compete for and participate in DOT's financial assisted programs."

Cosgrave challenged the audience by positing "Whether the DBE enables firms to function in the free enterprise system?..." Do the companies gain a fair and reasonable share of the work without contractually mandated DBE participation goals? "Unfortunately not." The answer is, Cosgrave points out,

that few minority firms are able to "graduate" from the DBE programs to the point that they are no longer considered to be economically disadvantaged. Subsequently, when firms do "graduate," the phone stops ringing.

Finally, Cosgrave advised that minority business owners must take responsibility for their own success by recognizing the business realities of the marketplace. The cost of doing business and the willingness to assume risks cannot be avoided. DBE's can increase their share and help each other by forming consortiums and joint ventures to pursue new work.

♦ LEGAL ISSUES

John Allison, Professor at the University of Texas at Austin's Graduate School of Business, discussed two reports that comprised Volumes II and III of the Disadvantaged Business Enterprise (DBE) Capacity Study Sponsored by the Texas Department of Transportation (TxDOT). Volume II, Legal Standards for the Establishment and Implementation of a Disadvantaged Business Program by the Texas Department of Transportation, discusses the requirement made by the 72nd Texas Legislature mandating that TxDOT establish a "set-aside" program for businesses designated as a Disadvantaged Business Enterprise for all contracts financed with state funds. Similar mandates already exist for contracts financed with federal funds. Allison provided the background for the actions of the 72nd Legislature, which was found in the Supreme Court decision regarding the case *Richmond v. Croson* in 1989. After discussing the challenges faced by state and local courts in the application of the Croson decision, Allison concludes his

examination of Volume II by explaining how the inclusion of women owned and minority owned business has further complicated this already complex issue.

Allison then began a discussion of Volume III, State and National Review of Disadvantaged Business Enterprise Legislation, Programs, and Availability-Disparity Studies, by examining its three separate components. In part one, a survey was designed and administered to officials in counties, cities, water districts, and school districts in Texas who sponsored contracting and procurement set-aside programs. The objectives were to determine the absolute and relative demand for DBE's by other Texas public response rates received. Out of the 870 government agencies surveyed, Allison was very pleased with the 75 percent response rates received. He then discuessed the data and summarized its findings.

Part two examined a similar survey of state operated DBE programs that were administered nationwide and whose findings were presented. In part three, existing state-wide DBE are discussed and analyzed. Many of these programs are also a result of the *Croson* decision and their experiences may be beneficial for policy and decision makes in TxDOT.

AMERICANS WITH DISABILITIES ACT AND THE TRANSPORTATION INDUSTRY

♦ PUBLIC AGENCY RESPONSE

Carol Lewis, Director of Transportation Research, focused on another area of importance -- the Americans with Disabilities Act (ADA) of 1990 and the effect it has on the Transportation Industry in the U.S. The ADA caused a variety of responses in the business community; some of which echoed disapproval and skepticism. Many small businesses felt that the Act would simply enable disabled individuals, in addition to creating a legal loophole for disgruntled job-seekers and workers that falsely claim discrimination.

Transportation officials must ensure that public transit vehicles and facilities are accessible and public parking is abundant. By altering facilities and vehicles to accommodate the disabled, management provides a new source of employees, increased ridership and lower incurred costs. Lewis cited an article by Larry King, from the *ITE* Journal, (January 1993) that discussed the importance of existing facilities, new construction, and benefits of an accessible transit mix as required by the ADA. She also reported on a case study of the initial experience of a local transit agency's implementation of ADA. Capital costs were less than originally anticipated and response from the community was largely positive.

Lewis also discussed service provisions for the disabled community in Houston, Texas. The Metropolitan Transit of Harris County (METRO) is the public transportation provider in Houston. The "*METROLift*" was Houston METRO's response to ADA concerns. The METROLift is a wheelchair equipped

paratransit service that provides door-to-door service to its customers on an *as needed* basis. Customers using this mode of travel were required to call in advance to arrange travel services. METRO's solution was not ideal to many in the disabled community. Several branches of the disabled public lobbied for the installation of wheelchair lifts on the primary metropolitan buses instead of *METROLift*, posing that *METROLift* was too restrictive in regards to the basic issue of freedom of mobility, patrons found it too difficult to get on scheduled service routes, and *METROLift* only covered a limited area. However, prior to ADA legislation, METRO authorized all commuter buses to be made accessible.

Cathryn Rice, Supervisor of Accessibility Services at Seattle METRO, also discussed the development of the Americans with Disabilities Act. Rice reflected on early policies aimed at servicing the elderly and handicapped. The *Biaggi* Amendments of 1970 were an addendum to *the Urban Mass Transportation Act* to address the special needs and requirements of the elderly and handicapped. The act required that federally funded transit programs make *"special efforts"* for the protected groups. Between 1970 and 1990 when the ADA was finally passed there was substantial unrest between the disabled community and the transportation industry. Transportation managers were concerned with the cost-effectiveness of implementing the changes outlined in the amendments. Lobbyists for the disabled community fought for additional regulations and compliance. Rice referred to the intensity of the protests - recalling group blockades and activists chaining themselves to local buses.

The ADA requires that all transportation providers, public and private, equip all new vehicles with wheelchair lifts and provide special services for those unable to use accessible fixed-route services. Rice cogently argued that the ADA

requirements were not *optional* and that transportation professionals needed to work diligently to maintain its ADA goals.

Rice shared her role-playing experience as a wheel-chair dependent individual. She found that the encounter was horrendous, even for an 8-hour day. She was unable to perform the most basic mobility tasks. She missed several buses and even fell out of her wheelchair while attempting to climb a curb. Rice stated that the experience sensitized her to the plight of the disabled person and has added tremendously to her conviction to serve that community.

APPENDICES

APPENDIX A
CONFERENCE ATTENDEES

Allison, John
Director
Center for Legal & Regulatory Studies
University of Texas

Allen-Byrd, Gloria
Asst. Dir.of Transportation/Bus
Dallas Area Rapid Transit (DART)

Anderson, Irma
Grants Coordinator
Capital Metro

Anderson, Rose
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Dallas Area Rapid Transit
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Antebi, Jack
Special Projects
Transportation Dept.
City of Dallas

Ardekani, Sia
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UT @ Arlington

Argueta, Nick
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TxDOT
Dallas, Texas

Baier, Russ
Director
Mobile Source Division
Texas Air Quality Board

Bailey, Charles
Director of Civil Rights Division
Texas Dept. of Transportation
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Baker, Carla
Statewide Coordinator
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Balboa, Matt
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Balster, Fred
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Binkley & Barefield, Inc

Bazazzadeh, Reza
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Bisco, Samuel
Travis County Commissioner

Blacklock, Bill
Radio Controller
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Bobo, Jerry
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Houston-Galveston Area Council
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Britton, Francis
Houston - METRO

Black, Travis
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SouthEast TX Region Planning Comm

Bloyd, Pauline

Bloyd, Pauline
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Coleman, Nina
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Cosgrave, Sharon
Cosgrave & Associates

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APPENDIX B
CONFERENCE AGENDAS

Public Transit Issues

Official Conference Program

Energy Efficiency as a Transportation Objective:

"Traditional and Non-Traditional Approaches to Conservation" is conference topic.

"As America is challenged to maximize the benefit of its dwindling energy resources and meet the more stringent requirements of the Clean Air Act, the focus of this Public Transit Issues conference becomes increasingly relevant," says **Naomi W. Ledé**, vice president for institutional advancement and professor of transportation at Texas Southern University. "We are pleased to have the impressive array of speakers and program participants here to address this timely subject." she added. The conference is sponsored by the Southwest Region University Transportation Center, a consortium comprised of transportation research programs in three universities: Texas A & M, TSU, and the University of Texas at Austin.

Clint Winters, transportation policy coordinator in the office of Texas Governor Ann Richards, will keynote this conference.

Milton Dietert, district engineer, Texas Department of Transportation will present at the luncheon session.

Wilbur Hare, regional administrator of the Federal Transit Administration, will moderate a panel on Improving Utilization of Existing Resources" On this panel are representatives of three of Texas's largest public transit systems: **METRO, DART, and Capital Metro.**

Jason Smitherman, director of the alternative fuels program for the State of Oklahoma will present a paper and serve as moderator in the panel, "Energy Efficiency: Utilizing Vehicles."

On Friday morning, the question, "What else should we do?" will be asked by a panel composed, in part, of general managers of two transit systems, and the executive director of the nation's largest inland port. **Robert MacLennan** of METRO-Houston, **Anthony Kouneski** of Capital Metro and **H. Thomas Kornegay** of the Port of Houston Authority will bring a perspective of three of the areas largest energy consumers. **David Hitchcock** of Houston Advanced Research Center moderates this panel.

University faculty, technical staffs, and students are updating materials, formulating new methods, exploring and systematically investigating a variety of data in key areas affecting public transit and regional mobility.

Greater exposure of this research is needed within both the academic community and the public arena. Further, expertise must focus on fulfilling key national transportation goals of safety and efficiency through the application of creative ideas.

These workshops on significant regional mobility issues are designed to expose and advance the newest available information on subjects such as "Energy Efficiency as a Transportation Objective".

This conference will disseminate data analyses and research findings from the many projects related to energy efficiency as a transportation objective that are currently underway.

Energy efficiency as a transportation objective can be addressed in a number of ways, including:

(1) technological innovations such as more efficient transit vehicles and routing methods,

(2) reduction of vehicle miles travelled through increased transit use and carpooling, and

(3) improved land use planning in cities to reduce the need for automobile travel.

Achieving improved energy efficiency will have the added benefit of reducing U.S. dependency on imported fossil fuels.

Topics and speakers for workshops sessions identified.

- Modal Energy Data Base for Transportation / Texas Transportation Energy Data Book. *Zane Goff, Dock Burke*—A&M/TTI
- Estimating Energy and Air Quality Impacts of Park and Ride and HOV Facilities. *Katherine Turnbull*—A&M/TTI
- Evaluation of Strategies for Improving Urban Transit Energy Efficiency—*Vergil Stover, Tim Lomax*—graduate students, A&M/TTI
- A Methodology for /Optimally Locating Transit Terminals—*Jacqueline Dowds*—graduate student, UT/Austin.
- Energy Impacts of Transit Terminals —*Mark Euritt*—UT/Austin.
- Compressed Natural Gas - The Alternative Fuel for Transit—*Rocky Burke*—Capital Metro.
- Telecommunications, Transportation, Energy Interaction. *Hani Mahmassani*—UT/Austin.
- A Survey of Costs Associated with Fuel Conversion Techniques by Selected Public Transit Systems: A Report of Preliminary Data. *Naomi W. Ledé and Mohammed Hamid*— CTTR/TSU.
- Compressed Natural Gas—The Alternative Fuel for Transit. *Rocky Burke*—Director of Vehicle Maintenance, Capital Metro.

RESOURCE PERSONS NAMED FOR EACH WORKSHOP

● I A—*ENERGY EFFICIENCY:* UTILIZING FACILITIES

Jeff Arndt, Houston METRO; **Marcia Johnson**, *Houston METRO (Board of Directors)* **Carol Lewis, Clyde Lemon, Joshua Hill** and **Gerald Hill**, *Texas Southern University.*

● I B—*ENERGY EFFICIENCY:* UTILIZING TECHNOLOGICAL ADVANCES AND PROVEN TECHNIQUES:

Alan Clark, *Houston Galveston Area Council;* **Don Caggins**, *Houston METRO (Board of Directors);* **Barbara Burton**, *Capital Metro (Board of Directors);* **Lee Davis**, *National Transportation Consortium of Minority Colleges and Universities;* **Norma Johnson**, *assistant general manager, Capital Metro;* **Walter McCoy, Franklin Jones, Kenneth W. Jackson, Harold Houston, Boma Afiesimama, Wolde-Michael Akalou,** and **Theodore Ingram**, *Texas Southern University.*

● II A—*ENERGY EFFICIENCY:* UTILIZING VEHICLES

Russell Pentz, James Patrick, *Houston METRO;* ; **David Hitchcock**, *Houston Advanced Research Center;* **Ben Gomez**, *Capital Metro;* **Mitchell Allen, Lalita Sen**, Texas Southern University.

● II-B—*ENERGY EFFICIENCY:* IMPROVING THE UTILIZATION OF EXISTING RESOURCES

Carol Lewis, *Texas Southern University;* **Dock Burke**, *Texas A & M University;* **Charles Tatum**, *Texas Southern University*

November 4 - 6, 1992
Sheraton Astrodome Hotel
8686 Kirby Drive
Houston, Texas

Sponsored by
Southwest Region University Transportation Center
Texas A & M University • Texas Southern University
•The University of Texas at Austin
Hosted by
Center for Transportation Training and Research
Texas Southern University
Houston, Texas

This conference is supported, in part, by grants from the Offices of University Research & Sponsored Programs Administration and Small Business Utilization, U. S. Department of Transportation, Washington, D.C.

Conference Schedule

Wednesday, November 4

4:00 - 7:00 p.m. — Registration

- *Gulf Coast 6*

6:00 - 7:30 p.m. — Opening Reception

- Stephen F. Austin - B
  Greetings: *Joseph Jones*
  Associate Vice President and Dean,
  The Graduate School
  Texas Southern University

Thursday, November 5

7:30 - 11:45 a.m. —Registration

- *Gulf Coast 6*

7:30 - 8:30 a.m. — Continental Breakfast

- *Gulf Coast 3 - 5*

8:30 - 9:30 a.m. — Opening General Session

- *Gulf Coast 3 - 5*
  Presiding: *Dock Burke*
  Texas A & M University

  Greetings: *Robert C. Lanier*
  Mayor
  City of Houston

  Jon Lindsay
  County Judge
  Harris County

  Robert L. Prater
  Dean, School of Technology
  Texas Southern University

  Keynote: Texas Transportation Policy: Current Status and Outlook
  Clint Winters
  Transportation Policy Coordinator
  Governor's Office

9:45-11:15 a.m. — Breakout Sessions

SESSION I - A: *"ENERGY EFFICIENCY:* UTILIZING FACILITIES"
This session focuses on how transportation facilities can be effective in conserving energy.

- *Gulf Coast 1*
  Moderator: Dennis Christiansen
  Associate Director,
  Texas Transportation Institute
  Texas A&M University

  Presenter: Estimating Energy and Air Quality Impacts of Park and Ride and HOV Facilities
  Katherine Turnbull
  Texas Transportation Institute
  Texas A&M University

  Presenter: A Methodology for Optimally Locating Transit Terminals
  Jacqueline Dowds
  The University of Texas at Austin

  Presenter: Energy Impacts of Transit Terminals
  Mark Euritt
  The University of Texas at Austin

SESSION I - B: *ENERGY EFFICIENCY:* UTILIZING TECHNOLOGICAL ADVANCES AND PROVEN TECHNIQUES"
This session highlights methods of efficiency that have been effective in the past as well as methods that have potential for the future.

- *Gulf Coast 2*
  Moderator: *Isaac Richmond Nettey*
  Airway Science Program,
  Texas Southern University

  Presenter: Modal Energy Data Base for Transportation/Texas Transportation Energy Data Book
  Zane Goff, Dock Burke
  Texas Transportation Institute
  Texas A&M University

  Presenter: Telecommunications, Transportation, Energy Interaction
  Hani Mahmassani
  The University of Texas at Austin

  Presenter: Compressed Natural Gas—The Alternative Fuel for Transit
  Rocky Burke, Director
  Vehicle Maintenance
  Capital Metro
  Austin Texas

11:30 a.m. - 1:00 p.m. — Luncheon Session

- Sam Houston 3
  Remarks: *Milton Dietert*
  Texas Department of Transportation

1:15 p.m. - 2:45 p.m. — Breakout sessions

SESSION II - A: *ENERGY EFFICIENCY:* UTILIZING VEHICLES

This session focuses on energy-saving strategies that may be achieved through fuel adaptations and estimating techniques.

- ***Gulf Coast 1***

Moderator/Presenter:
Jason Smitherman
Administrator, Alternative Fuels Program
State of Oklahoma

Presenter: A Survey of Costs Associated with Fuel Conversion Techniques by Selected Public Transit Systems: A Report of Preliminary Data
Naomi W. Ledé
Vice President, Institutional Advancement
Texas Southern University
and
Mohammed Hamid
Graduate Student
CTTR/Texas Southern University

Presenter: *William Jernigan*
Technology Transfer Specialist
U.S. Department of Energy
Dallas Support Office

SESSION II - B: *ENERGY EFFICIENCY:* IMPROVING THE UTILIZATION OF EXISTING RESOURCES

This session assesses the many avenues that can be pursued to more effectively utilize existing services and facilities.

- ***Gulf Coast 2***

Moderator: *Wilbur Hare*
Regional Administrator, Ft. Worth
Federal Transit Administration

Panelists: *Francis Britton*
Assistant General Manager
Office of Management and Budget
Houston METRO

Ben Gomez
Assistant General Manager
Capital METRO

R. K. Rogers
Director of Quality Assurance,
Training and Safety
Dallas Area Rapid Transit

3:00 p.m. - 4:00 p.m. — General Session

Special Exhibit: METRO Houston's LNG Bus—The Metropolitan Transit Authority of Harris County (METRO) will demonstrate the benefits of liquefied natural gas as an alternative fuel and provide a tour of a newly-acquired LNG bus.

- ***Gulf Coast 1***

Presenter: *Russell Pentz*
Assistant General Manager
Houston METRO

Friday, November 6

8:00 - 10:00 a.m. —Registration

- ***Gulf Coast 6***

8:30 a.m. - 10:00 a.m. — Panel

Discussion: "Energy Efficiency: What Else Should We Do?

- ***Gulf Coast 1 - 2***

Moderator: *David Hitchcock*
Houston Advanced Research Center

Panelists: *Robert MacLennan*
General Manager
Houston METRO

Anthony M. Kouneski
General Manager
Capital Metro
Austin, Texas

Alan Clark
Transportation Planning Manager
Houston-Galveston Area Council

H. Thomas Kornegay
Executive Director
Port of Houston Authority

Dewayne Huckabay
Finance and Administration
City of Houston

10:15 a.m. - 11:00 a.m. — Wrap Up

- ***Gulf Coast 1 - 2***

Panel: SWUTC Executive Committee.
G. Sadler Bridges
Deputy Director
Texas Transportation Institute
Texas A & M University

Dock Burke
Director, SWUTC
Texas Transportation Institute
Texas A & M University

William J. Harris
Deputy Director
Texas Transportation Institute
Texas A & M University

Robert Herman
Center for Transportation Research
The University of Texas at Austin

James T. P. Yao
Texas Transportation Institute
Texas A & M University

Naomi W. Ledé
Vice President
Institutional Advancement
Texas Southern University

C. Michael Walton
Center for Transportation Research
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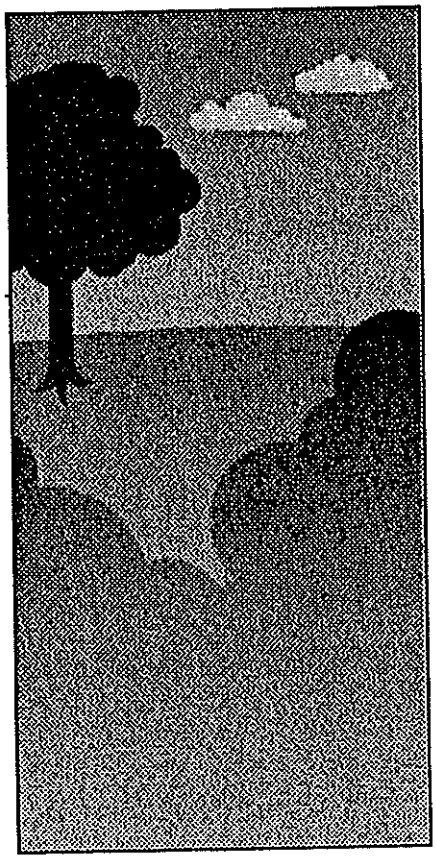
Charley V. Wootan
Texas Transportation Institute
Texas A & M University



METRO...A Commitment to the Environment

Environmental protection requires that each of us do our part. METRO is committed to the health and vitality of Houston's environment. We've risen to the challenge of these responsibilities by beginning an Alternative Fuels Program. By 1994, 40% of the METRO fleet is to be fueled by clean-burning Liquefied Natural Gas. Ultimately, all METRO buses will be fueled by LNG. METRO is proud to contribute to the environmental health of the region and we look to the future with hope for a cleaner tomorrow.

METRO

Houston METRO

Capital Metro/Austin

and the

National Chapters

of the

Conference of MinorityTransportation Officials

Salute the

Southwest Region University Transportation Center

on its First Regional Mobility Conference, 1992-93

NATION & WORLD

Energy bill does little to reduce U.S. dependence on foreign oil

Nation's lack of interest helped weaken long-awaited legislation

Texas air panel asked to reconsider higher fines

By BILL DAWSON
Houston Chronicle

The Texas Air Control Board stepped back Friday from its two-month-old policy of boosting fines for major polluters and asked the agency staff to reconsider the measure in light of industry complaints.

President poised to sign energy bill

WASHINGTON — President ...

The Houston Post/Tuesday, January 21, 1992

Air panel tries to clarify vehicle occupancy effort

By NORMA MARTIN
Houston Chronicle

Alternative fuels now emerging in U.S. battle to beat pollution

By H. JOSEF HEBERT
ASSOCIATED PRESS

WASHINGTON — Facing serious air pollution, America is trying to ... from gasoline.

POLLUTION: Gasoline may ...

Houston buses driving alone in fuel choice

By TARA PARKER POPE
Houston Chronicle

CONFERENCE CREDITS

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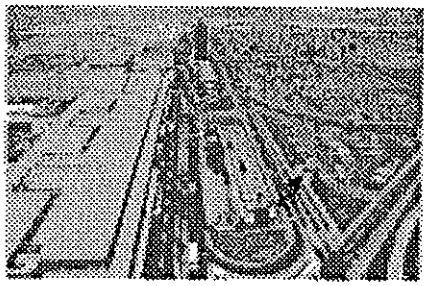
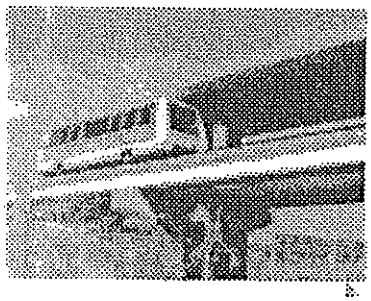
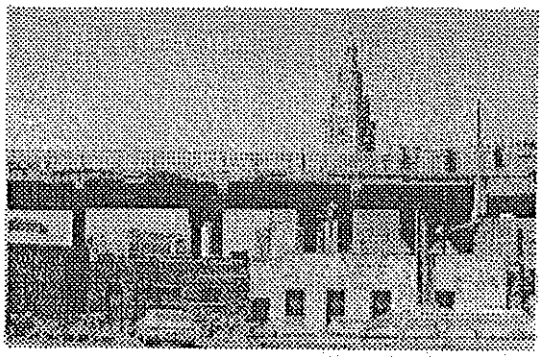
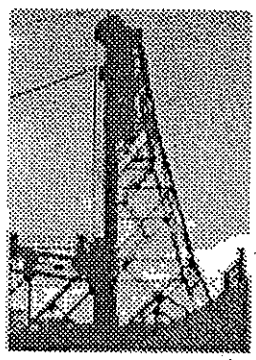
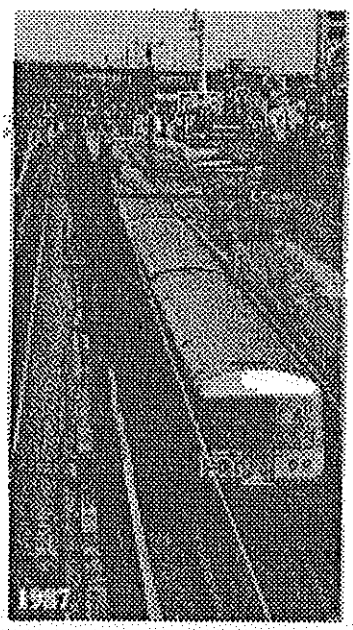
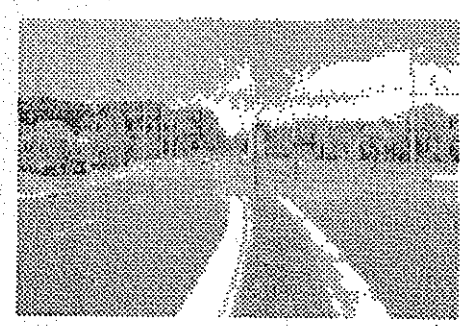
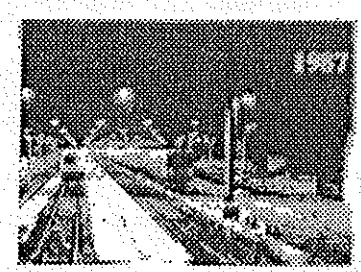


TRANSPORTATION

AIRPORTS
- JFK International Airport Redevelopment Program
- Cleveland Hopkins International Airport Runway Improvements
- Hobby Airport Fuel Farm Improvements, Houston, TX
- Cleveland Hopkins International & Burke Lakefront Airports Master Plan

CONSTRUCTION MANAGEMENT
- Cleveland Hopkins International Airport Taxiway 61 Air Cargo Area Road
- JFK 2000 Control Tower
- Ohio Department of Transportation 1985 - 1990 Bridge Program Rehabilitation of Six Bridges, Ohio Turnpike
- West Side Storage Yard, MTA - New York
- Meadows Rail Equipment Maintenance Facility - NJ Transit
- Centralized Electrification and Traffic Control Center for Amtrak,
- NECLP - Philadelphia
- Hiram Clarke Bus Operating Facility, Houston, TX
- LIRR Main Line Electrification New York, NY

MASS TRANSIT
- Light Rail Electrification, Catenary, and D.C. Power System Buffalo, New York
- Southern California Rapid Transit Metro Rail Project, Los Angeles
- Northeast Corridor Improvement 55 Miles Railroad Section
- East Falls Church Station & Line Section, Washington, D.C.
- Inman Park-Reynoldstown Station, Atlanta, GA - MARTA
- Engineering Services, Procurement of 60 Heavy Rail Vehicles & 48 New Lightrail Vehicles, Cleveland, OH
- Technical Services Manufacturing of Advanced Design Buses, Dallas, TX

STREETS, HIGHWAYS & BRIDGES
- Highway and Bridge Improvements State Route 164, Ohio
- Danville Expressway (Route 265), Danville, VA
- Weslayan Boulevard Pavement Widening, Houston, TX
- State of West Virginia Bridge Program Replacement of Six Bridges
- Bridge Inspection, Analysis and Evaluation, Cleveland, OH
- Ohio Department of Transportation 1985-1990 Bridge Program
- Rehabilitation of Six Bridges, Ohio Turnpike Commission

STUDIES
- Columbus Road Bridge No. 26 - Study Cleveland, OH
- Ohio High Speed Intercity Rail

TRAFFIC ANALYSIS
- MTA, Houston, TX

Polytech, Inc.

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Special Acknowledgement

The Southwest Region University Transportation Center acknowledges the support of, and expresses special appreciation to, the Energy Office of the Governor of the State of Texas for its funding of research and technology transfer activities from oil overcharge revenues.

Public Transportation Issues

Intermodalism and Opportunities to Improve Mobility

A one-day workshop on issues facing the public transportation industry:
Congestion Management, Intermodal Opportunities, FHWA on Updated Procedures.

September 30, 1993

RADISSON
HOTEL CENTRAL DALLAS

6060 North Central Expressway
Dallas, Texas 75206

This conference is underwritten by grants from the Offices of University Research & Sponsored Programs Administration and Small Business Utilization, U.S. Department of Transportation, Washington, D.C.

Public Transit Issues

Exploring the Impact of Changing Policies on Urban Transportation Systems

A one-day workshop on three new legal realities facing the public transportation industry:
Clean Air Act Amendment, Americans with Disabilities Act, and Ethnic and Gender Awareness.

THURSDAY, APRIL 29, 1993
RADISSON HOTEL ON TOWN LAKE
111 EAST FIRST STREET
AUSTIN, TEXAS
(512) 478-9611

Who should attend this conference?

- Local and State Transportation Professionals
- Transportation Worker's Organizations
- Elected Officials
- Private-sector business owners and managers.
- University Administrators
- Academics
- Students
- Civic and Community Leaders
- Non-Profit Agency Directors
- Fleet Operators and Managers
- Workers With the Disabled and Physically Challenged
- Human Resources Specialists
- Environmental Professionals

Public Transit Issues

ORKSHOP TWO: EXPLORING THE IMPACT OF CHANGING POLICIES ON URBAN TRANSPORTATION SYSTEMS.

Thursday, April 29, 1993
The Radisson Hotel on Town Lake
Austin, Texas

00 - 11:45 A.M. ***Registration***

8:15 A.M. ***Opening General Session***
Greetings: City of Austin
SWUTC

8:30 A.M. Keynote: **The Honorable Rodney Ellis**
State Senator
13th Senatorial District
Harris County, Texas

15 -11:45 A.M. ***Breakout Sessions***

ESSION ONE: IMPLEMENTATION OF THE AMERICANS WITH DISABILITIES ACT
Moderator: **Dock Burke**
Director, SWUTC
Texas Transportation Institute
Texas A & M University

- **Carol A. Lewis**
Director of Research
Center for Transportation
Training and Research
Texas Southern University

- **Cathryn Rice**
Supervisor of Accessible Services
Seattle METRO

- **Virginia Roberts**
Executive Director,
Governor's Committee on People With Disabilities
State of Texas

ESSION TWO: CLEAN AIR ACT REQUIREMENTS
Moderator: **Naomi W. Ledé**
Executive Director,
Center for Transportation
Training and Research
Texas Southern University

- **Russ Baier**
Director
Mobile Source Division
Texas Air Quality Control Board

- **Ben Gomez**
Assistant General Manager
Capital Metro

- **Steve Howard**
Director of Programs
Houston-Galveston Area Council

- **Jesus Reynoso**
Program Supervisor
City of El Paso Health and Environmental District

12:00 P.M. ***Luncheon***
Speaker: **The Honorable Samuel Bisco**
Commissioner, Precinct One
Travis County, Texas

1:30 - 3:45 P.M AGENCY PREPARATION FOR EMERGING GENDER / ETHNIC AWARENESS
Moderator: **DeMetris Sampson**
Member, Board of Directors
Dallas Area Rapid Transit

- **Charles Bailey**
Director
Civil Rights Division
Texas Department of Transportation

- **Sharon Cosgrave**
Sharon Cosgrave & Associates

- **Linda Escamilla**
Manager for Workforce Diversity
Motorola

- **Gwendolynmary Simpson**
Director of Human Resources
Houston METRO

- **J. Geraldine Tucker-Carter**
J. Geraldine Tucker-Carter

4:00 - 4:45 P.M. *THE NEW LEGAL REALITIES*: MAKING THE ADJUSTMENT

- **John Allison**
Director
Center for Legal and Regulatory Studies
Graduate School of Business
The University of Texas

4:45 - 5:30 P.M. ***Wrap-Up***
The Southwest Region University
Transportation Center

Center for Transportation Training and Research
Symposium Agenda
October 21, 1994

12:30 p.m.	***Keynote: State-of-the-Industry-Alternative Fuels*** Dan Deaton, Deputy Director U.S. Department of Energy Dallas Support Office
1:00 - 1:30 p.m.	Student Presentations on "Best Practices in Saving Energy and Reducing Congestion" ***Marishca Love*** ***Tyrone Hamilton***
1:30 - 2:15 p.m.	State of the Region: Implementation of Employer Trip Reduction Programs ***Racquelle Wooten, CTTR*** ***John St. Julian, Texas Natural Resource Conservation Commission***
2:15 - 2:30 p.m.	Discussion Adjourn

◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆

Please RSVP by **October 18, 1994** Phone: 713/639/1925 Fax: 713/639/1925
Mail: 3100 Cleburne Ave Houston, Tx 77004

Name:_____

Company:_____

Yes_____ I would like to attend

No_____ I will not be attending

The Center for Transportation Training & Research at
Texas Southern University

A Member of the Southwest Region University Transportation Center
Texas A & M University
Texas Southern University
The University of Texas At Austin

Presents

"Best Practices for Saving Energy & Reducing Congestion"

Texas Southern University Campus
Room 225 School of Technology (map enclosed)

Register Now

This conference is underwritten by grants from the Offices of University Research & Sponsored Programs Administration and Small Business Utilization, U.S. Department of Transportation, Washington, D.C.

There is no registration fee for the conference, however, cost of lunch must be borne by the participant. To pre-register and make lunch reservations, please complete and return the form below.

Please reserve a space at the conference for:

Name: _____

Title: _____

Organization: _____

Mailing Address: _____

_____

City: _____

State: _____ **Zip Code:** _____

Telephone Number: _____

Area of Interest: _____

Include me for lunch at $35. ☐ YES ☐ NO

Please mail or fax the registration form to:

Center for Transportation Training and Research
TEXAS SOUTHERN UNIVERSITY
125 School of Technology Building
3100 Cleburne Avenue
Houston, Texas 77004

Facsimile: (713) 639-1095

For further information contact:
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(713) 527-7925