TRANSPORTATION
AND
ECONOMIC DEVELOPMENT
IN THE UPPER MIDWEST

Minnesota Consultation II

June 12, 1992
TRANSPORTATION AND ECONOMIC DEVELOPMENT
IN THE UPPER MIDWEST:
NEW MODELS FOR FEDERAL, STATE AND LOCAL COOPERATION
IN INFRASTRUCTURE INVESTMENT

Minnesota Consultation II
June 12, 1992

Preliminary Agenda

Moderator: Gary DeCramer, Minnesota State Senator

7:30 a.m.    Continental Breakfast

8:00         Welcome and Introductions
             Lee W. Munnich, Jr., Director, State and Local Policy Program

8:15         The Once and Future Upper Midwest: Growth and Change, Centers and Corridors
             John Adams, Professor of Geography and Public Affairs, University of Minnesota

9:00         Transportation Strategies and Alternative Finance Models for Regional Economic Growth
             David Forkenbrock, Professor and Director, University of Iowa Public Policy Center

10:00        Break

10:20        Panel Discussion: Toward Transportation and Economic Development Policy, Ten Year Visions

   Infrastructure Finance
    Ed Cohoon, Deputy Commissioner, Minnesota Department of Transportation
   Trade and Commerce
    Lisa Peterson, Minnesota Trucking Association
   Environment, Safety and Quality of Life
    David Morris, Institute for Local Self Reliance
   Technology
    Mike Sobolewski, Minnesota Guidestar, Minnesota Department of Transportation

11:20        Participant-Panel Discussion/Questions
12:00 Luncheon / Keynote Speaker
Donn Osmon, Group Vice-President, Traffic and Personal Safety Products, 3M

1:30 Directed Small Group Discussions: Development of State and Regional Vision and Policy Objectives

Participants will review morning sessions by considering the following questions:

1) What excited you?
2) What worried you?
3) What was left out?
4) What was said today that made you rethink your vision of the future transportation system?
5) What is your ten year vision?
6) Rank key elements of future transportation policy?

3:00 Break

3:20 Whole Group Reconvenes: Small Group Reports
Each group reports on above item 6.

3:45 Quality Check and Wrap Up

4:00 Adjourn

nominal spokes person Admin

maneants First packets

Bob Terry
UNIVERSITY OF MINNESOTA

State and Local Policy Program
Hubert H. Humphrey Institute of Public Affairs

TRANSPORTATION AND ECONOMIC DEVELOPMENT
IN THE UPPER MIDWEST

Minnesota Consultation II
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Biographical Sketches

JOHN S. ADAMS

John Adams is Professor of Geography, Planning and Public Affairs at the University of Minnesota, where he teaches in the Department of Geography, in the Humphrey Institute of Public Affairs, and in the Program in Russian and Central European Studies. He has served as visiting professor of geography and environmental engineering at the U.S. Military Academy at West Point, New York, and Fulbright Professor in the Faculty of Geography at Moscow State University.

He was economic geographer in residence, department of economics-policy research, Bank of America World Headquarters, San Francisco, and visiting research fellow at the Institute for Urban and Regional Development at the University of California at Berkeley. From 1976 through 1979 he was director of the School of Public Affairs, and first director of the Humphrey Institute of Public Affairs—the graduate school of public policy, planning and management at the University of Minnesota. He has served as chair of the University of Minnesota geography department, coordinator of the Humphrey North-South Fellowship Program (a Fulbright Exchange activity for mid-career officials from developing countries), and president of the Association of American Geographers.

Adams completed his Ph.D in economic geography at Minnesota. He holds a bachelor's degree in economics from the University of St. Thomas in St. Paul and a master's in economics and statistics at the University of Minnesota. He taught at the Pennsylvania State University and the University of Washington, and has visited many programs and campuses throughout the USA, Canada, Europe, USSR, China, Korea, and Japan, consulting and lecturing.

He has written, edited, and co-authored numerous articles, books, and reports on the American city, regional economic development, intra-urban migration, and housing markets and urban development in the USA.

SENATOR GARY DeCRAMER

Senator Gary DeCramer is Chair of the Minnesota Senate Transportation Committee and has thus overseen many important state transportation initiatives. He has represented Senate District 27, a primarily rural district in southwestern Minnesota since 1982. He has also served on the Senate Governmental Operations, Finance, Education, Education Funding, Redistricting and Rules Committees. His additional special legislative concerns include agriculture and conservation.

Senator DeCramer teaches English and government courses at Southwest State University in Marshall, Minnesota. He recently served as Interim President of Southwest State. Senator DeCramer holds a master's degree in English from the University of Oklahoma and a bachelor's degree from the College of St. Thomas in St. Paul.
Biographical Sketches
(Continued)

DAVID J. FORKENBROCK

David Forkenbrock is director of the Public Policy Center and professor of urban and regional planning and civil and environmental engineering at the University of Iowa.

He is nationally recognized for his work in transportation finance and policy. He chairs the Transportation Research Board Local Transportation Finance Committee and serves on the Taxation, Finance, and Pricing Committee. He gave the keynote address at the Transportation Research Board National Conference on Transportation and Economic Development.

Forkenbrock is co-author of the Iowa economic development strategic plan, which was mandated by the Iowa Legislature. He also helped design Iowa's RISE program and the Oregon Opportunity Fund. Both are highway investment programs intended to foster local economic development. He recently completed a study evaluating the effectiveness of such programs nationally.

During the past two years, Forkenbrock and his colleagues at the Public Policy Center have been studying ways in which transportation can best help strengthen Iowa's long-term economic prospects. Working with an advisory committee comprised of public and private sector leaders, the research team is identifying a series of investment strategies and other policy changes.

Forkenbrock holds a Ph.D in urban and regional planning from the University of Michigan, a master's degree in urban planning from Wayne State University, and a bachelor's in architecture from the University of Minnesota.

DONN R. OSMON

Donn Osmon is Group Vice President, 3M Traffic and Personal Safety Products Group. During his 34-year career with 3M he has also served as Group Vice President, Commercial Markets Group, as Vice President, Marketing and Public Affairs, and in numerous other marketing and general management positions.

Osmon has held management positions in both U.S. and overseas operations, and has traveled to more than 50 countries while engaged in 3M business activities. He has been Area Vice President, Africa, Latin America and Middle East; and Managing Director and Chief Operating Executive, 3M U.K.

He is active in many business, professional and civic organizations, including many transportation organizations. He is a member of the board of directors and executive committee, and past chairman, of the Minnesota Chamber of Commerce and Industry. He is a member of the board of directors and executive committee of the Highway Users Federation for Safety and Mobility and a director for the Minnesota Transportation Alliance. He is chairman of the International Road Federation and of the Automotive Safety Foundation.

Osmon holds a bachelor in philosophy degree from the University of North Dakota. He is president of the University of North Dakota Foundation, and a board member of the North Dakota Alumni Association. He also serves on the boards of directors of St. Paul Progress and S. Shamash and Sons, Inc., and on the Minnesota Executive Board of Directors of U.S. WEST Communications.

UNIVERSITY OF MINNESOTA

State and Local Policy Program
Hubert H. Humphrey Institute of Public Affairs

Transportation and Economic Development in the Upper Midwest

Introduction to Research Agenda and Issue Papers

New federal legislation and changing economies have created opportunities and concerns for the transportation system in our region. The State and Local Policy Program is conducting a regional policy development series with transportation officials, policy-makers and interested stakeholders to advise the U.S. Congress on ways in which to improve federal transportation legislation and to explore models of federal, state, local and regional cooperation.

The State and Local Policy Program has developed a research agenda and a series of issue papers to help stimulate the discussion at its state level consultations in the following areas:

- Public Finance of Transportation Infrastructure
- Trade and Commerce
- Environment, Safety and Quality of Life
- Role of Technology in Transportation

This research agenda and set of issue papers are working drafts, not comprehensive studies of each topic. Participants are asked to review and react to these ideas during our second consultation. These areas will be further refined and tested during our third and final consultation in order to recommend how the U.S. Congress can improve its policy making and to assist the Upper Midwest in developing a transportation system which will enhance its economy in the years to come.
Transportation and Economic Development in the Upper Midwest

Research Agenda

1. Public Finance

New federal legislation (ISTEA) has created an opportunity for states to match an increasing level of federal funds for transportation infrastructure development. At the same time, states have growing autonomy in planning and setting priorities for infrastructure. Given these changes, there is a need for research and creative thinking. This project would focus on the following questions:

- How will competition for public funds affect state and local ability to finance infrastructure and transportation? What new finance mechanisms should be explored?

- What opportunities exist for regional approaches to planning and finance?
  
  ... at the interstate level?
  ... at the substate regional level?
  ... between rural areas and metropolitan centers?

- What are the potential economic impacts of these alternative approaches?
  
  ... for the Upper Midwest?
  ... for states and sub-state regions?
  ... for the private sector?

- What level of government should fund which elements of the system, and what matching arrangements should be used?

- What new funding mechanisms or sources should be developed?

- What decision-making process would encourage intergovernmental and regional cooperation?
2. Trade and Commerce

Understanding the linkages between transportation and economic development is critical to maintaining and improving the competitiveness of the industrial sector of the Upper Midwest and the health of the region's economy. This project would be aimed at improving the understanding of sources of economic growth and stability such as goods movement and trade in the region, focusing on the following questions:

- How important is transportation infrastructure to the economic health of the region? What are the sources of regional growth related to the transportation system?

- What priority should be placed on maintaining or improving goods movement versus passenger movement?

- How do various goods-transporting modes contribute to the region's competitiveness?

- What priorities should be placed on goods moving through the region? ... on prospects of tourism?

- How could new or existing transportation-related mechanisms improve trade and commerce? How should these be funded/organized?
  
  ... trade corridors
  ... harmonization of motor freight regulations/procedures
  ... intermodal facility development
  ... international relations

- How will new international trade agreements impact the region?

3. Environment, Safety, Quality of Life

Degradation of the natural environment, including air quality, loss of wetlands, areas of community or historical significance, and other negative social impacts have been attributed to increased use and development of the transportation system. This project would focus on the costs and benefits of including such enhancements in the development and maintenance of the transportation system. It would focus on such questions as:

- How do transportation infrastructure improvements impact environmental, safety and quality of life in the region? What approaches lead to positive impacts?
  
  ... air quality
  ... wetlands and agricultural lands
  ... historic buildings and sites
  ... land use
  ... urban congestion
  ... rural sparsity
  ... neighborhood and community livability
  ... social equity
  ... energy conservation

- What are the costs of increased attention to such factors in transportation decisions? Benefits?

- How should these costs be allocated? Who should pay? What mechanisms could be used?

- What opportunities exist for regional approaches?
Transportation and Economic Development in the Upper Midwest

Research Agenda (Continued)

4. Role of Technology in Future Transportation Infrastructure Development

Technology can be applied to reduce the costs and improve the efficiency of the transportation system. Applications of new and existing technology can help to reduce demands on the system by moving goods and people in new ways and to understand and deal with environmental problems. This project would look at the role of technology in improving the transportation system of the Upper Midwest. The focus includes:

What are the benefits and costs of incorporating new technologies into the transportation system?

How will technology improve the role of

- goods movement?
- aviation in the region’s transportation mix?
- transit?
- environmental quality?
- intercity passenger movement?

What policies will advance beneficial technologies? What institutional barriers need to be overcome? What are promising approaches?

What policies allow us to take advantage of unanticipated technological change?

What technologies show promise?

- intelligent vehicle highway systems
- telecommunications
- high speed rail
- container technologies
- alternative fuels
- personal rapid transit

Public Finance

The passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in December 1991 create new opportunities for state and local governments, as well as creates significant new financing challenges. The act shifts responsibility for planning and setting transportation priorities from the federal government to states and regional bodies, while setting standards for certain areas such as safety at the federal level. The very title of the act predicts a new way of doing business in the area of transportation, with a new focus on surface transportation, intermodal planning and efficiency.

While intergovernmental cooperation in planning and setting transportation priorities is encouraged by the new act, such cooperation is frequently incidental rather than systematic. It is more common for states and local jurisdictions to compete with each other for limited funds than to cooperate in developing the best and most efficient transportation solutions.

While ISTEA authorizes increased funds for transportation infrastructure for the next six years, there is no guarantee that these funds will in fact be appropriated. With the federal deficit as large as it is, Congress and the President will be hard-pressed to fully fund the transportation authorization while cutting spending in other areas or increasing taxes. Even if all of the funding is appropriated, citizen and business demands for infrastructure improvements and maintenance go well beyond available funds.

What is the solution? States must begin a long-term process to redesign and restructure their systems of planning and setting transportation priorities. The types of shifts that need to occur can be grouped into four major areas:

Current System

- Modal autonomy in planning, priorities and funding
- Jurisdictional focus, dedicated funding, fixed formulas
- Emphasis on funding capital improvements, maintenance and operating costs
- Limited linkage between who benefits and who pays

Alternative Model

- Intermodal, customer oriented approach in setting funding priorities
- Regional, cooperative model with increased flexibility
- Emphasis on long-term costs and benefits of transportation improvements
- Greater use of pricing and benefit assessment

Modal Autonomy vs. Intermodal Approach

Current system: Until the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA), public funding of transportation systems in the U.S. was handled differently for each mode of transportation. The planning and setting of priorities with each mode relied on a separate federal funding stream, working within the framework of a separate federal authority (Federal Highway Administration, Federal Transit Administration, Federal Railroad Administration, etc.) As Figure 1 shows, Minnesota’s transportation financing is representative of most states, with a heavy bias towards funding highways.
Transportation and Economic Development in the Upper Midwest

Research Agenda (Continued)

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Even though most state departments of transportation have incorporated the other modes within their missions, highway funding and planning has tended to dominate their work. The 1956 Federal-Aid Highway Act and the Highway Revenue Act enhanced the emphasis on highway transportation by establishing the Federal Highway Trust Fund and by authorizing the completion of the Interstate system. The 1978 and 1980 deregulation of the airline and railway industries has further complicated intermodal transportation planning and funding decisions.

Table 1 indicates federal transportation infrastructure priorities.

**Alternative model:** While ISTEA encourages an intermodal approach to planning, prioritization and funding transportation systems, states have just begun to think about how their organizations and systems should change to become intermodal. If intermodal is to become more than a buzzword, it will require redefining planning systems to consider all modes in the planning process. An initial step may be to create an intermodal team, as the Minnesota Department of Transportation has done. However, eventually each of the components of the system for planning and setting priorities should be organized on an intermodal basis. This may mean examining and redefining problems that have been in place for many years. Moving towards a more integrated intermodal transportation system will require more public and private financing ventures.
Jurisdictional Focus vs. Regional Cooperation

Current system. Over the years, the system of funding highways has had a strong jurisdictional focus. Transportation funding is dedicated by federal law and state constitutions. Each jurisdiction — state, county, city — receives an allocation of highway funds under fixed formulas. Most highways are included in the Federal-Aid System and are eligible for federal aid. The Federal-Aid System is divided into four divisions: the Interstate System, the Federal-Aid Primary System, the Federal Urban System and the Federal-Aid Secondary System. State systems also include trunk, county, municipal and town road and bridge accounts.

User charges comprise the largest source of tax revenue for highway financing. User fees include: motor-fuel taxes, registration fees, motor vehicle excise taxes, driver license fees, and weight-distance taxes. A comparison of user fees and total revenue is shown in Figure 2. Nationally, 60% of all highway revenue was generated by user taxes in 1989. The Minnesota Highway User Tax Distribution Fund derives funding from a twenty cent gasoline tax, vehicle registration fees, and motor vehicle sales taxes. Ninety-five percent of this fund is allocated to: the Trunk Highway Fund (62.0%), the County-State Aid Highway Fund (29.0%), and the Municipal-State Aid Street Fund (9.0%) (Figure 3). Other states use similar formulas. General funds, property taxes, and local bonds are also used to finance capital outlays, maintenance and operations of highways and roads (Figure 4).

Figure 2

User-taxes as Percentage of Total Current Revenues for Highways, All Levels of Government, 1987


Figure 3

Figure 4

TRANSPORTATION FUNDS MANAGED BY MnDOT FY 1990 Unaudited ~ Millions


Research and Issue Papers
Page 9
While constitutionally allocated trust funds may provide predictability and stability to the system, they can also limit expenditure decisions. Currently, there is little opportunity for a jurisdiction to consider the opportunity cost, or alternative uses of these funds. Also, since each jurisdiction has its own sources of money, there’s no particular incentive to cooperate with other jurisdictions in transportation planning.

States also allocate their own funding for transportation and have mandates for state level planning. Yet there is little incentive for regional or cooperative transportation between states. The emerging competition for north/south trade corridors is generating some new cooperative efforts between states, but this is more the exception than the rule.

Alternative Model. States should consider placing greater authority for planning, setting priorities and making transportation funding decisions at regional level within and among states. The federal government should encourage long-term joint transportation planning between states. This should occur both on a multi-state regional basis and between each state and its neighbors. Federal funds should be allocated for these multi-state planning efforts, and the federal government should consider giving higher priority to funding multi-state transportation plans over single-state priorities.

ISTEA may force the higher participation of Regional Development Commissions, Metropolitan Planning Organizations and provides the foundation for interstate cooperation in transportation planning.

Capital Improvements vs. Maintenance

Current system. The current system of transportation funding encourages capital improvements over maintenance and operating costs. By law federal funding is restricted to capital improvements; therefore, highway operations and maintenance is left largely to the states and local governments (Table 2 & Figure 5). In 1989, state and local governments financed over half of all highway capital improvements. Maintenance of deteriorating infrastructure has become an increasingly important issue for state DOTs. The question is whether the current system offers too much of an incentive to build new roads and not enough encouragement to take into account the long-term costs of supporting this infrastructure.

Table 2

<table>
<thead>
<tr>
<th>Road classification</th>
<th>Miles</th>
<th>Jurisdiction</th>
<th>Capital funding</th>
<th>Maintenance funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate System</td>
<td>44,000</td>
<td>State</td>
<td>98% Federal, 2% State</td>
<td>100% State</td>
</tr>
<tr>
<td>Federal-Aid Primary System</td>
<td>200,000</td>
<td>State</td>
<td>75% Federal, 25% State</td>
<td>100% State</td>
</tr>
<tr>
<td>Federal-Aid Secondary System</td>
<td>400,000</td>
<td>State</td>
<td>75% Federal, 25% State</td>
<td>100% State</td>
</tr>
<tr>
<td>Federal-Aid Urban System</td>
<td>125,000</td>
<td>State</td>
<td>75% Federal, 25% State</td>
<td>100% State</td>
</tr>
<tr>
<td>Local roads</td>
<td>2,791,000</td>
<td>Counties, municipalities, and townships</td>
<td>Less than 5% for state aid</td>
<td>Less than 5% for state aid</td>
</tr>
<tr>
<td>Federal roads</td>
<td>228,000</td>
<td>Federal</td>
<td>100% Federal</td>
<td>100% Federal</td>
</tr>
</tbody>
</table>

*Routes that connect principal metropolitan areas, serve the national defense, or connect with routes of continental importance in Mexico or Canada (Subarrays of the Federal-Aid Primary System).
*Interconnecting roads important to interstate, statewide, and regional travel.
*Major rural collectors that assemble traffic and feed to the arterials.
*Urban arterials and collectors routes, excluding the urban extensions of the major primary arterials.
*Residential and local streets.
*Trails in national forests and parks, roads on military and Indian reservations.


Figure 5

[Graph showing capital spending per mile of road by all levels of government, 1987, by road jurisdiction.]

Alternative model. Each transportation decision should include an analysis of long-term benefits and costs, and these should be an integral part of the initial funding decision. While there may be short-term public gratification and political benefit in new capital investments, these must be balanced against the long-term costs of maintenance, operations and safety. Some Midwestern states will have to face difficult decisions between maintaining infrequently used rural roads and maintaining the entire transportation system. Efficient transportation investments are not always politically popular or feasible. Future funding decisions will be focused on balancing equity of access against economic efficiency as rural populations continue to migrate to metropolitan areas.

Who Benefits? Who Pays?

Current system. There is currently only a limited linkage between who benefits and who pays for transportation service. While user charges, motor fuel taxes and motor vehicle taxes and fees, are the primary source of funding for highways, there is only an indirect linkage between those who benefit and those who pay for highway improvements and costs. Tolls are a limited source of funds in some states, but are not common in the Upper Midwest. Local real estate taxes and assessments link local road benefits to the local community. In some cases, private property owners may share in costs where they derive benefits from highways. While the ISTEA encourages experiments in congestion pricing, this has not been tried very extensively in the U.S.

Alternative model. Increased use of benefit charges and pricing can contribute to a more efficient transportation system, assist in the process of setting priorities, and provide additional funding for transportation infrastructure investments. If a development or business benefits from a specific transportation improvement, a share of the cost should be assessed against that business. Congestion pricing should be considered as a solution to reducing peak hour congestion in the Twin Cities Metropolitan area, encouraging drivers to consider other modes, and help to fund the high cost of urban transportation improvements.

Trade and Commerce

Do Transportation Investments Pay Off in Economic Growth?

Most researchers agree that, in general, investments in infrastructure should mirror rates of economic growth. That is, infrastructure investments should follow rather than lead economic development. These researchers also prove that infrastructure supports economic activity and that continued decline in this type of investment will eventually erode our productivity, competitiveness and quality of life. Strategic investments in transportation infrastructure include those that make the system more efficient by reducing the costs of getting people and products to their destinations. This may mean building or improving roads in areas that connect with major trade routes, transport major export commodities, which help to reduce congestion, or improve access between various modes of transportation.

In 1965, Niles Hansen, a University of Texas economist classified regions into three categories: congested, lagging and intermediate. This typology may help to show how investments in infrastructure can pay off. A congested community benefits from infrastructure investments by reducing the time wasted on choked highways -- this helps to accommodate the growth experienced by these faster growing areas. A lagging community is one in which employment and industry are declining, little benefit comes from increased infrastructure investments in such areas. Intermediate areas are those which lack specific infrastructure improvements but have a trained workforce and prospects of future economic growth.

The Basics of the Upper Midwest’s Economy

The five states of the Upper Midwest, including Minnesota, Iowa, North Dakota, South Dakota and Montana, are centrally located just west of the St. Croix and Upper Mississippi rivers and south of the Canadian border with Manitoba, Saskatchewan and Alberta. This region shares a history of trade and commerce based on agricultural production and trade. This agricultural base led to the development of the Twin Cities of Minneapolis - St. Paul as a financial services center and distribution hub for much of the region’s value-added agricultural and manufactured products.

In keeping with its agricultural and natural resource-based economy, the region is relatively sparsely populated. Between 1960 and 1985, the population of the Upper Midwest grew at a rate well below the national average (see CURA Trade Centers study). Within the Upper Midwest, there continues to be growth of urban centers and loss of population in rural communities.

Upper Midwest Population

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>2,943,000</td>
<td>57%</td>
</tr>
<tr>
<td>Minnesota</td>
<td>4,324,000</td>
<td>35%</td>
</tr>
<tr>
<td>North Dakota</td>
<td>660,000</td>
<td>63%</td>
</tr>
<tr>
<td>South Dakota</td>
<td>715,000</td>
<td>72%</td>
</tr>
<tr>
<td>Montana</td>
<td>805,000</td>
<td>65%</td>
</tr>
<tr>
<td>U.S.</td>
<td>248,239,000</td>
<td>19%</td>
</tr>
</tbody>
</table>

Source: Almanac of 50 States
Agriculture is very important to the region. Iowa is second in the nation for agricultural exports, South Dakota leads the U.S. production of oats and rye and is second in sunflower seeds and flaxseed. Minnesota is ranked first in sugar beet production, third in soybeans and fifth in corn production. The region is also strong in numerous livestock products. The producers of these agricultural products continue to consolidate — during the past 30 years the number of farms and farmers has decreased by 37 percent.

Natural resource based activities such as mining, energy resources and tourism are also important to the region's economy. During the past two decades there has been a rapidly accelerating development of fossil fuels in the western Dakotas and Montana and increasing tourism development in Montana and Minnesota.

Over the past several decades these states' economies have experienced a great deal of change. For the states of Minnesota and Iowa this has meant a tremendous diversification and continued growth of the economic base. For the Dakotas, the past twenty years have led to loss of population and economic activity overall. Montana continues to reap benefits from its natural resources of minerals, forestry and wilderness (tourism) as well as a small but vital manufacturing sector. The service sector has grown over the past decade both nationally and in the region. At the same time, many manufacturing sectors have lost employment.

The most striking change in employment in the Upper Midwest has been the growth in service industries, particularly those servicing the business and the computer industry. This has been the case in high population density states like Minnesota as well as low-density states such as North Dakota.

### Upper Midwest Employment by Industry Percent Change 1979 - 1989

<table>
<thead>
<tr>
<th>State</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>44.31</td>
</tr>
<tr>
<td>Minnesota</td>
<td>66.68</td>
</tr>
<tr>
<td>N. Dakota</td>
<td>61.24</td>
</tr>
<tr>
<td>S. Dakota</td>
<td>28.07</td>
</tr>
<tr>
<td>Montana</td>
<td>36.59</td>
</tr>
<tr>
<td>U.S.</td>
<td>73.09</td>
</tr>
</tbody>
</table>

Trade: The Engine of Economic Growth

The goods producing activities of the region, including manufacturing, construction, farming, agricultural services, forestry, fisheries and mining, are a measure of the region's economic growth potential. These goods are exported outside the region and bring additional income to the area. According to the Bureau of Economic Analysis data on income from employment in these industries, only two states in the region, Minnesota and Iowa, exceed the national rates of goods producing income.

Foreign trade is a part of this export income. In the five states these exports are as follows:

<table>
<thead>
<tr>
<th>State</th>
<th>Tot. Value of For. Exports ($ millions)</th>
<th>Rank Among U.S. States</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>2,189</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Minnesota</td>
<td>5,091</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>N. Dakota</td>
<td>360</td>
<td>45</td>
<td>47</td>
</tr>
<tr>
<td>S. Dakota</td>
<td>205</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>Montana</td>
<td>229</td>
<td>48</td>
<td>44</td>
</tr>
</tbody>
</table>

The ability to produce and deliver goods to trading partners is an essential part of a healthy economy. In the Upper Midwest, goods produced are shipped to other regions of the U.S. and to foreign destinations. The following table shows the importance of foreign exports to the economy of these five states:

<table>
<thead>
<tr>
<th>State</th>
<th>Foreign Exports as Percent of Gross State Product, 1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>4.2</td>
</tr>
<tr>
<td>Minnesota</td>
<td>5.4</td>
</tr>
<tr>
<td>N. Dakota</td>
<td>1.7</td>
</tr>
<tr>
<td>S. Dakota</td>
<td>3.2</td>
</tr>
<tr>
<td>Montana</td>
<td>1.8</td>
</tr>
</tbody>
</table>

The U.S. (as a pct. of GNP) | 10.2

Source: Survey of Current Business

Increasing globalization of the world’s economy, along with "freelag" of up of trade restrictions among North American neighbors places the Upper Midwest in a unique position to capture a greater share of the increasing north-south trade with Canada and Mexico. According to a recent report, the Red River Trade Corridor between Upper Midwest and Manitoba is the fourth largest corridor along the Canadian border, accounting for nearly $8 billion in trade annually. These commodity flows include energy, wood and paper products, chemicals and agricultural products flowing south from Canada and industrial equipment, electronics, motor vehicles and parts, consumer goods and agricultural products flowing north. As this level of trade increases, it will require more attention to the connectivity between this region and other destinations throughout the U.S. on a north-south axis.
Getting Our Products to Market

Minnesota is a pole for much of the economic activity of the region. Minneapolis-St. Paul is one of 28 airline hubs nationally. Of these hubs, Minneapolis-St. Paul airport ranks 16th in aircraft departures and 12th in freight shipments per 10,000 residents. Several of the region’s intermodal (rail/truck, rail/barge) hubs are located in Minnesota (e.g. Twin Cities, Dillworth, International Falls, Duluth/Superior). According to University of Minnesota economist, Wilbur Maki, the Twin Cities serves as the core metropolitan area of the multi-state commodity-producing region and as a part of the global transportation - communications network.

The Upper Midwest’s trade and commerce depends heavily on its transportation infrastructure. The region has a number of well maintained interstate and highway thoroughfares which carry passenger vehicles within and through the region. In addition, to motor vehicles, passengers rely on the air services available at major commercial air hubs such as the MSP airport as well as other commercial and private aviation centers throughout the region. The vital service sector and headquarters functions of the Twin Cities rely heavily on the existence of the Minneapolis-St. Paul airport and its daily access to major markets throughout the world.

Passenger and Air Freight in Upper Midwest, 1989

<table>
<thead>
<tr>
<th>State</th>
<th>Enplanements</th>
<th>Freight Enplanements (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>1,042,003</td>
<td>7,816</td>
</tr>
<tr>
<td>Minnesota</td>
<td>871,085</td>
<td>65,765</td>
</tr>
<tr>
<td>North Dakota</td>
<td>500,561</td>
<td>3,077</td>
</tr>
<tr>
<td>South Dakota</td>
<td>350,015</td>
<td>1,645</td>
</tr>
<tr>
<td>Montana</td>
<td>678,614</td>
<td>9,109</td>
</tr>
</tbody>
</table>

Source: FAA Statistical Handbook

Annual aircraft operations are projected to increase dramatically, showing an increase of 75% from 2.1 million to 3.9 million over the next thirty years. This is due to an envisioned increase in the amount that each aircraft is used especially as aircraft are used to a greater extent for business purposes.

Goods produced in the region rely primarily on shipments by trucks along the extensive interstate and intrastate highway system of the region. The following table shows the modes by which the region shipped its manufactured freight in 1989. Trucking is clearly the dominant force in the region. This varies somewhat by commodity. Grains and coal shipments are carried by the region’s rail system and some barge traffic. Air cargo accounts for high value computers and scientific instruments as well as printed matter.

Inbound and Outbound Manufactured Freight, 1989 (millions of tons)

<table>
<thead>
<tr>
<th>State</th>
<th>Total</th>
<th>Truck</th>
<th>Rail</th>
<th>Air</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>94.2</td>
<td>74.0</td>
<td>17.0</td>
<td>.020</td>
<td>3.2</td>
</tr>
<tr>
<td>Minnesota</td>
<td>126.9</td>
<td>103.7</td>
<td>18.3</td>
<td>.076</td>
<td>4.8</td>
</tr>
<tr>
<td>North Dakota</td>
<td>14.8</td>
<td>11.3</td>
<td>3.5</td>
<td>.045</td>
<td>0.0</td>
</tr>
<tr>
<td>South Dakota</td>
<td>14.6</td>
<td>13.3</td>
<td>1.3</td>
<td>.001</td>
<td>0.0</td>
</tr>
<tr>
<td>Montana</td>
<td>35.7</td>
<td>30.1</td>
<td>5.6</td>
<td>.07</td>
<td>0.0</td>
</tr>
</tbody>
</table>

TOTAL

| Upper Midwest | 286.2 | 232.4 | 45.7 | 0.159| 8.0   |

Source: American Trucking Associations Foundation/Rebbie Associates

According to the ATA Foundation, 77 percent of the total freight moved throughout the Midwest is transported by midwestern trucking companies.

While water does not account for as large a share of total shipments as other modes, it is important to point out that the total shipments by barge through the Rock Island District of the Mississippi River grew nearly 90 percent from 1979 to 1989, and was dominated by grain and coal.

Miles of Public Roads and Streets

<table>
<thead>
<tr>
<th>State</th>
<th>Total</th>
<th>Urban</th>
<th>Rural</th>
<th>Federal Aid Primary Highway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>112,551</td>
<td>7,843</td>
<td>94,425</td>
<td>9,566</td>
</tr>
<tr>
<td>Minnesota</td>
<td>129,553</td>
<td>12,912</td>
<td>115,458</td>
<td>10,206</td>
</tr>
<tr>
<td>Montana</td>
<td>73,378</td>
<td>2,113</td>
<td>69,092</td>
<td>6,444</td>
</tr>
<tr>
<td>N. Dakota</td>
<td>86,384</td>
<td>1,600</td>
<td>84,579</td>
<td>6,109</td>
</tr>
<tr>
<td>S. Dakota</td>
<td>76,378</td>
<td>1,574</td>
<td>71,622</td>
<td>6,674</td>
</tr>
</tbody>
</table>

Source: FHWA

Levels of Public and Private Investment

Investment in infrastructure has slowed during the past several decades. Capital outlays for infrastructure are 1.6 percent of the gross national product today compared to 2.2 percent in 1963. Investment in infrastructure come from both public and private sectors. Public sector sources include federal, state, and local governments. During the past ten years, the burden of building and maintaining our transportation infrastructure has been shifted to the state and local level. These needed investments must now compete with an increasing array of other public goods in an environment of reduced taxing capacity.
The American Commission on Intergovernmental Relations (ACIR) produces a measure of tax capacity based on property values, sales tax and mineral production for each state as well as tax effort — the burden placed on the states’ revenue base relative to the national average. The following summarizes these for the Upper Midwest region.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>$15,487</td>
<td>84</td>
<td>118</td>
<td>20</td>
</tr>
<tr>
<td>Minnesota</td>
<td>$17,767</td>
<td>103</td>
<td>117</td>
<td>20</td>
</tr>
<tr>
<td>North Dakota</td>
<td>$13,563</td>
<td>85</td>
<td>107</td>
<td>17</td>
</tr>
<tr>
<td>South Dakota</td>
<td>$13,685</td>
<td>78</td>
<td>95</td>
<td>18</td>
</tr>
<tr>
<td>Montana</td>
<td>$14,078</td>
<td>84</td>
<td>102</td>
<td>20</td>
</tr>
<tr>
<td>U.S.</td>
<td></td>
<td>100</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Source: American Commission on Intergovernmental Relations.

The private sector invests in infrastructure mainly in plant and equipment. Private sector investments related to transportation include fleets of motor vehicles, material handling equipment, warehouses as well as computerized inventory and communications equipment. In an era of “just-in-time” delivery of parts and materials to U.S. manufacturers transportation is substituting for warehouses. This makes the speed and reliability of the transportation system even more crucial for the competitiveness of American manufacturers.

The following table shows the ratios of total public capital stock to total private capital for this region in two years, 1978 and 1988, derived by the Federal Reserve Bank of Boston from BEA data. This study (see Munnell, 1990) concluded that public capital investment has a statistically significant positive impact on private sector output. It also showed that although this public capital investment enhances productivity, public capital substitutes for private capital — the more public investment available the less private investment is required. It also proved a significant positive impact between investment in public capital and employment growth.

<table>
<thead>
<tr>
<th>Year</th>
<th>Iowa</th>
<th>Minnesota</th>
<th>Montana</th>
<th>N. Dakota</th>
<th>S. Dakota</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>1: 2.8</td>
<td>1: 2.0</td>
<td>1: 3.3</td>
<td>1: 3.8</td>
<td>1: 2.3</td>
</tr>
<tr>
<td>1988</td>
<td>1: 2.5</td>
<td>1: 2.2</td>
<td>1: 3.1</td>
<td>1: 4.2</td>
<td>1: 2.2</td>
</tr>
</tbody>
</table>

Source: Federal Reserve Bank of Boston

New Models for Cooperation in Infrastructure Development

Deregulation:

Motor carrier act of 1980 relaxed the restrictions governing interstate movement of goods. This Act led to a dramatic increase in the number of road transport carriers and intermediaries. Between 1979 and 1985 the number nearly doubled. As a result, a hub and spoke network for less than truckload (LTL) emerged to take advantage of the economies of scale of consolidating shipments.

Most analysts believe that deregulation led to a relative fall in prices, and contrary to some fears service to rural areas has not deteriorated. The most significant impact of deregulation has been the greater competition between modes as trucks are now competitive with rail even on long hauls. While this competition has in many ways been beneficial, it has also made planning for an intermodal transportation system very difficult due to the dispersed interests of competing modes.

- Minnesota recently adopted a new law regulating intrastate trucking operations. This law allows for greater competition in transporting of less than truckload (LTL) shipments.
- Border crossings with Canada managed jointly. Montana Governor, Stan Stephens recently led a trade delegation to Alberta, Canada that worked to create a jointly operated vehicle inspection station at the border at Coutts, Alberta. In addition the Montana/Alberta Advisory Committee has been given increased emphasis to help expand the trade, cultural and intergovernmental ties between Canada and Montana.

Intermodalism:

A recent University of Minnesota study of use of intermodal shipping found that Intermodal Railroad-Truck (IRT) is used by a great variety of industries. The most common characteristic of users of IRT was that their shipments tended to be low-volume per unit of size and had a distant destination. The benefits of IRT include reduced energy consumption, pollution, congestion, and road deterioration. Promoting greater use of IRT is limited by present regulatory structure.

- Siting of new intermodal truck/rail yards is difficult. The City of Minneapolis is planning to develop such a new facility, working with industry to improve inner-city goods movement and reduce delays in through shipments.

Public-Private Finance

The Pennsylvania Partnership Act: provided for more formal partnership arrangements between the public and private sector, and permits municipalities to act jointly with each other and with the private sector to finance transportation projects. The act provides a process for pooling resources to take advantage of economies of scale. It also establishes transportation development districts which may raise revenues through: 1) imposing an assessment on business property or benefitting projects, 2) imposing any other taxes permitted by law, 3) issuing notes and bonds, and 4) accepting grants, gifts and donations. Finally, this act requires that the transportation development districts establish multi-year transportation improvement programs that identify priorities.
Interjurisdictional Cooperation

With the increasing potential for new markets brought forth by the trade agreement with Canada and the potential for a trade agreement with Mexico, the major goods shipment axis will shift from its traditional east-west orientation to a north-south one. (Larry Swanson of the University of Montana has analyzed the trade flows between U.S. and Canada.) The Red River Trade Corridor has organized a coalition of business institutions and governmental institutions including Minnesota, North Dakota, and Manitoba to promote trade within the corridor. A similar effort is being undertaken by several western states.

South Carolina’s State Development Board has initiated the use of GIS (Geographical Information Systems) to better coordinate infrastructure investments and other community and economic development activities. The GIS system allows policymakers to consider large geographical based data related to policy analysis and industrial site selection. GIS systems have the potential to connect transportation infrastructure investments with other infrastructure needs such as water and wastewater systems, and with broader economic development objectives. This GIS program has been a joint effort of several state agencies including the Highway Department, the Department of Health and Environmental Control, and the Water Resources commission.

Environment, Safety, and Quality of Life

Transportation infrastructure investments have societal costs. Transportation contributes to pollution and consumes limited world resources. In urban areas, persistent highway congestion reduces mobility, increases pollution and adds to energy consumption. Infrastructure impacts neighborhoods, rural communities, and natural and historic sites. The interaction of transportation with land use underpins many of these issues.

Transportation investment decisions occur in an environment of growing complexity, as community and environmental impacts are recognized. In a cost-benefit framework, these impacts are costs not directly paid by transportation users. Fuel taxes are a dominant source of system revenues, and are to some degree user-based. But U.S. levels of fuel taxes do not cover true costs of the transportation of the systems if these social and environmental costs are included.

Air Quality

Environmental impacts of transportation systems are multifold, but of primary current concern is air pollution. The gasoline combustion engine is the largest single source of air pollution and a major contributor to global warming. The transportation sector in the U.S. alone emits more carbon dioxide than most other countries combined. Globally, motor vehicles account for about a third of world oil consumption and about 14 percent of the world’s carbon dioxide emissions from fossil fuel burning. For the United States, the figures are 50 percent of oil demand and about 25 percent of carbon dioxide emissions.

Motor vehicles produce about half of the chemicals that form smog and ninety percent of the carbon monoxide in metropolitan areas.

The Minnesota Pollution Control Agency (MPCA) reports that among major U.S. cities in 1988, the Twin Cities was the only metropolitan area with no summer days when air pollution creates unhealthy conditions. This is an improvement from earlier decades, due at least in part to government actions of the 1970s and 1980s. Still, enjoying reasonable local air quality locally does not suggest that the region is unaffected by globally harmful emissions.

The Federal Clean Air Act of 1977 established National Ambient Air Quality Standards at two levels: primary, set at concentrations low enough to protect the health of the public; and secondary, to protect public welfare and take into account injury to livestock and agricultural crops, damage to property, annoyance, and transportation hazards. National and state ambient air quality standards have been set for six pollutants. Attainment of these standards must be demonstrated by monitoring and computer modeling and non-attainment responses relate mainly to tracking industrial polluters and altering permits.
These measures are in line with the two major strategies used by policy makers since the 1960s to combat pollution: 1) technical improvements in automobile engines and gasoline, and 2) emission regulation from new and existing stationary sources.

The Intermodal Surface Transportation Efficiency Act (ISTEA) takes several approaches to pollution control, as follows:

- The act makes it difficult to build new highways in areas that do not meet clean air standards.
- Transportation agencies will have to establish targets for reducing vehicle miles traveled (VMT).
- A larger share of transportation funding is earmarked to be used for mass transit, high occupancy vehicle (HOV) lanes and other alternatives to usual highway construction.
- Certain decision-making power is shifted from state transportation departments to metropolitan planning organizations.

In the Twin Cities, computerized traffic control systems and a vehicle inspection and maintenance program are among recent approaches to reducing air pollution, especially in the "hot spots," intersections and districts exceeding standards.

The Clean Air Act Amendments of 1990, Title Two, expanded the realm of pollution policies and focused on controlling car and truck emissions. Major vehicle provisions included more stringent tailpipe standards for cars and trucks, reformulated-gasoline requirements and an oxygenated-fuels program for carbon monoxide non-attainment areas. A special California clean-car pilot program was enabled and a clean-fuels program for vehicle fleets in twenty-two of the worst air-pollution areas was initiated.

The total contribution of efforts in reducing air pollution levels remains in question. Vehicle standards have substantially reduced pollution per vehicle mile, but these gains are often offset by increases in total vehicle use. Many people feel that more extreme measures are needed, especially in view of the potentially devastating, albeit uncertain, level and impacts of global warming. Deborah Gordon (1992) delineates substantial federal, state, and regional and local policy objectives for reducing the amount of air pollution attributable to transportation.
Federal Objectives:

- Increase the energy efficiency of the transportation system by increasing the fuel efficiency of new vehicles and switching to more energy-efficient transport modes.
- Promote use of commercial clean alternative fuels in heavy-duty and passenger vehicles.
- Promote intercity rail enhancements and upgrade systems to high-speed rail in highly traveled U.S. corridors.

State Objectives:

- Increase motor-vehicle fuel efficiency and reduce passenger-vehicle emissions.
- Increase average passenger-vehicle occupancy by twenty percent and increase use of alternative transportation modes such as mass transit and intermodal freight.
- Commercialize alternative fuels in state-government-owned fleet vehicles.

Regional and Local Policies:

- Double mass-transit ridership in urban areas.
- Stabilize regional vehicular miles traveled (VMTs) levels.
- Commercialize alternative fuels in municipal fleet vehicles.

Such approaches, however, do not always spell out the degree to which proposed solutions actually mitigate the problems. For example, government provision or subsidy of increased transit does not necessarily lead to improved energy efficiency or reduced pollution. It does so only to the extent it actually diverts passengers from other, higher polluting modes, and only to the extent it does so with relatively full vehicles.

The goal of doubling transit ridership in urban areas may indeed be laudable, but how to achieve such a goal is a very complex policy question. A substantial multiple-line light rail transit system proposed for the Twin Cities in the early 1990s would increase total regional transit ridership by no more than 20 percent, according to the forecasts of system planners. Planning documents for the proposed light rail claims positive contributions to regional air quality. However, the preliminary environmental impact statement for light rail did not project any substantial gains overall. Indeed, it laid out concerns that air quality might actually become worse in certain intersection areas, due to increased automobile idling required at light rail intersections.

Similarly, a recent article in Governing reports a case of a big urban area with bigger problems:

In further efforts to lure commuters from their cars, the Los Angeles plan calls for spending more than $43 billion on mass transit. Yet almost every study of ridership shows that few mass transit riders are reformed car commuters and most new subway riders used to ride the bus.

Chang-Hee Christine Bae of the University of Southern California estimates that all of the mode shift strategies in the 1989 Los Angeles plan — employer ride sharing, elimination of parking subsidies, auto use restrictions, increased carpooling, transit improvements — will produce less than two percent of the total projected reductions for each of the two chemicals that are pre-cursors to smog formation and about 3 percent of the plan’s projected reductions in carbon monoxide.

Strategies to improve urban air quality, even if greater gains could be achieved are overwhelmingly unpopular with commuters.

Energy Consumption

In many ways, the discussion of energy consumption goes hand in hand with the air quality question. Federal vehicle standards, the Corporate Average Fuel Economy (CAFE) standards, have been a prominent approach. They have succeeded in reducing energy consumption per-vehicle-mile, but increases in total miles travelled has offset gains in terms of the total system. Many policy approaches to minimize air pollution, including those aimed at reducing VMTs, increasing average vehicle occupancies, and so forth, would also positively impact energy consumption.

Several studies have reached surprising conclusions about the question of modal energy consumption. One study, for example, found that rail transit wastes fuel in most applications due to the fact that vehicles actually travel with, on average, only a fraction of theoretical capacity (Gordon and Richardson, 1988). A Congressional Budget Office (1977) study placed light rail transit (LRT) below buses in total energy per capita (BTUs per vehicle-mile).

Similarly, Anderson (1988) has developed a model to compare energy efficiency of various transportation modes. The model considers, in addition to vehicle energy use in motion, energy used in infrastructure and vehicle construction. Anderson ranks transit modes according to total energy efficiency as follows: personal rail, van pools, motorized buses, heavy rail, automobile, trolley buses, light rail, and “dial-a-bus.” Light rail, at about 3 kw-hr/pasenger-mile is second from the worst, behind even automobiles, and well behind motorized buses. One key factor is that light rail is given only a 0.13 daily average load factor. (Buses are .10 – automobiles .25. Thus the average automobile has a six person design capacity but, on average, is carrying only 1.25 passengers.)

Congestion

Robert Cervero notes, “What is so alarming about traffic congestion in recent years is its pervasiveness. Today, it seems to affect all Americans to some degree. Spatially, it is no longer confined to downtowns; temporally it is no longer limited to 7 to 9 a.m. and 4 to 6 p.m.” In the Twin Cities, congestion problems are not at the level of some other cities, but they have drawn increased concern. According to The Metropolitan Council total miles of freeways and expressways with major and severe congestion tripled between 1972 and 1984 [from 24 to 72 miles], and are expected to double again by the year 2010 [to 175 miles].

Congestion adds to environmental degradation. Speed reduction, increased acceleration, stop-and-go movements, and longer trips increase the amount of pollution released by vehicles. Persistent congestion magnifies environmental and energy impacts, but more subtle impacts involve class segregation and social inequities enabled by urban sprawl.

Congestion also reduces efficiency of the transportation system. Individuals waste time and energy in transportation. Commerce is impacted, as Winston notes: “Congested and damaged roads thwart the effectiveness of carrier innovations, cause travel delays that disrupt the just-in-time inventory process, and raise carrier operating costs through wasted fuel and vehicle damage.”
In growing cities, efforts to increase urban highway capacity to relieve congestion may only increase suburban sprawl, and thus congestion will return. This effect, which has been called "Down's Law," occurs when users do not pay the full cost of the infrastructure or even rates proportionate to their use. Yet constraining capacity in situations usually guarantees congestion, thus contributing to increased pollution and energy consumption.

Economists, including Herbert Kohring and Clifford Winston, argue that pricing systems which better allocate these costs can reduce congestion and maximize system efficiency. Intelligent Vehicle Highway Systems (IVHS), currently the subject of great interest in transportation research, may have no long-term congestion-reducing benefits in and of themselves, Winston argues. However, he points out, the evolving technology would facilitate efficient electronic congestion pricing systems. In fact, the technology already exists:

An automated vehicle identification (AVI) system, in which an electronic number plate is mounted underneath each vehicle, can be used to transmit a vehicle's numbered identification to a control center each time it passes over a power loop embedded beneath a toll site. The vehicle owner is then sent a monthly bill similar to a phone bill. Such a system has been tested in Hong Kong and found to perform exceptionally well ... In the United States an AVI system is currently operating on the North Dallas Tollway and in New Orleans.

Congestion pricing may be theoretically sound, but it has been dismissed by many as impractical or impossible politically. Still, in areas where all other attempts to eliminate congestion prove futile, and especially if public resistance to freeway capacity increasing efforts exist, the concept may gain acceptance.

Others have suggested land-use control models, and improved integration of land use and transportation policy to mitigate future congestion.

Major demographic forces which have contributed substantially to urban sprawl, increased automobile use, and congestion, have changed, or peaked. These forces involve the movement of the large "baby boom" generation into the workplace and home ownership, and increased numbers of women in the workplace. The immense changes of the past several decades will not be as intense. These concepts will be discussed briefly in the following section.

Urban Land Use

Interactions between transportation and land use are important, but sometimes neglected. These impacts relate to energy consumption, pollution, and congestion. However, the linkages are complex and not fully understood. By providing accessibility, infrastructure increases demand for settlement in certain areas -- a prime example being growing suburbs. However, this demand emerges because of a host of other locational factors, and governments are legitimately responding to public desires by providing such accessibility.

American urban development patterns have been influenced by successive levels of transportation technology and public infrastructure investment. In recent decades, automobile and truck transportation came to supersede and dominate other modes. This was due to their unique levels of mobility and flexibility available to their users and by a public and governmental willingness to build roads. So urban areas, such as the Twin Cities region, have developed in a sprawling fashion. Personalized automobile travel has allowed people to live and work in a staggering variety of permutations.

In urban areas, some have called for renewed efforts -- a combination of land use and transportation initiatives -- to produce development patterns which will lead to fewer and/or shorter individual trips, thus mitigating both pollution and energy consumption problems. The International City Management Association (1988) suggests the following:

It can be argued that the market has given the public what it wants -- multi-nucleated, decentralized communities heavily dependent on the private car. Critics respond, however, that certain government infrastructure decisions, including massive financing of the highway system, have interfered with the market process in ways that predetermined the outcome.

Although the use of transportation facilities as a deliberate tool of land use control has not been a part of the American approach to city planning, several European national-level governments have used regional rail and highway investments in an effort to relieve congestion in central cities and direct new growth in concentrated areas or corridors ... Even if the American approach were to change in the coming years, transportation and other planners would require a great deal of empirical information about the land-use transportation equation before they would be able to implement more active approaches to land use control.

The Twin Cities Metropolitan Council has adopted several stances which constitute active growth-management. But still, the political will and ability to limit access to outer areas which have a certain degree of governmental autonomy remain in question.

The traditional view of American cities, with residential areas sprawling outward from a dense center along spoke-like transportation corridors is largely a thing of the past. The central region dominates in terms of commercial and industrial enterprise. Thus, most individual trips are expected to be inward on spokes to work at the center and outward home from work. For the Twin Cities and many metropolitan areas, most individual trips are from point-to-point outside the central business district (CBD) with only a fraction to or from the CBD. Only about two percent of the daily trips in the seven county region end in one of the downtowns and nearly half of all trips were suburban to suburb. Recent trends have increased the proportion of non-radial travel in the region.

The large amount of non-center based work travel does not necessarily mean that most people are taking longer work trips. It actually leads to shorter work trips when an individual's home and workplace may be close to one another while not necessarily close to the CBD. Thus, the trend is not always bad in terms of energy and environmental concerns. However, other recent research suggests that, overall, average work trip lengths are rising moderately but steadily (Hodge, 1990; Cervero, 1992) in American metropolitan areas.

Two approaches to mitigating automobile travel through transportation decisions are suggested by Cervero. One is to enforce lost historical patterns of a radial metropolis with commercial activity concentrated in the center. This would increase transit viability. The other is to encourage multiple dense nodes of commercial activity, perhaps co-located with new denser suburban housing developments that are dispersed throughout the metropolitan area.

Gordon and Richardson (1991) conclude that: "The co-location of firms and households at decentralized locations has reduced, not lengthened, commuting times and distances." They further suggest that those supporting "reurbanization" or promotion of denser cities, through land use control and rail transit are likely to fighting an impossible, and perhaps unwise battle. "U.S. metropolitan planners have neither the will nor the capacity," they say, and "There is no case for reinforcing weak-headed analysis with heavy-handed implementation."
Safety

Support for maximizing safety in transportation systems seems undeniable. Yet there are tradeoffs among conflicting public concerns and balances to be struck. Safety issues can be broken down as related to three aspects of the transportation equation:

- Drivers
- Vehicles
- Infrastructure System

This section will concentrate on infrastructure system aspects of safety. A wide range of standards are in place for highway projects to produce safety. These deal with such factors as road surface, road width, gradient, radius of curves, width of shoulders, and many more. These standards are dominated by those developed by AASHTO, the American Association of State Highway and Transportation Officials.

Ezra Hauer in "The Engineering of Safety" describes the evolution of these standards, and calls them into question. The standards, he argues, have not always evolved from judgements based on conclusive data, but rather on inference and inertia. They have become widely accepted by highway engineers because of convenience and because they provide protection from lawsuits.

The 1982 National Academy of Sciences Committee established by the U.S. Congress to study safety cost-effectiveness of geometric highway rehabilitation design standards concluded that: "Despite the widely acknowledged importance of safety in highway design, the scientific and engineering research necessary to answer these questions (i.e. about the relationship between roadway geometry and safety) is quite limited, sometimes contradictory and often insufficient to establish firm and scientifically defensible relationships"

Hauer and others have argued that safety decisions should be made more situationally - that is, in detailed evaluation of site and usage factors. Also, increased study of actual human response to different infrastructure features is called for. For example, "safer" designs may in some cases lead to "less safe" drivers, lulled into complacency by straight uninterrupted travel with long sight-lines.

Martin Friedland and others (1990) argue that a question equal in complication to that of the efficacy of existing standards and approaches to highway safety, is their cost-effectiveness. Clearly, all investments which may lead to an incremental increase in safety cannot be made, the cost would be too high and other public needs would suffer. Thus, public decision-makers must pick and choose.

Trebilcock, and Roach (1990) discuss the difficulty of cost-benefit analysis in safety design. Valuing costs and benefits implies placing monetary valuations on life and limb. Indirect costs and benefits which may stem from transportation decisions - "fuel consumption, pollution, driver delay, aesthetic detriment" - are similarly difficult to value. A cost-effectiveness approach might call for selecting the maximum safety within a given budget.

Both selection of standards and provision of flexibility become important public policy questions. Less costly infrastructure investments may be possible from more flexible or appropriate safety standards. This has been argued by transportation decision makers serving primarily rural areas, who sometimes see standards as consuming resources which could alternatively build capacity and lead to regional development benefits.

ISTEA has certain provisions which would allow states new freedoms of flexibility in standard applications. From an economic development standpoint, this could mean more effective allocation of resources overall - especially if in fact current standards do not necessarily lead to safety in all current applications. These standards are costly and divert resources from other potential transportation investments. Although ISTE A would seem to allow increased flexibility, there may be resistance from state transportation departments and others who favor current standards by virtue of resistance to change and self-protection from criticism and lawsuits.

Neighborhood and Community Impacts and Activism

Many variations of local level impacts of transportation arouse public interest. Thus the root concerns may be neighborhood continuity, population displacement, historic site preservation, pedestrian mobility, park and natural site preservation, visual and aesthetic concerns. In non-urban areas, preservation of wilderness and natural sites may be the 'tragic of resistance'. In some towns, major bypass projects may be resisted by those who would wish to bring passing traffic to main street. In others, unnecessary highway expansions may be sought by local leaders hoping to spur economic activity.

Some of these impacts may be manifested through changed property values, which are not likely to be distributed equitably. While government can compensate those whose homes and businesses may be removed or otherwise directly impacted by infrastructure, this only partly mitigates impacts. Neighborhood continuity and community design character are non-quantifiable benefits in citizens lives. Infrastructure decisions may impact different segments of the community differently, and those in poorer, inner-city neighborhoods are often most affected.

Since the late 1960s, citizen and neighborhood organizations began to take more active efforts regarding planned infrastructure construction projects - especially urban highway construction and expansion projects. This activism often took the form of resistance to highways, primarily due to specific disruptive physical effects of specific new construction or expansion proposals. Lawsuits have increasingly become a vehicle of action for citizens organizations resisting infrastructure projects.

In Minneapolis, such resistance is currently becoming manifest in response to proposals to expand Interstate Highway 35W south of downtown. Many residents of impacted neighborhoods have voiced opposition to what are seen as inequitable negative impacts in the city of Minneapolis to serve suburban commuters. Meanwhile commercial interests and others from southern suburbs argue for the economic importance of increasing capacity on the stretch of freeway. Some fear that the increased capacity will only facilitate additional residential and commercial location in the outer reaches, thus leading eventually to a wider, but still congested facility. The corridor is a classic case study of the complexity of infrastructure decision making in the 1990s.
Role of Technology in Transportation

The advent of new technologies in transportation has enhanced the economic growth of the Upper Midwest. New technologies will continue to be part of the development of the region's transportation system. A variety of areas can be used to highlight the changes technology will bring to this region. These apply to all modes of transportation. The following graphic represents possible changes in surface transportation:

![Image of a graphic representing technology in transportation]

This paper looks at both current and future technology innovations being considered by various transportation venues. The Upper Midwest and other regions of the country are also exploring such opportunities. The most advanced technology being tested in the region is Intelligent Vehicle Highway Systems (IVHS). This paper highlights its passenger and commercial vehicle applications.

Great gains have been achieved in recent years by using additional technology information systems for aviation traffic management. Today's advances in transportation technologies are centered around surface transportation. In each of the states of the region, research projects are being conducted by the state Departments of Transportation and by universities. In some cases, private enterprise such as Motorola, 3M and other companies are involved in these projects. The region must be ready to evaluate and test various modes of this technology during the next five years.
Throughout the region, agriculture serves as a key ingredient to economic prosperity. Transportation of agricultural products as well as other products is essential to the economic growth of the region. The use of new technologies, such as on-line systems between shippers and carriers, can keep costs competitive by creating faster and more efficient delivery systems.

In addition, new technologies may increase the productivity of transportation vendors and government regulators. Several research projects are testing more efficient monitoring of government regulatory requirements. In addition, training for future employees of transportation related industries might be aided by satellite based education systems.

The five state region will be able to serve as a model for regional cooperation in technology implementation.

Current Technologies Being Implemented in the Five State Region

IVHS

Minnesota is one of the nation's leading research centers of Intelligent Vehicle - Highway Systems (IVHS). Minnesota Gueidestar is the state's IVHS program and is a joint effort between the Minnesota Department of Transportation and the University of Minnesota's Center for Transportation Studies.

Minnesota Guidestar plans to reduce traffic congestion and improve safety. By decreasing delays, air quality will be improved and energy will be conserved.

Research is focused on three primary areas: 1) attempting to prevent congestion and predicting where and when it will occur 2) providing motorists with in-vehicle information on a variety of topics, including congestion, weather conditions and routing advice 3) developing fleet dispatching services for taxis, buses and emergency vehicles.

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IVHS-CVO

There is a great deal of interest in commercial applications of IVHS at the federal level. Currently, the Federal Highway Administration is funding research of regional strategies for IVHS-CVO. Several studies are being done across the country, investigating how states can cooperate with each other.

Researchers in Iowa and Montana are investigating applications of Intelligent Vehicle - Highway Systems (IVHS) in Commercial Vehicle Operations (CVO). The Iowa research is being conducted by the Midwest Transportation Center (MTC) and the Montana investigation is being done in cooperation with the Washington State Transportation Center (TRAC).

According to Mark Hallenback, Director of the Washington State Transportation Center, there is an eight state project in the Northwest, another eight state project in the Southeast, and a third project with three states in the Southwest.

The regional projects are designed to "encourage and assist regional states and industry in adopting advanced IVHS technologies which can increase the productivity and safety of motor carriers and efficiency of state regulatory programs."
There are two broad goals of the FHWA sponsored research:

- Free Flow of Interstate Truck Movement
- Electronic Commercial Driver/Vehicle Safety Inspections

The first goal hopes to create "transparent borders." Using electronic technologies to coordinate states' regulatory systems would allow commercial vehicles to travel from one state to another easily and smoothly. Compliance with registrations, licenses, and permits would be verified electronically by a regulatory agency. Further, mileage could be reported to the states electronically."

Researchers at the MTC in Iowa are leaders of the IVHS-CVO applications field. They have identified five promising applications for IVHS-CVO:

- Weigh-in-motion with automatic vehicle identification
- Pre-clearance for safety inspection
- "One-Stop-Shopping" for licenses, registrations, and permits
- Automated, apportioned fuel tax administration using instrumented state line crossings
- Automatic toll collection using electronic toll and traffic management systems

Researchers at MTC estimate complying with states' regulations and permit requirements cost $12,000 per tractor-trailer per year. This does not include the cost of taxes, tolls and fees associated with registration requirements. Assuming "that the Iowa's motor carriers surveyed are indicative of motor carriers throughout the country, a conservative estimate of the national cost of complying with administrative rule and regulation is approximately $6 billion per year."26

MTC says there is a need for a new paradigm for the successful application of IVHS-CVO application. More work "on institutional and policy issues is needed in terms of research, within the motor carrier community, and among policy-makers and their staffs."21

Telecommunications and Distance Education

North Dakota has several education programs reliant on telecommunication technology. The Upper Great Plains Transportation Institute is developing a two-way interactive satellite system.12 The system will link up four universities and six Departments of Transportation. The satellite system, expected to be operational by the end of September 1992, is designed to accomplish three objectives:

- Establish a graduate program in transportation at the four universities to be linked, North Dakota State University, University of Wyoming at Laramie, Utah State-Logan, Colorado State-Fort Collins.
- Stimulate technology transfer and research awareness between the universities and the DOT's.
- Create discussion between the DOT's in areas of policy and technical expertise.

The University of North Dakota-Grand Forks is developing a satellite based education program which will broadcast aviation instruction to universities across the United States.23 UND has received $4.5 million from the FAA to develop the system and it expects to receive additional FAA funding. The FAA hopes the service will provide more consistent aviation instruction.

The satellite education program will provide aviation instruction to ten universities by September 1992. Eventually, this service is expected to serve between forty and fifty universities.

UND has recently acquired a Cray supercomputer which will develop better models to predict weather conditions. The university will use the computer to research weather conditions as they relate to transportation challenges, such as de-icing of planes.

UND is also providing computer based instruction for students training to be pilots. Gone is the old manual based education. Students studying hydraulic systems are now able to see the operation of the systems in motion on their computer screens.

Pave-Tech

"Pave-Tech" is being used by the North Dakota Department of Transportation.14 "Pave-Tech" uses a mini-van equipped with cameras to inventory the condition of North Dakota state highways. This technology improves the state's pavement management system; providing a more consistent inventory of state highway conditions.

Before "Pave-Tech," twenty-four ND-DOT workers spent three months investigating the conditions of state highways (equivalent of eight full-time workers).

Now, with the use of the $130,000 mini-van, three DOT workers do the work that the twenty-four did previously. Once the ND-DOT is finished cataloguing its roads and highways, it plans to lease out the mini-van to cities and counties.
Regional Technology Projects

Nine projects are being tested throughout the nation in conjunction with the Federal Highway Administration. Several of these projects have multi-city and multi-state parameters.

The following graph shows the location of these projects.

[Diagram of the United States with various projects labeled, such as SMART Corridor, ADVANCE, TRANSCOM, etc.]

A brief synopsis of the work of these projects is as follows:

TRANSCOM: A consortium of 14 transportation and public safety agencies in the New York and New Jersey area which are working to improve inter-agency responses to traffic incidents.

SMART Corridor Project: A joint demonstration project located along 12.3 miles of Santa Monica Freeway corridor in Los Angeles. The objective is to provide congestion relief through various alternatives.

GuideStar Project: A cooperative effort that will bring together a number of on-going operational traffic management and traveler information systems with a range of IVHS projects in Minnesota.

Pathfinder Project: A cooperative effort by Caltrans, FHWA and General Motors to provide in-vehicle navigation to improve traffic flow.

TravTek: TravTek represents a public/private partnership involving the City of Orlando, Florida, the Florida DOT, FHWA, General Motors, and the American Automobile Association (AAA) to provide traffic congestion information and various guidance facilities to 100 test vehicles equipped with an in-vehicle TravTek device.

ADVANCE: An effort to evaluate performance of the first large-scale dynamic route guidance system in the nation in a joint project including the Illinois DOT, Motorola, Inc., the Illinois University Consortium and the FHWA.

DIRECT: Located in the Detroit, Michigan area, it will deploy and evaluate four alternative low cost methods of communicating advisory information to motorists.

HELP/Crescent: HELP (Heavy Vehicle Electronic License Plate Program) is a multi-state, multinational research effort to design and test an integrated heavy vehicle monitoring system.

Advantage I-75: The project represents a partnership of public and private sector interests along the I-75 corridor to allow transponder equipped and documented trucks to travel any segment along the length of I-75 at mainline speeds with minimal interruption at weigh/inspection stations.

Possible Projects for Five State Region

The following is a list of possible cooperative efforts between the states within the region.

- Duplicate I-75 project possibly along I-94 and I-29.
- Expand GuideStar focus into five state region; broadens to include rural applications of IVHS.
- Expand current Iowa project for truck licensing and regulating into five state consortium.
- Provide linkages for radio or transponder information amongst properly equipped vehicles in five state region.
- Duplicate HELP/Crescent Project for heavy vehicle monitoring.

The possibilities for developing a five state consortium project are limited by the funds and the equipment available. However, as this information demonstrates, a need exists in the nation to determine how this work would be implemented into larger scale designs.
Endnotes

1. Leading work on this topic includes:

   Aschauer, David Alan. 1991 "The Third Deficit" GAO Journal pp. 4-8;

   Forkenbrock, David J., Thomas Pogue, Norman S. J. Foster and David I. Finnegan 1990 Road Investment to Foster Local Economic Development Iowa City: Public Policy Center;

   Munnell, Alicia H., Editor. 1990 Is There a Shortfall in Public Capital Investment? Boston: Federal Reserve Bank;


6. Sources for the Environment, Safety and Quality of Life section are as follows:


   Brandt, Steve. 1988. Light rail may be wrong cure/Study finds flaws in assumptions that led to push for system in Hennepin. Star Tribune. March 21: 1A.


7. All maps and graphics in this paper are from *An Overview of the IVHS Program Through FY 1992*, Federal Highway Administration, Washington, D.C.

8. IVHS Funding for Institutional Issues Development Memorandum, FHWA, 5/21/92.

Road Investment to Foster Local Economic Development

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EXECUTIVE SUMMARY

Highway investment is widely regarded by both policymakers and analysts as an effective tool for promoting regional economic development. Accordingly, 24 states have established special programs under which highway investments are undertaken for the explicit purpose of fostering economic development. Furthermore, even when economic development is not the stated goal of highway investment, the effect of such investment on a state’s economic development is nevertheless a major concern of policymakers. Highway planners throughout the nation therefore face the questions of how to define, measure, and evaluate the economic development effects of highway investment. The broad objective of this study is to provide the best available answers to these questions. These answers must be based on a sound understanding of what economic development is and how it is affected by highway and other infrastructure investment.

THE ECONOMIC DEVELOPMENT PROCESS

Economic development occurs when the real income generated by economic activity within a state or other area increases; it is the process by which real income is increased. The economic development effects of a road project or any other infrastructure investment are appropriately measured by the project-induced changes in people’s real incomes, increases in real income as benefits, and decreases are costs.

- A project is termed efficient if the present value of its benefits exceeds the present value of its costs, in which case it increases real incomes in the aggregate. Some persons may enjoy an increase in real income because of the project, while others experience a decrease. But if the project is efficient, the gains of the gainers more than offset the losses of the losers.
- In contrast, a project is termed inefficient if it decreases real incomes in the aggregate, in which case the project makes society worse off.
- Economic development is not “job creation.” Real income from economic activity within a state can increase even if employment does not, and employment can be increased by measures and policies that actually reduce real income.
- Policies that simply shift economic activity from one location to another do not promote overall economic development.
- Infrastructure investment policy in general and road investment in particular can have an important effect on a state’s economic development. But other policies, such as education, may be equally or more important.

- Infrastructure usually plays a supportive role for businesses whose overall economic viability is determined by their success in matching production to consumer demand. Thus infrastructure policies may influence the location of economic activity and employment without creating it.

THE ROLE OF ROAD AND HIGHWAY INVESTMENT

Road investment can have two opposing effects on a state’s economic development. It can increase the real income derived from economic activity within the state by reducing the transportation costs involved in such activities; this promotes development. But road investment also entails costs, which are financed by increases in taxes and fees that reduce real income and deter development. If a road project reduces transportation costs by more than the cost of the project (both stated as present values), the project promotes development and is also efficient. If the converse is true, the project deters development and is inefficient. Thus when highway investment promotes economic development, it is also justified on the grounds of efficiency.

- A state can promote economic development by undertaking highway investments if and only if they are efficient.
- Roads are “tools” used in transporting goods and people from one place to another. A road project generates benefits only to the extent that it lowers transportation costs. It promotes development only if it produces transportation cost savings, broadly defined to include safety and environmental impacts, that exceed the project’s costs (including the present value of future maintenance and operation costs).
- There is no separate “economic development” justification for highway investment. Even though a road project may be seen as an economic development tool, it must be justified on the basis of its transportation benefits alone. That is, all of the benefits of a road, and the rationale for building it, flow from using it for transportation.
- When a road project is evaluated as a means of attracting a particular business to a certain location, it must be compared to other means of attracting the business, such as direct financial assistance in the form of a cash subsidy, a low interest loan, or a tax abatement. The road project is justified only if it is the least costly means of attracting the business—that is, only if it generates transportation cost savings in excess of its construction, operation, and maintenance costs.
- In assessing the benefits of road projects, it is necessary to recognize that building or improving a particular stretch of road may reduce the benefits derived from existing highways. That is, a project’s benefit to the state as a
While usually cannot be determined by looking only at how it affects transportation costs for those using the road and the value of property along it.

- **Road investment** is sometimes seen as a means of redistributing income, wealth, and/or prosperity within a state, but it is a poor tool for doing so. Income and wealth redistribution is better achieved by the direct transfer of income.

We apply the general principles of efficient highway investment in six paradigms. The paradigms illustrate various situations that frequently confront policy makers assessing the potential effects of a highway project on an area’s economic development.

- **Sixty City.** If undeveloped sites already exist, investing in access to still other sites will not promote economic development.

- **Gold Mine.** Highway investments that would benefit a small number of persons—investments they would make public action—are unlikely to foster economic development.

- **Raise the Ante.** The total incentive package offered to a particular firm that is being recruited should not be whatever it takes to attract it. Rather, the level of net economic benefits it would bring should be the basis for any incentives, including roads.

- **Spread It Out.** A highway investment program that seeks to spread development to declining areas cannot maximize development in the state as a whole.

- **Open Up the Amazon.** Building or improving highways in less developed areas is inherently speculative; it rarely will contribute to economic development in the short run, and long-term gains are problematic.

- **The Carnival.** Investing in roads to attract foot-loose industries is generally unwise; the investment is fixed, but the business may leave if only marginally better circumstances avail themselves elsewhere.

**INVESTMENT GUIDELINES OF IOWA’S RISE PROGRAM**

The concept of efficiency in this report is Iowa’s RISE (Revitalize Iowa’s Sound Economy) program. The Iowa Legislature authorized RISE to promote economic development through road investments. The $11 million annual program provides for three different types of projects, one of which is Immediate Opportunity. The projects involve grants or loans to a local government that is actively negotiating to attract a specific business, and roads are an issue. A total of 56 projects has been approved to date.

**WORKABLE GUIDELINES FOR EFFICIENT ROAD INVESTMENT**

If it is to promote economic development, a road project must generate transportation cost savings that exceed its costs, both broadly defined to include the road’s effects on safety, equipment wear, and the environment and literally its expected present values. This criterion applies whether the project is large or small and whether or not the project has economic development as an explicit goal.
tions. RISE cost per job assisted and non-RISE capital investment per RISE dollar. We also examine the suitability of the two measures in light of our conceptual work. Our findings include:

- At the time of their approval, 18 projects had projected costs per job ranging from $290 to $7429, with a weighted average of $2549.

- The RISE cost per job does not address the fact that a business may also receive assistance from other state programs or from a local government. On average, an additional $729 per job was provided from non-RISE sources.

- The applicant's estimates of the jobs created or retained by a project is not an accurate indicator of the project's economic development impact. Questions remain as to wage rates, the extent to which the jobs were new or relocated from another place, and the project's effects on taxes and non-wage income.

- The other measure, capital investment ratio, pertains to the extent to which RISE Immediate Opportunity projects helped stimulate capital investment. The ratio of private and other non-RISE public investment to RISE investment for the 13 projects for which complete cost data are available was projected to be 14 to one at the time of application. The actual ratio for these projects was slightly over 11 to one.

- Use the cost per job measure, the capital investment ratio is a gross, not a net measure. It is difficult to determine the extent to which new capital investment was stimulated rather than shifted from another location within the state.

In short, the statutes and administrative rules governing RISE cannot indicate whether in fact a project promotes economic development.

APPLICATION OF GUIDELINES TO EVALUATION OF IOWA RISE PROJECTS

Using our suggested screens to evaluate a set of RISE projects leads to several conclusions:

- It is successful. Local programs sometimes only shift or direct activity from one part of the state to another, rather than increasing statewide activity.

- It is difficult to assess the payback to local projects.

- Outcomes are highly variable. As in any fairly large number of ventures involving business risk, some firms will perform better than expected and some worse. Those using projections of future economic gains should allow for the inherent riskiness of business forecasts.

WHAT OTHER STUDIES SAY

Previous research on the relationship between highway investment and economic development is relatively sparse. Indeed, no studies have examined the effects of state-level highway investment programs on income at the local level. Yet some previous work is germane to our analysis.

- The results of various studies demonstrate that the incomes received by immobile factors depend on where roads are built. It is difficult to quarrel with this conclusion.

- Several quasi-experimental studies have shown that a road investment is to spur local economic development, other necessary factors of production must also be present or able to be attracted.

- Studies of industrial location decisions typically acknowledge the importance of good highway access, but it rates it as less important than educational institutions, quality of labor, climate, quality of life, and certain other attributes.

- Input-output models and most other analytic approaches can approximate the impact of a highway investment on a local economy, but they typically do not measure the extent to which this growth is a net increase in or a relocation of existing activity.

In short, previous studies strengthen our conclusion that sound principles of project evaluation, not the best guidance. Focusing on net transportation cost savings is the surest way to foster economic development through road investments.
The Once and Future Transportation Plan

For decades highways have been kings of the road, dominating transportation policy, taking charge of its funding. But no longer. With the passage in 1991 of a major new surface transportation bill, Congress shifted policy away from a single-minded obsession with interstate highways and focused it on a variety of means of moving people and goods.

These changes, as expressed in the Intermodal Surface Transportation Efficiency Act, offer unique opportunities to state and local officials: It lessens their burden to devise the most suitable forms of future transportation for their regions—from new high-tech subways to low-tech car-pool lanes. "Our idea is to let states compete among themselves. Let them learn from each other's mistakes, copy each other's successes," says U.S. Senator Daniel Patrick Moynihan, a principal architect of the transportation act. "Those who make wise decisions will prosper. Those who make poor decisions will pay."

This edition of The Public's Capital highlights three areas of the new transportation bill that pose opportunities and challenges to state and local governments:

- Devolution: Decision-making authority moves away from the federal government to the states, and in urban areas, from state agencies to metropolitan planning organizations. MPOs, rather than departments of transportation, will have a chance to call the shots, deciding which projects the region should invest.
Who Gets What: The Major Funding Provisions of ISTEA

National Highway Systems: $21 billion for construction and repair of Interstate highways and major state roads. States can transfer 50 percent of the money to the Surface Transportation Program. States can also spend highway money on non-NHS projects that will improve traffic flow on national highways. An additional $17 billion is earmarked for Interstate maintenance.

Surface Transportation Program: $21.9 billion for roads, transit, transportation enhancements and safety. Some of the money is allocated by formula to urban areas. An additional $14 billion from four other programs can either be transferred to the Surface Transportation Program or spent on projects eligible for the program.

Transit: $12.4 billion for new systems and equipment. Of that, 40 percent is for new starts, 40 percent for rail modernization and 20 percent for bus and other uses. About half the money is to be spent on 184 specifically authorized projects. In addition, $17.4 billion has been earmarked for transit operating assistance.

Congestion Mitigation and Air Quality Improvement Program: $6 billion for projects that will help areas struggling to achieve air quality goals.

Interstate Completion and Trade-In: $13.4 billion to complete the Interstate system and honor prior commitments for Interstate transfers to rapid transit projects.

New technologies: $660 million for smart cars smart highways research and development. $725 million for research and development leading to the production of a magnetic levitation train system.

Special Projects: $6.2 billion earmarked for 538 specific projects, such as replacement of a bridge in Portland, Maine, and improvement of an expressway in Chicago.

Bridge Repair and Replacement: $16.1 billion for continuation of existing bridge program. Up to 40 percent of a state’s bridge funds may be transferred to the National Highway or Surface Transportation programs.

Finally, for all the hoopla surrounding these new state programs, MPOs will control only about $9 billion of the $150 billion authorized by ISTEA. As Lawrence Dahms, executive director of the San Francisco Bay Area MPO, notes, “We have to reconcile expectations with resources. The amount of money we are receiving in the Bay Area will not even pay for two interchangegers in our current plan.”

The big question: Can MPOs do the job?

Congress granted significant power to metropolitan planning organizations. Can they fill the shoes Congress set out for them?

Yes, the good news is:

1. MPOs have a flexible outlook. Unlike state departments of transportation, which traditionally make investment decisions, MPOs do not have to rely on a single metropolitan solution, such as highways.

2. MPOs are experienced. They’ve long had to coordinate the concerns of several jurisdictions, special interests and assolated government agencies at one time.

3. MPOs are not concerned with the states. Although they share some responsibilities with MPOs and state agencies. Their greater experience, state agencies may be able to pass on a thoroughpass over MPOs.

4. MPOs’ structural barriers in coordinating policy. Large metropolitan areas, in fact, are often divided into several MPOs. And air quality and congestion management are often handled by other agencies whose jurisdiction doesn’t overlap the MPO’s.
DEVOLUTION

Ready or Not, Here Comes Regional Power

I
there's one point of agreement on the new transportation bill. It's that effective regional planning councils in charge of decision making is the biggest gamble in the whole bill.

Congress is betting that these few-key advisory units—metropolitan planning organizations, by official moniker—can turn themselves into Type-A agencies who can wield political clout as they coordinate policy, set priorities and make hard funding decisions. Wield such a transformation, the high hopes for ISTEA as a force for change in urban transportation policies may not be realized.

Congressional sponsors of ISTEA launched on to MPOs as a way of changing transportation policy. They wanted less emphasis on building roads and more on conscious-Itting alternative investments, such as mass transit or car-pool lanes, to regional transportation needs. There was widespread concern that state transportation departments had too concentrated a bias toward road building and had been relatively insensitive to the impact of highways on urban areas and environmental goals. MPOs, on the other hand, tend to represent a variety of metropolitan interests. As such, they were perceived to be in a position to push state and localities toward investments that encompass a variety of solutions for regional traffic and air quality problems.

"We don't know how this will play out," admits John Bolender, council to the National Association of Regional Councils, which represents MPOs and other regional groups. "But we think we're moving in the right direction and the old road gang has lost control."

The new act requires states to allocate a fixed percentage of available funds to urban areas or other areas on allocations. As a result, MPOs for urban areas larger than 200,000 people (as well as MPOs in smaller areas that have not met air quality goals) are given the responsibility of deciding, in consultation with state DOTs, how to spend that money.

MPOs are not accustomed to exercising this power. Councils in the 1960s and early '70s, MPOs have been advisers to local governments transportation, urban renewal and land use activities. They prepared metra-area plans but those rarely had much impact on hard-nosed spending decisions. Anxious not to offend any of their local government partners, MPOs produced long, sanitized with lists of projects. State DOTs were precluded from funding unless projects but they could, and routinely did, pick and choose from the lists with broad discretion.

The new act dramatically changes these historic practices by requiring the MPOs to set the priorities. They will for the first time to balance urban and suburban interest, choose among transit and road investments, and reconcile mobility with clean air goals. The funding allocation power gives MPOs considerable clout, say Bruce McDowell, director of research for the U.S. Advisory Commission on Interstate Relations. "Now they have some chips when they come to the table. That has been their biggest problem until now."

While they may have new powers, the bigger concern is whether they'll know how to use them. McDowell notes that regional council of governments, which serve as MPOs in many parts of the country, have proven themselves useful institutions for exchanging views, discussing issues, and providing data and analysis..."However, most have not proven themselves as police policy makers, especially when the issues are controversial."

The ability of MPOs to grow into their new role is complicated by confusion and overlap in the region's responsibilities, especially in regard to state agencies. The bill contains language that requires consultation and cooperation between state DOTs and MPOs. This means that state DOTs are just as key actors: They have the technical expertise and they control the state funds needed to match federal grants. Some fear that state planners may attempt to subsume the MPO process.

The move to automobilize regional planning in the past, to focus on making the regional organizations work. Bill Roberts, regional director of the Environmental Defense Fund, which strongly backed the MPO provisions, figures that when the MPO was important, a mayor might appoint his brother-in-law as his representative. Now that the MPO has power, you can be sure a mayor will make sure he has somebody good representing him on the MPO.

Larger jurisdictions will probably move to gain greater control over the MPOs, many of which are dominated by smaller jurisdictions in their metropolitan areas. In the Denver metropolitan area, for instance, the Council of Government, which serves as the region's MPO, makes most of its decisions via a majority vote of all governments. There is a little-used provision in the organization's by-laws, however, that allows weighted voting. This could be invoked if a large jurisdiction felt it needed to protect its interests.

There are also a number of structural problems that could make life miserable for MPOs. ISTEA calls for transportation plans to be coordinated across types of transportation, local governments and policy sectors, specifically those involved with quality, land use and transportation. The law, however, doesn't adequately address the structural coordination that makes such coordination difficult. Large metropolitan areas are frequently divided into several MPOs. In addition, air quality and congestion management may be handled by a layer of agencies with non- overlapping jurisdictions. This patchwork structure reflects a distrust of regional government typical of many local officials and residents.

A Primer on Pollutants, Congestion and The New Transportation Policy

The link between transportation and clean air is rooted in chemistry. About 90 percent of the chemicals that combine to form smog are emitted by motor vehicles, as is about 90 percent of the carbon monoxide in urban air.

Since the 1960s, policy makers have tackled this on little in two ways. First, they emphasized reduction of emissions from plants and technical improvements in automobile engines and gasoline. Then they required emissions from new and existing stationary sources, such as factories, power plants and the like. These two strategies produced substantial reductions in emissions and a noticeable improvement in air quality. Moreover, they proved to be popular with politicians because their costs, while not large, are not readily apparent to voters. Instead, they are hidden in the prices of products such as automobiles.

There is also a third line of attack: reduce air pollution while getting back on automobile travel. But that approach has never been seriously pursued. There have been public subsidies for mass-transit systems, but the effects of these systems on automobile travel have been insignificant. Regulatory actions, such as mandatory no-drive days or limits on employers-provided parking, and pricing policies, such as parking surcharges at work sites, have invariably floundered in the face of voter unpopularity.

I believe that while automobiles are much cleaner than those of the early 1970s, the gains from emissions reductions per vehicle mile traveled have been significantly eroded by increases in automobile travel. In the Los Angeles area, for example, where the population has increased by 30 percent in the last 20 years, auto emissions have been reduced by about 70 percent but total vehicle miles traveled has doubled. The net effect is that automobile-created pollution dropped about 35 percent, in areas where travel growth has been slower, pollution reductions have doubled but increased. Even so, many areas have been unable to attain the nation's ambitious air quality goals.

This approach, if implemented, represents an almost complete reversal of historic patterns in transportation decision making, contends Denver city councilman Ted Hadachow, chair of the National Association of Regional Council's task force on the surface transportation bill. "This political and development interests must understand that transportation must address the Clean Air Act first and development needs second."

I will it work? Until regulations promoting the clean air and surface transportation laws are written, it is impossible to predict how states and local policies will respond to the federal policy direction. Recent experience in Los Angeles suggests, however, that many of the measures most likely to be implemented have only limited impacts on air quality.

Since the late 1980s, the Los Angeles area, the most polluted in the country, has undertaken an ambitious program to improve air quality. In 1990 plan calls for quadrupling transit ridership, eliminating 3 million daily work trips through telecommuting and eliminating another 1.7 million daily work trips through car-sharing—all by the year 2010. Achieving these goals requires substantial efforts, and they are being made. Car-sharing is encouraged through investments in special car-pool lanes and by regulations that require employers to develop transportation management plans that reduce the number of vehicles employees use to commute to work.

Martin Wachs, a professor at the University of California in Los Angeles, has been monitoring these efforts. He found that substantial increases in car-pooling occurred only when employees face negative incentives, such as parking charges. In Century City, a major mixed-use employment center, Wachs reports 92 percent of those who receive free parking drive to work alone. By contrast, only 74 percent of those who have to pay for parking drive to work alone. "It is very difficult to get very large shifts from single-occupant commuting to car sharing by employing only incentives for ride-sharing," he claims. "We must also take steps to reduce the incentives for driving alone."

Regional councils will finally have some chips when they come to the table.
Employees are not necessarily passive in the face of such relocations. Public employees unions in the Los Angeles area worked to get a rule adopted that prohibits the region’s Air Quality Management District from adopting any regulations that violate collective bargaining agreements or place an undue impact on the poor. If free parking is considered a fringe benefit, it removes another important incentive. The use of parking coupons to induce carpooling could easily qualify as a violation of the second.

In further efforts to lure commuters from their cars, the Los Angeles plan calls for spending more than $43 billion on mass transit. Yet almost every study of ridership shows that few mass transit riders are return car commuters and most new subway riders used to ride the bus.

Ching-Huei Christine Bae of the University of Southern California estimates that all of the mode shift strategies in the 1990 Los Angeles plan—employer ride sharing, elimination of parking subsidies, auto use restrictions, increased transit and transit improvements—will produce less than 2 percent of the total projected reductions for each of the two chemicals that are precursors to smog formation and about 4 percent of the plan’s projected reductions in carbon monoxide (see chart on page 70). Bae adds that implementing all the plans’ travel reduction strategies—alternative work schedules, telecommuting, better land use planning—will produce 15.1 and 21 percent reductions in the two precursors to smog formation and 31 percent reduction in carbon monoxide. Even if they could be achieved, Bar concludes, “the VMT-reduction measures in the Los Angeles plan make only a modest contribution to the total emissions reductions.”

There are several reasons why VMT-reduction strategies have limited effects on air quality. Most pollution from automobiles comes when cars are first started and then idling after being turned off. In an average 10-mile trip, roughly half the pollution is from the first few miles of driving. Thus, a shift from automobile to transit will have little impact if workers still drive to the transit station. Similarly, telecommuting can reduce the number of work trips made each week. There is some evidence, however, that workers are likely to respond by moving their residences further out of the area, which could, in effect, lengthen the remaining work trips.

Because the gains from behavior-changing measures are so limited, it may make more sense to reduce emissions via emerging technologies. Consider, for example, the tools done by Professor Donald Strohm of the University of Denver. In collecting data on 380,000 cars used in actual travel conditions, Strohm discovered that half the emissions came from less than 10 percent of the fleet. It makes more sense to concentrate on three vehicles, he says. One way to get the dirtied offenders off the road is by using a mobile emissions monitoring device. Such devices could be deployed to flag in polluting cars the same way radar is used to catch speeders.

Such an effort, however, may be hindered by policies that focus on VMT as a surrogate measure of automobile pollution. Yet, despite evidence that a strategy of reducing VMT produces minimal gains at relatively high costs, there has been little call to re-examine that approach.

One explanation is that VMT reductions would facilitate achievement of a number of other goals, most notably congestion relief, open space preservation, energy conservation, air revitalization and prevention of global climate change.

Another comes from environmentalists who say that the nation’s goal ought to be to reduce all forms of air pollution regardless of cost. Since air quality goals outlined in the Clean Air Act cannot be fully attained through other means, even steps with small impacts must be undertaken.

But there has been little effort to question whether air quality goals are realistic. As Alan Altshuler, director of Harvard University’s Taubman Center for State and Local Government, noted in his 1979 book, The Urban Transportation State, those standards are designed to guarantee pollution levels “that can be tolerated by anyone, however ill or fragile, without ill effects.... By way of illustration, I have a standard that entailed zero levels of mortality and personal injury would be achieved only by a total ban on travel.”

While the rhetoric of the Clear Air and Surface Transportation acts suggests that stringent measures to achieve clean air goals is it entirely conceivable that there will not be the political will to make hard decisions. Policy makers must discern whether the goals merely restate a society’s hopes or actually relate to a national commitment.

The marketability of in-vehicle systems will be much greater if the same hardware can be used from one geographic area to the next and if different system components are compatible. These problems can be best resolved if a ‘systems architecture’ is defined at the outset. Such an architecture defines the major components of a system, the function of each component and standards for component interface. It leaves plenty of room for multiple private industry providers of individual components, with the ultimate integration and technological advancements.

While the development of systems architecture and standards are needed, the process of getting there will be difficult. Much research, development and operational experience is required. Choices of how to test and how, will have positive impact on commercial developers. Negative impacts on others. This will put pressure on the administrators of federal research and development dollars. They will also be measured by state and local governments that peer investments in proven technologies. Cost may be a definitive barrier. The magnitude of the investment required to implement IVHS is daunting. Mobility

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**INNOVATIVE TECHNOLOGY**

High-Tech Highways Could Rule the Road

One are the days of building new highways. Today all efforts are on squeezing more out of what we have.

Asphalt and concrete will be replaced as the building blocks of future transportation systems. Computers, electronics and communications technologies known as Intelligent Vehicle and Highway Systems will come into their own.

This technolgy, its proponents believe, can do all: reduce congestion, enhance safety, save fuel, help clean the air and provide a spur to emerging American industries.

Advocates also contend that investments in IVHS make sense on industrial policy grounds. While many of the technologies underlying IVHS were developed in the United States for use in aerospace and defense, European countries and Japan are widely perceived to be leaders in applying the technologies to everyday transportation needs. Those countries have gained that edge through public commitment of funds and by establishing public-private partnerships.

Other countries have more than 50 percent.

Whether IVHS is a high-tech savior or just a technological mirage, remain to be seen. To find out what it can do, however, will require hefty financial commitments as well as unprecedented levels of cooperation among governmental agencies and between the public and private sectors.

The Intermodal Surface Transportation Efficiency Act of 1991 which authorizes $660 million over six years to research, develop and test IVHS, the investment is warranted.
This page contains an article discussing the impacts of high-speed rail transportation. The article highlights the controversy around high-speed rail projects, the economic benefits and drawbacks, and the potential for future expansion. The text mentions the high-speed rail system in Japan as a successful model and discusses the challenges in implementing such systems in the United States. The article also touches on the environmental and social impacts of high-speed rail, including job creation and reduced carbon emissions. The text concludes with a call for a comprehensive approach to high-speed rail infrastructure to address the needs of different regions and populations.
**Flooding the Market**

The West is witnessing a growing market for renewed water. Consider:

- A four private duck-hunting clubs in the Midwestern states have contracted with a municipal water supplier for treated water to irrigate rice fields and to fill ponds during the winter hunting season. Pond water requires disinfection as well as secondary treatment and will be sold for $4.00 per acre-foot.

In 1990, Tucson County Club contracted with Tucson Water for a 700 acre-foot of irrigation water, reducing its reliance on water from the local rivers. The club will pay the city $4271.60 per acre-foot, or the same price as the utility.

- A central Texas school district was unable to build a new school because state laws prevented on-site drainage. On-site wastewater treatment and use of reclaimed water to wash toilets reduced discharges by 85 percent, allowing the new school to be constructed.

California, for example, carefully reviewed existing reclamation facilities and identified potential problems and health incidents associated with the use of treated wastewater. It is accordingly reviewing a 10-year-old regulation to make it easier to use the facilities.

Finally, a streamlined, accessible regulatory process is needed. Effluent is widely used in Arizona because the state has established clear criteria for the discharge of reclaimed water. Effluent reuse and recharge are solely regulated by the Arizona Department of Environmental Quality. By contrast, coastal states, such as California, allow for use of reclaimed water with no additional regulatory framework.

**Psychic Drains**

Financial and regulatory considerations are not the only factors driving recycling projects. There is also public and health risk, based on past experiences with some wastewater treatment plants. Overcoming these may require more stringent measures than those originally adopted.

Despite the pilot project, the lack of state and local government will have to work to overcome these hurdles by demonstrating the economic and environmental benefits of reclamation programs.

Reclamation water in the only available source for four Western water basins. At best it can only meet a part of their growing needs. But one or two lower cases may be dependent on the alternatives now under serious consideration. If so, they take the appropriate steps, then can be ensured that reclaimed water at a reasonable cost will be an important part of future municipal water portfolios.

Roger Laughter & its manufacturer and the distributor of the Water Storage, a manufacturer, must have the article adapted. The growth of consumption has produced remarkable savings. The report says that the Federal Reserve Bank. Some $3 billion may have been gained from increased efficiency and new technology, another $1 billion from limited rate rationalization. Further deregulation could produce additional savings. Credibility, difficult, but political pressures make it unlikely that policy makers will embrace full deregulation in the near future.

**False Dreams and Broken Promises**

Ffael and Reed: The Wasteful Federal Investment in Urban Mass Transit

In this report, two papers, issued by two prominent think tanks, represent a useless effort to change the course of last fall's debate over federal transportation policy. The first paper, by Illinois-based transportation consultants John Love and Wendell Cox, argues that transit generally has not achieved their stated goals of increasing ridership, alleviating congestion, reducing air pollution, revitalizing cities or saving the poor. The second paper, written by Peter Gordon, a professor of urban and regional planning at the University of Southern California, reiterates these arguments and notes that demand for transit actually has fallen as transit system costs have increased. Although they have not allowed more people to pursue the American dream of low-density living, Love and Cox call for an end to federal transit subsidies, elimination of barriers to private service and competitive contracting for subsidized services. Gordon is well known and congestion pricing, emissions charges, full-cost parking charges at work sites, transportation vouchers for the poor, deregulation and increased privatization.


Policy Insights No. 131, The Lincoln Foundation, 3145 Sepulveda Blvd, Los Angeles, CA 90034 Tel: 310-391-2245.

**Liberalization Without Deregulation**

U.S. Telecommunications Policy During the 1980s

During the last twenty years, the structure of the U.S. telecommunications industry has shifted from the public utility model to one geared toward competition. Although the growth of competition has produced significant savings, this report says there may be a cost to that most beneficial contracts contain few incentives for efficiency. Because they often allow a pass-through of costs, they may actually encourage inefficient behavior.

Federal Options for Reducing Waste Disposal

As more waste is generated, concern about the health and safety implications of disposal is rising. This report by the Congressional Budget Office considers alternative policies for reducing the amount or toxicity of waste that people—may not be feasible in practice. Five other policies alternatives also are evaluated: unit-priced pricing, a disposal tax and reuse subsidies, a vegetable, material tax, an investment tax credit for recycling, and a recycling credit system. The criteria for evaluating high potential impact on recycling, impact on volume or toxicity of materials in the waste stream, can be evaluated, and whether it encourages illegal dumping.

Congressional Budget Office. Second and Third S. W., Washington, D.C. 20515 Tel: 202-226-2809.

**Privatization of Municipal Wastewater Treatment**

Privatization of municipal wastewater facilities is often promoted to provide a more efficient and cost-effective system in the private sector. This report compares costs of privately and publicly owned wastewater treatment facilities. However, this study found that the private sector was not significantly different than the public sector costs. Instead, it found that many contracts contain high-cost facilities that are included, the private facilities, on average, are more expensive than the public facilities. Author Randall Holcomb, a Florida State University, contends that the most cost-effective approach involves a mix of public and private treatment. The growth of consumption has produced significant savings. Although some legislation has shifted from the public utility model to one geared toward competition. Although the growth of competition has produced significant savings, this report says there may be a cost to that most beneficial contracts contain few incentives for efficiency. Because they often allow a pass-through of costs, they may actually encourage inefficient behavior.


**How Federal Spending for Infrastructure and Other Public Investments Affects the Economy**

Carefully chosen federal investment in physical infrastructure could yield economic rates of return higher than the average return on private capital, concludes this report by the Congressional Budget Office. The highest economic benefits would result from maintaining existing assets and from expanding capital stock in critical sectors.

The report also reviews the effects of investment in human resources and research and development activities.

Congressional Budget Office, Second and Third S. W., Washington, D.C. 20515 Tel: 202-226-2809.

**Public Sector Maintenance: The Case of Local Mass Transit**

Private transit operators tend to devote significantly more resources to maintenance than public sector operators. Contenda Brian Comrie, an economist with the Federal Reserve Bank of Cleveland, argues that the case for federal subsidies of local and state transit programs should be made investment in new equipment or maintenance of existing equipment. Alternatively, it may be that institutional features of public ownership tend to be more supportive of maintenance activities.

Trade Centers of the Upper Midwest: Changes from 1960 to 1989

by: Thomas L. Anding, John S. Adams, William Casey, Sandra de Montille, and Miriam Goldfein
CHAPTER 5. FINDINGS AND CONCLUSIONS

The study confirms the continuing existence of an eight level trade centers hierarchy that was first revealed by the Upper Midwest Economic Study in 1961. This hierarchy is based on the economic activities and spheres of economic influence of the almost 4,000 trade centers—towns and cities—of the region. The hierarchy consists of the following (from the highest to the lowest levels):

- Four metropolitan centers, with an average population of 983,869 and an average of 23,336 business establishments (Milwaukee, Des Moines, Omaha-Council Bluffs, and the Twin Cities of St. Paul and Minneapolis).
- Thirteen primary regional centers, with an average population of 122,845 and an average of 3,104 business establishments.
- Sixty secondary regional centers, with an average population of 41,512 and an average of 1,034 business establishments.
- One hundred sixty-seven complete shopping centers, with an average population of 12,502 and an average of 333 business establishments.
- Two hundred seventy-five partial shopping centers, with an average population of 5,132 and an average of 140 business establishments.
- Eighty-seven full convenience centers, with an average population of 2,748 and an average of 72 business establishments.
- One thousand forty-nine minimum convenience centers, with an average population of 1,636 and an average of 35 business establishments.
- Two thousand thirty-six hamlets, with an average population of 625 and an average of 10 business establishments.

Not only does the hierarchy continue to exist, but it remains surprisingly stable despite important internal changes:

- Fewer than 10 percent of the towns and cities moved either up or down within the hierarchy during the period 1960 to 1989.
- There were, however, significant changes in the mix of business activities handled by the trade centers. These changes include: phenomenal growth in the number of service establishments (up 51,696), a decrease in the number of retail establishments (down 11,173), and a moderate increase in the number of manufacturing establishments (up 12,076). Important changes within the retail category—decline of traditional retailing and increases in the miscellaneous category, particularly in small centers—have altered the character of the retail function. For example, there are many more boutique and antique stores and fewer hardware and grocery stores in 1989 than in 1960.
- The trade center hierarchy as a whole shifted, with the higher and lower order places moving away from each other over the study period. The lowest three classes of trade centers—hamlets and minimum and full convenience centers—occupy a less important position within the regional economic system than they did a generation ago. The highest three classes—metropolitan areas and primary and secondary regional centers—play a far more dominant role than they did a generation ago.
- The extent that individual places moved up or down the trade center hierarchy was as a function of both large-scale economic forces and small-scale influences, such as individual business successes and local planning efforts.
For the most part, economic growth has been steady throughout the Upper Midwest, but this growth has been unevenly distributed, both geographically and within the hierarchy:

- The greatest concentration of growth occurred in the eastern third of the region. This is the area where most higher level trade centers are located, as well as the four metropolitan areas. Because trade centers in this portion of the region benefited from the major economic trends affecting the Upper Midwest, these places experienced robust growth.
- The four metropolitan areas and the seventy-three regional centers captured most of the increase in the number of business establishments. In fact, most places that moved up the hierarchy lie within a hundred mile radius of one of the four metropolitan areas.
- The trade centers that moved down the hierarchy are, for the most part, in areas that suffered from drought and agricultural reorganization (western Iowa, southwestern Minnesota, and eastern Nebraska are examples).
- Agricultural services, transportation and communication businesses, retail establishments, banks, and service industries grew mainly in the higher level trade centers.
- Average numbers of establishments in manufacturing, construction, and wholesale business showed growth at all levels of the trade centers hierarchy.
- Some lower level trade centers, which might have had a difficult time surviving changes during the study period, continue to exist. Several reasons for their survival are apparent: agriculture remained important, new natural-resource-based economics developed, tourism and recreation replaced previous natural-resource-based economies, and local innovation and entrepreneurship offset the larger trends in some towns and cities.

The evolution of the trade centers hierarchy is largely explained by four major trends that affected the Upper Midwest during the past thirty years:

- The population of the Upper Midwest continued to migrate from rural to urban areas—from smaller cities and towns to larger ones, further up the trade centers hierarchy. This movement was essentially a redistribution of people since the overall population of the region remained relatively stable, increasing only about 16 percent during the 1960-1989 period, a much lower rate of growth than the national increase of 39 percent.
- Retail business activity consolidated into larger establishments which were often located in higher level trade centers, the larger cities of the region. Larger discount shopping establishments became a major and growing factor across the region in the last half of the study period.
- There was exceptional growth in the service sector of the United States’ economy, including the Upper Midwest. This new activity was found in all levels of trade centers, but it grew most in the region’s larger cities and its four metropolitan areas.
- Agriculture continued to consolidate its activities. The number of farms and farmers in the region decreased during the 1959-1987 period by 37 percent as operations adopted new technology and as land ownership and capital were consolidated. At the same time, agricultural service industries tended to concentrate in larger cities as a result of changes in transportation and marketing.

All four of these trends contributed to the shift in the trade centers hierarchy, increasing the number and relative importance of higher level trade centers, while at the same time diminishing the importance—in some cases threatening the survival—of smaller towns and cities, especially those outside the rings of economic influence of the four metropolitan areas.

There were, however, four countervailing forces that tempered the larger, more powerful trends:

- There was inertia against change associated with the long-standing historical settlement patterns of the Upper Midwest. These patterns date back to the nineteenth century and the early exploitation of natural resources—feral land for farming, vast acreages for ranching, abundant forests for lumbering, and rich mineral deposits for mining. The existence of well-established, smaller communities created an understandable lag in the shift of economic activity toward larger trade centers.
- Agriculture remained strong, despite its continuing consolidation. In their consolidated forms, farming and agribusiness continue to be essential elements in the economy of the region.
- The forest products and mining industries remained important to many towns and cities of the region, despite a general decline in other natural-resource-based economic activities. These industries provided sufficient economic activity to support some of the lower level trade centers.
- Some new natural-resource-based activities emerged during the period, including accelerated development of fossil fuels in the western Dakotas and eastern Montana and a burgeoning tourist industry located in various trade centers throughout the Upper Midwest, but particularly in portions of Minnesota, Montana, and Wisconsin. These gains have, in some cases, preserved towns and cities formerly reliant on farming, ranching, lumbering, and mining.

These findings raise several critical questions for the future of the region:

- To what extent will the overall trend toward centralization of critical functions such as health care and education in larger trade centers continue nationally and in the Upper Midwest?
- If these trends continue, what will be the social and economic impact on the region, especially for trade centers at the bottom of the hierarchy?
- What new types of problems and opportunities will emerge in the higher level trade centers—metropolitan areas and regional centers—as they continue to grow and become more dominant in the region and increasingly provide services formerly found in smaller centers?
- With an increasing number of smaller trade centers—which are “handcuffed” and convenience centers—become places with limited functions and services where people simply reside? Will people in these small centers rely on larger cities for employment and important goods and services and expect their place of residence to supply only convenience goods and services?
- What will be the effect of increasing separation in rural economics between the farmer-rancher and the trade centers? How will local rural economies change as they rely less on farm trade?
- What will the extraordinary aging of the population in the smaller centers of the region mean to the continued successful operation of these centers as places to live, work, and do business?
- How many smaller trade centers will eventually lose their economic viability, even as places to reside, given their diminishing number of functions and services and the increasing maintenance costs of the existing infrastructure?
- Is it possible and desirable to develop policies aimed directly at offsetting these trends in order to slow future change in the region, thereby preserving and enhancing to some degree the older settlement patterns?
- Or, should policies be developed to minimize the impact of the larger trend or in other ways ease the transition for communities undergoing change, thereby facilitating an easier, more orderly transition for the people living there?
- Given the potency of the larger trend, what are the appropriate roles for public policies—in economic development, agriculture, transportation, and intergovernmental finance—either to accommodate or slow the transition currently underway?
- To what extent have changes already taken place that require a fundamental restructuration of how public and private goods and services are provided in the smaller centers and rural areas of the region?
- Finally, it is time to face squarely the question of the value the larger society places on the human resources in the region’s smaller places and rural areas. Are their contributions to the fundamental strength of the states, the region, and the nation valued highly enough?

While this report cannot and did not intend to answer fully these vital questions it has attempted to move the discussion in that direction and to provide a framework for deliberation about the region’s future.
Figure 3.6 Major Trade Centers in the Upper Midwest, 1989

- Metropolitan Areas (Trade Center Class 0)
- Primary Regional Trade Centers (Trade Center Class 1)
- Secondary Regional Trade Centers (Trade Center Class 2)

Figure 3.10 Change in Number of Business Establishments, 1960-1989 (in percents)

- Greater than 10% gain
- 10% to 10%
- Greater than 10% loss

Figure 3.12 Places That Moved Down in the Trade Center Hierarchy, 1960-1989

Each dot represents a place that moved down in the hierarchy. Circles show a 100-mile radius around each county dot.
"I'm happy to welcome you all here to discuss the funding opportunities under ISTEA..."

All he wants now is a fast road out of town.
Transportation and Economic Development in the Upper Midwest: New Models for Federal, State, and Local Cooperation

MINNESOTA POLICY CONSULTATION I
February 24, 1992 - Hubert H. Humphrey Center

AGENDA

Moderator: Merritt Linzie, Minnesota Department of Transportation

8:00 a.m. Coffee and Rolls

8:30 Welcome and Introduction
G. Edward Schuh, Dean, Hubert H. Humphrey Institute of Public Affairs

8:45 Introduction to the Transportation and Economic Development Project
Lee W. Munnich, Jr., Director, State and Local Policy Program

9:00 Infrastructure and Economic Development
Arthur J. Rolnick, Director of Research, Federal Reserve Bank of Minneapolis

9:40 Break

10:00 Opportunities for Federal, State and Local Cooperation Given the Intermodal Surface Transportation Efficiency Act of 1991
Thomas D. Larson, Administrator, Federal Highway Administration

10:45 Panel Discussion: Regional Problems and Opportunities in Infrastructure Investment, Intergovernmental Cooperation, and Financing
Sen. Gary DeCramer, Chair, Minnesota Senate Transportation Committee
Darryl E. Durgin, Deputy Commissioner, Minnesota Department of Transportation
Mary E. Anderson, Chair, Twin Cities Metropolitan Council
Allen A. Housh, Vice President, Transportation, Cargill
Richard P. Braun, Director, University of Minnesota Center for Transportation Studies

11:30 Participant Discussion

12:20 Quality Check and Wrap-Up
Dennis M. Cavanaugh, Retired Chairman and Chief Executive Officer, Soo Line Railroad

12:30 Adjournment

Sponsored by the Humphrey Institute State and Local Policy Program with the University of Minnesota Center for Transportation Studies
TRANSPORTATION AND ECONOMIC DEVELOPMENT IN THE UPPER MIDWEST

Remarks by Dr. Thomas Larson
Administrator, Federal Highway Administration
Hubert H. Humphrey Institute of Public Affairs
February 24, 1992

Introduction by Merritt Linzie
Minnesota Department of Transportation

Introducing Tom Larson

We're really pleased today to have Tom Larson, Administrator for the Federal Highway Administration, tell us a little bit of what's envisioned by the new Surface Transportation Act. Mr. Larson was appointed by President George Bush as the twelfth Federal Highway Administrator on August 10, 1989. As Administrator for the Federal Highway Administration Larson is responsible for the overall management, including administering the Federal-Aid Highway Program. Prior to joining the Federal Highway Administration Larson served as Professor and Administrator at Pennsylvania State University. He was Secretary of Transportation for the Commonwealth of Pennsylvania from 1979 to 1987. During that period he served in various chairmanships and was recognized by the National Governors Association as an outstanding state cabinet official. He served as President of the American Association of State Highway and Transportation Officials and chaired the National Governors Association Tax Force on New Federal Transportation Legislation. His numerous honors and awards include Engineering News Records Construction Man of the Year in 1982, and International Road Federations Man of the Year in 1985. I'd like you to welcome Dr. Tom Larson, Federal Highway Administrator.
Thank you very much. I'm pleased to be here on several accounts. First, I'm pleased to see snow again; I haven't seen enough to even get my skis out. Here it looks like real winter, it's kind of refreshing. I suppose we all remember things from our childhood in a distorted way. Somehow I remember that we used to have snow in Pennsylvania, and now we don't seem to have it any more. So I'm pleased there's someplace that still enjoys real winter.

More importantly, I'm pleased to be here at the Humphrey Institute because in my academic career I've been a professor more than anything else I guess, if you add up the whole of my career, spending the last several years as University Professor at Penn State in the Penn State Policy Institute and now a school of policy. I have lectured or visited at The Kennedy School, at the Johnson Institute, and now at the Hubert Humphrey Institute. It is a distinct pleasure. I have a little bit of a feeling of remorse, or a twinge of regret I guess, that I'm part of a Republican administration, and it seems that if you want to go to a public policy institute, you have to cross party lines. I'm not sure what the meaning of all that is, but nobody will hold it against me as I appear in this fine institute.

There are a number of people that I remember with great fondness. I think Braun and I served (he in Minnesota and I in Pennsylvania) for essentially the same years. I followed him as president of AASHTO. Dr. Schuh is someone that I have revered, I think is maybe the best word, because I have been so taken by his thoughts on the role of Land Grant Universities.

During the years at Penn State, the last that I put in at Penn State, I worked for Bryce Jordon for a while and, like all institutions we were trying to rediscover the roots of Penn State as a Land Grant Institution. The person that I turned to more than any other single person I think perhaps, was Dr. Schuh for his very seminal writing in that area.

Well, I thought I would do two or three things this morning. Number one I would like to talk a little bit about transportation and the economy. As I was standing out drinking coffee, everybody around me was talking about that, and they had all the answers. So I'm not sure I can contribute very much, but I'm going to try a little bit. Then I'm going to talk about a process. On the way out here the folks from the Federal Highway Administration said that Minnesota is strong on process; they just talk and talk and talk and talk. So I'm here to help you talk and talk and talk and talk about process. I happen to believe that in government, process is often just as important as the product, because we don't always get the product right. But if we get the process right, the product is more likely to be a useful one. And besides, I'm a Scandinavian and I like to talk and I'm a professor, and so the process part is very natural with me.

Then I want to talk about product, because I think in this case I can lead you through a process that has led to a product. Then I'll talk about the product, which is of course the Intermodal Surface Transportation Efficiency Act of 1991. I had the remarkable good fortune to come to government. I wasn't at all sure that it was a right career move for me. I went through all the agonies I guess we all do when we change careers. I was settled into Penn State and I had a chair professorship, which I think is sort of the nirvana of university life. I gave it up and went to Washington. I did it because it seemed to me that we were at a very significant time in our history. Somebody was going to be involved in doing significant policy studies, and then be involved in writing new legislation that would really define the next era of transportation in America. It was on the promise that I could be involved with that that I left the University and went to Washington. I've had no regrets. I have not looked back even for a moment, because I have been totally engrossed ever since I got there over three years ago. I wasn't confirmed until August, but I actually started working in February with Sam Skinner on the policy study and so I'm into my fourth year, which is a pretty long time in Washington.

So, three things: a little bit about economics, a little bit about process and quite a bit about product. Then I'll try to tie it into Minnesota a bit. This study that several states are involved in—looking at the special opportunities in the transportation field—I think is just very timely. There are lots of things different, lots of opportunities. This is a very special moment in transportation.

This is the logo [on overhead] that we have developed and used—it's been in use now for several years—and I think it kind of says it pretty well what we're involved in is really moving America. There are clearly new directions and new opportunities that are our good fortune to have before us. There are various places you can go for advice in this world. The New York Times on February 9 said that as you listen to the political figures that are preparing for their campaigns and if you visit a sample of the state houses around the country, you will find that there is a very large convergence on a few things that are important for America's economic future, or cures for an economic ills. I'm not going to spend a lot of time on these because obviously I'm not an expert on these, except the last one. The sixth on the list is "invest more in public transportation infrastructure." Well, I'll expand on that just for a few moments because that sort of helps to make my first point.

These were indeed the exact words that were in the New York Times, "Invest more in public transportation infrastructure, highways, bridges, railways, airports." Most lists would include public transit, which will raise productivity by reducing transportation delays and costs. I have been bemused and greatly encouraged that transportation is on a list like this. If you think about it a while, most of us who have been in transportation over many years would not have found our area of interest on any list. But here is somewhat of a consensus of national thinking on the short list of things that we should operate on, if we want to improve America's economic conditions.
I happen to believe this is true, and I’ll enlarge on that in a minute. Given that this is true, it puts a very heavy responsibility on groups like your own that are involved with transportation on a multi-state basis. It also obviously gives you an enormous opportunity as opposed to those that have in the past labored to have a little bit of identity. Often the identity was in immediate job creation; not a very productive place to be with relatively few jobs created out on the highway site that often were too late to have the right kind of economic impact. Seeing a statement like this that we’re now recognizing transportation as very fundamental is, I think, in itself one of the most important things that’s happened in my transportation career.

Well, why has it happened? Here a lot of people will have a lot of different theories, but it seems to me that it comes down fundamentally to what we have done with ourselves as a society. We started by opening up the country. Many of us landed—like my own forefathers from Sweden—in New York. Everything fanned out from what was essentially a coastal oriented set of nodes, originally by trails and water routes and then by rail, into a very poorly defined, poorly served interior in terms of transportation.

The first focus of our country, then, was to open up this great interior and to try to get beyond these nodal points that were the New Yorks and the New Orleans and the San Franciscos and so forth around the coast. The interior places lined up along the lakes and rivers. Driven by the need to get beyond those places and open up the country, we spent almost all of our national history up until the just now concluding Interstate era opening up the interior of our country. Well, in the meantime, the society served by this transportation was changing in lots of ways. We’ve become urbanized: eighty percent of our people live in urban areas. We became a very different agricultural society. (I should be careful what I say about agriculture with Dr. Schuh as a possible intelligent critic in this arena.) But certainly the numbers of people and the way farming is done has changed dramatically. Also, manufacturing has changed in ways we can hardly imagine. So transportation as a service function has had to contenc with a quiet revolution. Transportation has been learning how to serve a society with much different distribution. Now, really in just the last couple of years, all at once lights have been going on in the minds of some economists who have said, “Gee, this transportation function is much more than it used to be; it is now right at the heart of a whole lot of things.” And that’s of course why it’s on lists like this.

The people that have worked on this and have written about it are numerous. I’ll mention just two names. David Aschauer, who probably deserves as much credit as anybody, that what you do in public infrastructure investment will in fact improve private sector productivity. For me a more important observation and confirmation was made by Dr. Michael Boskin, who is the economic advisor to the President. One day Secretary Skinner and he invited me up for lunch; we were in the process of thinking about our transportation policy, and I raised the question of Aschauer’s work and his own work at Stanford. Dr. Boskin said, “Yes, there’s no doubt in my mind as an economist that public investment in infrastructure is important, it can contribute to productivity enhancements, but only to the extent that you make strategic investments.” Those words have, since that time, stuck with me. I’ve thought about the Interstate system, for example. That was a pattern of strategic investments. It’s a fairly modest system: 40,000 miles out of a whole four million miles of roads in the United States. But those miles, strategically placed and completed to a set of predictable standards, enormous impact on everything that’s happened in the U.S. economy since 1956 when the system was started. It continues to have massive impact.

The notion here is that when we invest strategically in public transportation infrastructure, the private sector becomes enormously more productive, and it isn’t those few jobs that we create out on the roadside. Those are good. I don’t want to demean those. You build a new airport, you build a transit system, a new highway, you are in fact creating jobs, and that has a positive impact if the cycle is right. All too often it comes too late in the economic cycle, but if you can be cyclical about it, it can be quite positive. The important thing is the fact that a plant now is linked to and thus a part of a national, and perhaps a global, system for producing components that have to come together. The transportation is obviously going to be critical to that enterprise. You can go to plant after plant, enterprise after enterprise, and you will find out that the logistic side of the production is perhaps as important—and in some cases more important—than the manufacturing per se. Getting all the components identified, getting them all to flow together in a timely way and getting the product back out into the global system—that’s crucial to making industry productive. That’s why transportation has achieved this eminence that it has lacked over most of its history. At least, that’s my personal belief.

The difficulties that we have, of course, are that we have to find the public resources to do this and that’s always a tough job. You have to be strategic about the investments, and it’s tough to do that. Part of the coffee discussion was how can we disinvest when we have some things that are in the wrong place at the wrong level. The answer is very, very slowly. The political system does not allow us to disinvest just because our population is eighty percent urban. That doesn’t mean we can neglect our rural areas. Rural America has to be connected. So you have to disinvest very selectively, and over time. I think that’s happening right now. I think we are seeing a significant shift in our infrastructure investment pattern.

The most obvious perhaps would be the hub and spoke system of airports. We are clearly in the business of focusing our air system resources on hub terminals and basing them on a new kind of a service that is evolving as new equipment and policies come into play. I think the
same thing is true in other modes. Certainly there has been a great rationalization in the rail system. We have rail freight and rail passenger freight that are really shadows of the systems that were there just before the turn of the century, but they’re lined up in particular ways as a result of economic need. The highway system, of course, is the same. It is becoming a more strategic network, and I think one of the great opportunities for the future will be to make it even more strategic, and I’ll get back to that before I close.

One of my hobbies is management. I like to carry around a simple model. There is a good book on demythologizing American management that came out just in the last couple of months. It says that we have too many faddish approaches to management. I only carry one around in my mind, and this is it. I learned this at another institute, the Kennedy School. It’s widely used by a lot of people, but I like it because it’s so simple. If you have a vision, that should propel you forward. You need an authorizing environment you’d like to have 250 million people that are going to support you, and then you need an organization that can deliver on the vision. What I’ll do as I go along is talk a little about these three things and try to put some of my remarks at least in this context.

That little bit of an economic background was mainly to the point that transportation is far, far too important to our national well being to be set aside; it has to be a focus for a lot of attention. Let me now shift to Part Two: the process of the legislative initiative. The question of what is a proper transportation policy statement on a national scale is a very tough one. These are some of the things that we put down. We thought it should be a framework for future decisions, not decisions per se, but a framework for thinking about this very important economic function in the context of all the other things that have to fit, or that it has to fit with. At the time we were doing this there was a lot more concern in Washington than there is now about not having an industrial policy. I don’t know what industrial policy is exactly, but I know we have a whole bunch of them in this country. We always have had and we probably always will.

Short term legislative, regulatory, and program strategies—there was no doubt in anyone’s mind that we had to get to work on this immediately. There are a lot of reasons for that, but one of the reasons was that the Interstate era—I’ve made reference to that as sort of the last part of the era of opening up land—ended in October of 1991. So we had to have short term legislation including the regulatory and program strategies to go along with it. Then finally, there was no doubt in anyone’s mind that the roles of federal, state and local government in the private sector had to be recast. In our history we’ve blown hot and cold on Federal involvement. President Jackson vetoed the first national road when it got to Mayville, Kentucky as I recall, because he said we don’t want to have any federal involvement in road building—that’s totally a state prerogative. Then in 1893 the government set up a small office called the Office of Road Inquiry in the Department of Agriculture and gave them $10,000 to look at road problems. That was the predecessor agency to the Federal Highway Administration. We’ve now been in business about a hundred years. We’ve gone from $10,000 to about $20 billion.

I think most of us who have state experience would say that the paternalistic role of federal government, vis a vis states, is to a large degree passe. One of my great moments of truth was when I became a Fed after spending eight years sort of bashing them. After saying all the things that were wrong with the Federal establishment, I found myself having to act like part of it or trying to at least part of the time. There are new roles, clearly, for the Federal, state and local governments as these institutions become more mature and as they develop their own needs. We have a country that is developing in very different ways: rural, urban, industrial, recreational and on and on. With many, many specializations, there is no way that you can have an even handed, one-size-fits-all approach that’s going to work. This last point was never really in dispute.

I say this because there must be a few academicians here who talk about strategic planning in a center for policy studies. Henry Mitzburg is one of my favorite authors; he writes on management and planning. I came to the DOT when Sam Skinner had just gotten there, and he was going around the country on a very fast circuit. He frequently would talk about this strategic plan that we were going to have for national policy. I tried at first to figure out what he was saying. It was hard because he never said the same thing twice. He always used the words “strategic plan,” but he defined it very differently. We set up a process of tracking his speeches and trying to analyze what the man was saying. He was never in one place long enough that you could get in touch with him and inquire as to what he had in mind. So I decided after just a little while that all this was a ploy. Sam Skinner was out buying time. It’s not a bad ploy, by the way. Mitzburg has it right. One of the uses of strategy in strategic planning is to buy yourself some time, and that’s what Sam Skinner did for the better part of six months. After six months we really had to get serious and start interpreting this, because by that time he had promised it so widely that we had to go on and make it into a plan. It was in fact a position; it set a national perspective. But I have to say that it was a ploy before it was anything else. And I respect that.

A little bit more on process. This is how we work, and I won’t talk very much about this except to say that this was clearly Sam Skinner’s initiative. He started talking about it day one. He had been the chairman of the Regional Transportation Commission in Chicago and had done a strategic plan. It was a pretty poor thing, I have to say. It’s about five sheets of paper, but that’s what he had thinking about this thing, and this was his vision. You remember my three circles. This was clearly his vision.
So we set up a special office, found an interim director, and we recruited staff from all over the DOT. We had a small working group of about twenty-five at its peak, and that group had a unique perspective because all the modes, all the perspectives were brought together. We did our outreach essentially by market clusters. Rather than going out and asking people about what they need in transit, we said, "Why don't we ask instead what they need in urbanized, personal movements, or urbanized freight movements, or long distance freight." Taking a market cluster approach, avoided getting trapped into modes. The modal device is useful in many ways, but it's also a seductive trap. You can very easily get to thinking of one or the other modes somehow as the Holy Grail which is not really true. We had some excellent consultants working with us and we had a very aggressive congressional, state and local government outreach via national seminars.

That was a little bit of the process leading to several different sets of policy development products. Most importantly, we had to have a short term or an immediate action plan for the four to ten year range. We're into that now clearly, having implemented legislation and preparing multi-year budget proposals based on our policy study. We have done a significant amount of department restructuring, although that's now on hold pending Secretary Card's impact. He was confirmed on Friday, so presumably he will start looking in that area. In the longer range fall term enhanced R&D and many activities outside of the DOT itself.

The six policy themes of the policy statement are a good basis for summarizing that first year's effort at developing a National Transportation Policy. We believe these provide the framework for decision making that I spoke of earlier beginning with "maintain and expand America's transportation system." For many people in this dialogue expansion was a bad word. They felt that we have too many airports, too many highways, therefore too much transportation. It's degrading the environment, it's a clutter on the landscape, and thus we've got to slow it down and stop it. I think one of the things that persuaded us to nevertheless include this theme is that this country is shifting and remobilizing itself all the time. What was true in a state twenty years ago is probably not true now, and so the system needs to expand. What we didn't put here is contract. It needs to expand and contract and be in a fluid state all the time. "A sound financial base" few can dispute that. The third bullet: "keeping the transportation industry strong and competitive." It's easy for me in the public sector to forget that ninety percent plus of all transportation is in fact in the private sector. That's where the things that matter the most and are the most visible happen. For example, today General Motors' Bob Stempel is going to be making announcements about the future of General Motors. The private aspects are the bulk of the transportation business. The governments contribution to keeping that industry strong and competitive was considered absolutely essential. The statement "ensure that the system supports public safety," reflects the fact that we will not take the government out of the safety side of transportation. One of the early statements by Congressman Minneta from California was that we will not deregulate safety. The final two themes refer to the quality of life and transportation technology and expertise.

These are the six themes that were developed really very early on. Since the National Transportation Policy was released in March 1990, President Bush has been extremely proactive in this arena. The themes have stood, we think, the test of time pretty well.

I've been talking about vision. The six themes represent as much of the vision as anything. Let me talk a little bit about organizational capacity. It's all well and good to have a vision, but if you don't have anything to deliver the vision it's not going to get delivered. That's all there is to it. Secretary Skinner started a phase two initiative almost concurrent with the announcement of the policy study, using pretty much the same process. We had an advisory committee, a multi-modal cross agency working group, task groups, consultants: the same basic structural approach because it worked so well the first time. This time were focusing on how to make the U.S. Department of Transportation into an agency that has a capacity to deliver on these lofty thoughts that were put forth in this statement.

That was the basic idea of the strategic forward-looking perspective to match the National Transportation Policy. The emphasis was on people. There are 110,000 people in the U.S. DOT, and if those people move and work and are empowered, things get done. If they don't then in fact we lose our cutting edge and it affects everything across the country. Commitment to equal opportunity, a unified sense of mission and values, effective communication in the DOT and information technology for the 90's, with strong leadership and guidance from the office of the Secretary of Transportation. This effort really focused on the office of the Secretary. Sam Skinner said, "Why do I have 1200 people reporting to me?" That was a challenge to find out why there are 1200 people reporting to Sam Skinner. We struggled with it and decided there were too many, but there are now just a few more.

One of the recommendations out of this effort was that we ought to have a strategic planning unit in the Department of Transportation so that this was not a once and done effort. If you look at the history of the DOT, you will see that there have been many studies; almost every Secretary has had some kind of an initiative that would report to layout the big issues and to set a path. All too often things have fallen on bad times and these efforts have simply accumulated as dusty documents on somebody's shelves. We're trying very hard now to inculcate this notion of strategic planning and strategic thinking, and to make sure that this strategic vision that I've talked about is kept current. There's a very aggressive process underway that Secretary Card will be involved in almost immediately as he gets on board.
This was not limited just to the office of the Secretary. As Federal Highway Administrator, I launched an effort called FHWA 2000. We are now through the business of defining our mission. Here’s the mission that we agreed on for the Federal Highway Administration. We are now in the business of actually developing a business plan for our agency. We’re not a very big agency. We have 3000 people spread around the country, in Washington, and around the world. But we administer a very large program and it will grow to twenty billion plus over the life of this bill. We believe that having an agency that is empowered and turned on is just absolutely important.

This is a vision that was created by a very collegial process; these are Federal Highway Administration people born and bred. They concluded that they wanted to be world renowned in surface transportation and export that innovation. I think that was a major breakthrough. There was lots of debate over whether this should be a highway agency for the future. They concluded that the future doesn’t lie with highways—it lies with a multi-modal approach. In the legislation, as a matter of fact, there is a requirement that the National Academy of Public Administration do a study on creating a surface transportation administration which would take part of the rail administration, part of the highway administration, part of safety and part of federal transit and create a new surface transportation administration. I believe that in three years that will happen. That will be one of the predictions I will make here in these hallowed halls, and it will happen not because there is anybody in Washington that really wants it. There are lots of people that really don’t like it. They have to give up some empires. It will happen because people in Minnesota will say, “Why do we have to talk to a Federal Rail Road Administrator, a Federal Highway Administrator, and a Federal Administrator when the bill that has just passed has essential funding fungible. Why do we have to do this?” And you will make much noise that the people in Washington in three years will figure out that they had better do things right, and that’s what is going to happen. Don’t let me be wrong about that now. Start writing to your congressman.

Part Three. By the way, there is a little booklet that does a better job of what I’m going to be doing, and it will be available out front afterwards. Titled Intermodal Surface Transportation Efficiency Act of 1991, it’s a pocket-sized summary that is very effective. Let me go through and try to point out the highlights to stimulate your appetite in just a few areas.

The President, when he signed this Act on the 18th of December, said that it will enable us to build and repair roads, fix bridges and improve mass transit, keep America on the move and help the economy. I don’t know whether the President was thinking of jobs in terms of the 60,000 jobs per billion dollar investment. That’s the number that we used. That’s a pretty impressive number. If you are going to spend $155 billion, it’s going to support a lot of jobs at the job site, at the airport site, and so forth. Again, I would argue, and I think the preponderance of economic thinking would come around to saying, these jobs are not only at the roadside or at the airport site. They are at the plants, the mills, and the places where in fact better transportation allows us to compete in a variety of markets. That’s where the jobs really are under the new thinking about transportation.

Well, what does the Act do? If you look in chapter four of our national transportation policy document—which I mentioned earlier—you will find a statement of how the principles ought to translate into the short term, intermediate term and long term actions. A lot of people have asked why we did this policy. If you go back in and look in chapter four of the original document, you’ll find that the principles espoused in the national transportation policy are followed with a great deal of faithfulness in the bill itself. It’s a six year bill; we asked for a long term stable platform. If you’re in a time of transition it’s very important that you have long enough that people can learn how to play by the new rules. Certainly the metropolitan planning organizations are going to have major new responsibilities under this legislation. The state is going to be recast in terms of how it performs its transportation functions. The private sector is going to be brought in. So we had to have a long enough period that these players could learn what the rules are and how to play by them.

It’s a dramatically restructured program following the trend toward simplicity and expanded flexibility. One of the hallmarks of this is that we don’t use the one size fits all approach. We tell Minnesota that if this is how you want to work, fine. We’ll work with you. Our Administrator, Chuck Foslien has to find ways of crafting a program under broad Federal guidelines that will be customized to meet the needs here in Minnesota. Every time I’ve spoken on this subject, I have said that communication between the Federal and the state governments has taken on a new dimension, because the state can say, “Feds, we don’t like you any more; you haven’t been doing a good job for us. Move out.” And we have to move out in almost all of the areas of our program. I believe that if we’re clever about this, and the right kind of partners, then in fact our role will continue to be a supportive role, but it’s going to be different. There will be new roles as a result of this expanded flexibility.

Concerning the National Highway System, I would point to Senator Durenberger as certainly one of the principle exponents of the need for this system. He argued when almost nobody else in the Senate was arguing that it was important. I think the National Highway System is important because it takes the concept of the Interstate system (which is a static system first drawn back in the 40’s) and it allows a companion system—up to 155,000 miles to flex and change as the country’s economy and demographics have changed. I’ve said only a little bit tongue in cheek that if the Soviet Union had had an Interstate or a National Highway System which would have moved cabbages around better, the breakup might not have occurred.
think that the lack of transportation was a fundamental reason why that union didn’t work in the modern time. We’ve got to make sure that we have a system that serves our union into the modern ages.

Further evidence of consistency between the National Transportation Policy and the Act: This goes on: improved management planning, greater investment in R&D, enhanced privatization and toll opportunities on this, up to eighty percent Federal participation is possible in toll bridges, fifty percent on toll projects overall. Why tolls? Because, again, in an aggregating society, where eighty percent of the people live in metropolitan areas, there will not be enough public money to serve some of the high volume corridors that have been developing. We believe that the private sector is going to have to step in and provide some of that investment. Continuing with the list, we are going to have to use new market forces to deal with congestion, also a result of this urbanization of our society. This Act provides us with congestion. So we have congestion pricing as an option, even on some Interstate projects around the country. Enhanced performance measurement follows from the need to be more accountable for what we’re doing for this $155 billion. The productivity of the motor carrier industry will be enhanced by the 155,000 mile National Highway System, where seventy percent of all motor carriage will move.

Construction of the Interstate System is rapidly approaching completion. Only a few projects remain. I was speaking to some folks from Virginia the other day and they said their biggest project is in Massachusetts. The project up there is going to total $8 billion, give or take a little bit, before it’s finished. So it is in fact a truly massive project that will mark the end of the Interstate era. The National Highway System will be defined over the next three years and then set in place in legislation. It will follow an intense negotiation between the states, the Federal government, and local governments. There are three parties here that have to work out what links should be on this 155,000 mile system.

The new Surface Transportation Program is a remarkable block grant approach. It says to Minnesota and the various transportation players out here that here is a multi-billion dollar pot of money with some take-downs off the top for safety and enhancements that’s very much out of the purview of the Federal government. It’s money that is distributed very nearly as a block grant. A special program was also created to address the air quality and congestion problems of metropolitan areas.

We clearly are we restructuring. The early legislation was so tightly focused on land access from 1921. When the Federal Aid plenary system was defined, through the completion of the Interstate system, we didn’t talk about things like congestion mitigation and air quality. Now here’s a multi-billion dollar program very tightly targeted on today’s needs and clearly these billions are not being spent on investments which primarily provide land access.

The critical problem of bridge replacements, equity provisions, demonstration projects, transit formula: these are other features of the legislation. The funding totals about $155 billion. You can see the number of programs are relatively few. One of the things that has been much criticized is that the administration has advanced a budget for transit that does not reflect the spending levels here. I’m not going to argue that case either pro or con. What I will say is that a very large portion of the highway money, which is the bulk of the money, is in fact available for other purposes at local choice. So if Minnesota chooses in its wisdom to invest very heavily in transit, it can do so by moving money out of the highway program at the same match, 80-20, and make its investments in what it thinks are important. The flexibility here puts a very heavy burden on local choice. I’m glad you have good process out here because you’re going to it exercised a whole bunch before you’re through with this.

Compared to here are the funding levels. One of the things that has been understated is the fact that the amount authorized over a five year period went from an annual average of almost 14 billion to 20 and 1/2 billion. This was a very significant increase. Is it enough? Senator Graham from Florida argued vigorously, using our own report on the condition of performance of the nation’s highways, said we were underfunding significantly. Yes, if you take a purist view that argument can be made. But I would argue that given the priorities in public funding, that this is a very significant increase.

Just a few program details. Some of the new requirements relate to statewide planning. There are nineteen factors that are involved in the development of a statewide transportation improvement program. It has to be consistent with the six management systems: pavements, bridges, congestion, safety, transit and intermodal. Project selection under programs developed statewide, and for areas less than 50,000 population, is by the state in cooperation with locals. There is a very significant increase in the funding available to address these new planning requirements. I have some misgivings about this. I’ve been involved in transportation planning all of my life. This is a process that has often stumbled. It has not produced the kind of products that you would like to see. Now we have required statewide plans with some very tight requirements on them. If there’s good news, it’s that there are lots of money. The bad news is that we probably don’t have enough professionals to do it. So for those of you that have any effect on career choice, I would urge that you point people in the direction of transportation planning because there is going to be a lot of very important work that’s going to have to be done here.
At the metropolitan area, we have a new wrinkle. I said there was going to be a new requirement for the metropolitan planning organizations. There the urban project selection is by the MPO. Now the state is in a concurring role. The MPO is in a lead role, and that's a dramatic shift and it is going to have profound implications for some metropolitan areas. Where the metropolitan planning organizations are essentially moribund, they do not have the resources, nor the talent, nor the political will to do the job laid on them. Even with the increased funding made available for urban planning, we don't have the staff resources to really do that job.

Research and technology is an area that I've been very interested in. We have a whole range of initiatives, and most importantly lots more money to do the kinds of things that we need to do if we want to be leaders in the global transportation business.

I would be remiss if I didn't talk about IVHS, since you have a major project here, the Guidestar Project. This program area has $620 million provided for it. In the requirement that we develop a prototype automated highway and vehicle system, we have extensive meetings through a group called IVHS America; Dick Braun serves on that group. We've met with key members of the House and Senate, and there is probably as much support for this bit of technology as anything I've experienced in recent years. It literally has something for everybody in it, and has an enormous amount of support and is a reason I think to be optimistic about our technology future.

In terms of program efficiencies, which may or may not turn out to be efficiencies one of the things that we now are given is the mandate to approve non-Federal standards for certain kinds of projects. For most of the miles of highway in Minnesota, Minnesota will set the standards and control the process. If it's efficient it will be because Minnesota makes it so, and if it's a wasteful process it will be because they make it so. In other words, the Federal government moves out of that business. In terms of policy setting, you can debate whether all the states are ready for this, but Minnesota clearly is. My guess is that Minnesota will realize significant efficiencies as a result of that.

The most significant change regarding private sector involvement is in terms of the toll provisions which allow the capital side of our economy—the banks, the investment companies—to look at transportation facilities as a place to put money. For the first time it's a significant investment opportunity for the private sector. We know a little about what's happening in California, Florida, Texas and a few other states. I would guess that in the metropolitan corridors where most of our economic activity is, we will see significant participation by the private sector.

I'll close with just a couple of observations about transit. One of the most significant aspects is that the basic Federal share is now eighty percent, the same as for highway projects. The matching ratio is 60 percent Federal for bus-related equipment need to meet the requirements of the Clean Air Act and the Americans with Disabilities Act. Coupled with transit planning requirements which parallel those for highway programs, a state such as Minnesota now has the option of investing where making the investments it wants. There is money for bikeways, scenic highways, other highways and transit, but the discretion rests with Minnesota and not with the federal government.

This is the story. Coming back to my management diagram briefly, I can say that there is a vision, and I believe the vision was laid out with a great deal of care to touch base with a lot of people. The organizational capacity has been addressed in a significant way that is still going on. Throughout the country in Minnesota, South Dakota, North Dakota, and Pennsylvania, and in the MPOs here in the Twin Cities, we're now in the business of building organizational capacity to take advantage of this legislation and the $155 dollars it provides. The authorizing environment is people like yourselves. I enjoy doing things like this consultation because if in fact this legislation is going to be taken advantage of in the best sense of that word, it's going to be by people like you. It isn't going to be by a few folks in Washington. They've sort of done their thing. Secretary Skinner has moved on to greater glory, if that's what the White House, is I'm not sure. I think that it's clear that the action has now shifted out to the areas, to the rural areas, to the states. That's where the implementation of this legislation will happen. So that's the authorization environment and the organizational capacity that we're really talking about.

The vision was started in Washington with the President and Secretary Skinner. It was adopted and reworked significantly in Congress by all other states including the members of the Minnesota delegation who had major input into this process. The debate over this legislation was intense. The important thing, though, about this legislation was that it moved so quickly to closure. Almost every agency that had an inside track told me that there would not be a bill. There was no way it was going to happen: there were too many disparate forces; the states were all over the lot; the Congress couldn't get its head together. Well, starting with the National Transportation Policy, the President's challenge to the Congress, the very strong leadership in the Senate to get out a bill very quickly, and then Chairman Roe coming along and working literally twenty-four hours a day for weeks on end, the government sort of hoisted itself out of its complacency posture and really did a yeoman service for Americans in this area.

Let me close with some observations that I jotted down on the way out. This was on a Northwest napkin, so you know they are profound. I tried to think of the three or four
things that, if transportation is as important as I said it is, one of the six top things according to the New York Times that affect America's future, what should be on the short list of things to keep in mind? We have been lifted from the relative obscurity of a few years ago, and now cast up as one of the half dozen most important features of America's economic future. That's a pretty heavy load to carry.

Well, what are some things we can do? Number one, there is no doubt that you need the right people at the right time. Now we need transportation professionals. I hope I've made that point over and over again. Among the MPO organizations, there are only a handful in the United States that have the resources to do what this bill requires. The states themselves are now by and large retiring the people who built the interstate highway system. In state after state, up to forty percent of the professionals are retiring. So whether it's at the local level, the state level, the Federal level or more importantly the private sector, we need resources, human resources, skilled people to carry out this mandate that is now so important. That is the number one requirement. In the University setting, clearly it ought to be the number one thing on my list. The universities have a major responsibility to meet these needs, and they can only do that if they understand just how profoundly they've changed. We are not talking about highway civil engineers that went out and built projects. That was important, but now we're at a point where we have to fit transportation into a more complex economic and social fabric, and we have to do a whole lot of things differently. There is still a role for people like me. I'm a civil engineer and very proud of that. But clearly we've got to have a mix of disciplines and responsibilities to do this job. So the people requirement is number one.

The second thing to keep in mind is making sure that our technology is as good as it ought to be. In my now three plus years in Washington, I have had too many experiences that were humiliating in terms of where we are, vis a vis our neighbors around the world. We had to send a delegation to Europe to learn how to make non-leading asphalt pavements. We're doing the same with concrete pavements this year. We have had a group in Europe and Japan looking at the intelligent vehicle highway technology. I could go on. We are going to start running a Swedish train on Amtrak this fall. The only technology we really have preeminence in is aircraft (flying) and unfortunately I flew out on an Airbus this morning.

We've got to do better, whether it's cars, or trains or whatever. We have got to promote our R&D investments more if we're going to stay abreast of the world in that area. I believe the opportunity there is a very important one. A couple of weeks ago I visited San Diego and Los Alamos. One of those laboratories makes warheads and the other makes missile systems to deliver the warheads, and the market for those things has fallen off considerably I'm told. But there's about 10,000 people at each one of those labs, and they are budgeted about a billion dollars each by the Energy Department. I think we've got to make major reinvestments in R&D for transportation. If transportation is on the short list of six things, then we'd better start our investment in R&D commensurate with its responsibilities. Our budget for environmental R&D is growing dramatically. We have a joint relationship now with the EPA, so we're coordinating our research with them. I could go on, but a whole lot of new investment strategies have to be developed if we are in fact going to be competitive. That's among number two. Number one is people, number two is R&D across the board.

Number three is something I touched on a moment ago. I think we've got to learn how to make our transportation investments strategically. We're past the era of opening up land; I don't think anybody would disagree with that although we're going to have sort of a residual policy for taking care of access.

The new strategy is one that I heard articulated best by a person that I think almost everybody knows, Sam Walton. He's the world's largest retailer. A few months ago I was down in Springdale, Arkansas. It's an interesting part of America. Up in the northwest corner of Arkansas. There they have the largest trucker in the world, J. B. Hunt, the largest retailer in the world, Walmart, and the largest chicken processor, Tyson Foods. There in this little remote place where everybody talks about being good old boys, they are the largest of their kind in the world. Congressman John Paul Hammerschmidt, who is the ranking Republican, on the House Public Works and Transportation Committee was having a hearing down there. Sam Walton got up to speak and proceeded to tell what this bill ought to do so he could make his business profitable. He didn't care about all these things that I've talked about. He wanted to be able to make Walmart more profitable. Remember, my thesis throughout all of this is that it's the private sector productivity that makes the difference. It isn't the jobs on the highway construction side, it's the private sector productivity.

I would suggest that the private sector ought to have a special council that works with the government to make sure that the money that's available makes a significant difference. (Many other states are doing this, perhaps Minnesota better than anybody else.) In 1991 the apportionments for Minnesota were $161 million. The average 1992-97 will be $290 million. This is a very significant amount of new money. You want to make sure that this money is invested strategically so that your private sector people can be better competitors in the world that we live in. You can spread whatever money you have uniformly over this great state and have nothing to show for it. That will buy you marginal improvements and you'll get a few nice letters to the editor about how you fixed my pothole. But if you want to make Minnesota the world class competitor that you are and can be, then you've got to take that money and invest it very strategically.
We don’t know how to do that, really. We do some things pretty well, but I think we need to listen to more people like Sam Walton, who said, “Invest in transportation that will allow me to be the world’s largest retailer.” Now if you take that and spread it across all of the interests, private and public, then I think you start to get a strategic investment plan. Then you have to make tough decisions. Of course, since I know you’re good at process, I know that you can make those tough decisions.

Thank you very much for allowing me to be here.

TRANSPORTATION AND ECONOMIC DEVELOPMENT IN THE UPPER MIDWEST

Remarks by Dr. Arthur Rolnick
Senior Vice President, Federal Reserve Bank of Minneapolis
Hubert H. Humphrey Institute of Public Affairs
February 24, 1992

Infrastructure and Economic Development

I want to focus on the question of whether or not there is a shortfall in the U.S. infrastructure. To this end, I will consider three related issues. First, in what sense can we have a shortage? Since the U.S. has a market economy, we don’t tend to see shortage of goods or services persisting; prices are allowed to adjust to equate supply and demand. I want to explain why it may be the case that we could have a shortfall in these goods we call infrastructure. Second, I want to examine the case that there is, in fact, a shortfall in U.S. infrastructure. I will conclude by looking at suggestions that have been made for correcting that shortfall. I will argue that the Transportation Act signed by the President late last year, aimed at correcting the shortfall will, probably fall shy of its mark unless governments at all levels make better use of the funds that they have.

Let me begin by talking about what I mean by a shortfall in infrastructure. In Russia, when prices had not been allowed to adjust, there were persistent shortages and little diversity of goods and services. But in the U.S., shortages are unusual; they quickly dissipate as rising prices ration demand and encourage supply.

In such a market economy, how can a shortfall in any good or service persist? With certain types of goods and services, it turns out that unfettered markets may not produce what the public desires. There are three types of such goods. One of them I call spill-over goods. Spill-over goods have effects beyond the benefits to those consuming the good. Examples of positive spill-over goods includes education and health services. The education of our children doesn’t just affect their own livelihoods; it benefits those of us who live in a democracy by having a more informed populace. Similarly, the health of our neighbors or co-workers can affect our own health. There are also goods that have negative spill-over effects. These are goods that produce unwanted side effects like noise or air pollution. More generally, spill-over goods are goods that have social benefits that are not the same as private benefits. Consequently, since the market equates marginal private benefits to marginal private costs, it fails to produce the correct amount of spill-goods.

Another good the market may under-produce is called a public good. Here the classic examples are national defense and lighthouses. These are goods that, once produced, are very difficult to exclude others from using. Consequently, they turn out to be difficult to price in a way that marginal benefits equal marginal costs.
The third type of good the market may fail to adequately produce is a good that is subject to increasing returns to scale. The problem with such a good is that the efficient price (where marginal costs are equal to marginal benefits) can be below the price at which a producer can make a profit. If you let the market produce this good, it won’t produce enough. Consider a bridge, and suppose—just to keep the example simple—that there’s no wear and tear on the use of the bridge. In other words, the marginal costs, the additional cost of somebody using that bridge, is zero. Obviously, if the bridge is privately produced and operated, the owners can’t charge the efficient price. They have got to charge a positive price to cover the cost of producing the bridge. Yet, society would be better off (and the producer could be compensated) if the price of using the bridge was set to zero. Since most goods we call infrastructure are subject to increasing returns, if left to free market forces, they will be under-utilized.

While there may be a theoretical case for a shortage of such goods, is that, in fact, the case with infrastructure in this country? The evidence over the last few years, in particular work by David Aschauer, makes a convincing case that there has been a significant under-investment in the expenditures that federal and local governments have made on infrastructure. Moreover, this under-investment may have led to a significant decline in economic growth.

Different types of evidence tha: there is a shortage exist, all subject to criticism, but taken as a whole, it’s hard to dismiss the case that there is an infrastructure shortage. We’re all familiar with congested highways and airports, we’ve heard about problems with collapsing bridges, deteriorating roads, periodic water shortages, faulty waste disposal facilities, etc. We’re also told that infrastructure is a very critical part of economic development. Governor George Miller of South Dakota, for example, recently reported that transportation quality was one of the first things asked about by companies looking to locate in his state. So there is a general impression that there has been a shortfall in infrastructure investment and it may be affecting the ability of our economy to grow.

We can get a better idea of how significant the shortfall is by looking at past expenditures on infrastructure and its current condition. The National Council on Public Works Improvement in 1988, for example, reported that public works expenditures at all levels of government fell from 2.5 percent of GDP in 1963 to 1.2 percent in 1984. The National Council also reported that the public capital stock, net of depreciation, fell from 1 percent per year between late 1970s and mid 1980s. The Federal Highway Administration reported that of the nation’s 600,000 bridges, roughly 40 percent are either structurally deficient or functionally obsolete. The Federal Highway Administration estimated that the cost of repairing the bridges and the federal aid system is roughly $47 billion, while the allocation is approximately $1.6 billion per year since 1987. It also forecasted a 43 percent increase in urban freeway congestion by the year 2000 if improvements to interstate systems are not forthcoming. It made a similar projection for airports.

Based on estimates of past expenditures and current conditions, the U.S. appears to have under-invested in its infrastructure. Studies by David Aschauer have made these arguments more precise. Aschauer’s approach was to estimate aggregate production functions, which include a measure of public capital infrastructure as an input to private production. His results are quite startling. In a 1989 study, Aschauer estimated an aggregate production function for the years 1949 to 1985. He found that output per worker was positively and significantly related to private output and marginal productivity. Indeed, he found that the rate of return on private capital was roughly 20 percent, while the rate of return on public capital was well over 140 percent—seven times what it was on private capital. In a more recent study Aschauer used the same methodology, same type of production functions, but applied it to state economies. Again he found a very positive and a very high return on public investment in infrastructure.

One should be a bit skeptical of Aschauer’s results, for there are some thoughtful critics of his work. Nevertheless, the results cannot be totally dismissed. One critic questions the direction of causality. Aschauer’s findings could mean that the more successful economies can afford more infrastructure. The causality could be going from strong economic growth to infrastructure investment rather than from infrastructure to strong economic growth. Aschauer is well aware of the criticism, and has attempted to take account of reverse causality; nevertheless, the results remain somewhat questionable. Aschauer’s results have also been criticized for the implausibility of the high rates of return on public investment. Critics have pointed out that, over the time period he considers, the U.S. has invested heavily in its interstate highway system. That investment initially yielded a high rate of return, but now when you’re improving those roads, the marginal return is going to be much smaller. The world has changed, the infrastructure is in place, the returns are going to be much smaller.

Despite these criticisms, I think Aschauer’s work has to be taken seriously. While he may have overestimated the shortfall, no one claims he is wrong about the problem. Moreover, additional evidence, of a somewhat different kind, lends support to Aschauer’s results. George Peterson, a Senior Fellow at the Urban Institute, has done a very innovative study that was directed at the question of whether the U.S. has a shortfall in infrastructure. His study was presented at a conference that the Boston Fed held in June of 1990 on the topic of public infrastructure. Peterson took a revealed preference point of view, examining voters’ behavior in bond referendums where roughly 25 percent of infrastructure spending is determined. Peterson argued that if political theory is right and local officials attempt to design capital programs that match the median voters preferences, frequent bond proposals would be submitted and would be closely contested. He argued that if instead large majorities are voting yes on these referendums, then infrastructure must be undersupplied because there were too few bond proposals. Peterson found that between 1984 and 1989, on a value basis, 80 percent of non-school infrastructure bond proposals were approved by the public and the approval rating on all such proposals was 66 percent, a rate far greater than other types of referendum.

These various observations and studies all point to the same conclusion: we have a significant shortfall in our infrastructure. That appears to be the rationale for the Surface Transportation Act. Passed last year, it authorizes $151 billion over the next 50 years for highways and mass transportation systems. (The National Council on Public Works in 1988 called for a $50 billion increase in annual expenditures on infrastructure; that is a doubling of what existed back then.)

But I’d like to point out that what is authorized is not always spent. And that will likely be true of this authorization given that our federal government will be running $300 to $400 billion deficits over the next few years. In such circumstances, the government may try other ways of minimizing deficits where they can. One way is simply not to spend what’s been allocated. Consequently, it wouldn’t surprise me that much of what’s been allocated under the 1991 law will not be spent.

Given that there is still a good change funding will fall short of what is required, we need to use the funds we have more efficiently. Consider the arguments made by Clifford M. Winston, a Senior Fellow at the Brookings Institute. (Winston’s arguments were also made at the Boston Fed conference of June 1990.) According to Winston, roughly half of non-local roads in the U.S. are in fair or poor condition and traffic during rush hours approaches capacity on one half of our urban interstates. Winston suggests that instead of building more highways or various
forms of mass transit systems, he argues for a better design, better taxes, and better pricing. What does he have in mind? To improve the durability of roads by increasing thickness. He finds a high return to that type of investment. Another Winston suggestion is to tax those who put more stress on the roads. Rather than gasoline taxes, Winston argues for an axle weight charge. The heaviest trucks cause the most damage so they should pay the highest tax. He also argues that we should be considering some form of congestion pricing. (In the 1991 Transportation Act there are funds for doing some case studies to test price congestion.) Some economies have been very successful with this type of pricing. Singapore, for example, adopted automated vehicle identification stickers that allow pricing of peak load road usage. As a result, Singapore has been able to reduce congestion while raising funds to improve and maintain its transportation system. Between improving road durability, taxing users, and pricing more efficiently, Winston estimates that the U.S. can save close to $20 billion per year. His message is persuasive; efficient pricing and better use of the infrastructure needs to be taken seriously.

In addition to using the funds we have more efficiently, we must also protect these funds from being diverted to private activities. Public funds are too often used to subsidize private activities. Consider tax exempt state bonds. To encourage states to invest in schools, roads and other forms of infrastructure. Congress exempted the interest on state issued bonds from federal taxes. But states have frequently used these bonds to finance low interest rate loans to private businesses. Between 1975 and 1985, $400 billion worth of state revenue bonds were issued to provide subsidized loans to provide businesses.

Congress recognized that these type of loans were not creating jobs but only relocating them. At the same time, the tax exemption was costing the national government much needed revenue. In the Tax Bill of 1986, Congress decided to limit this costly activity by putting a cap on the use of revenue bonds for private activities. Today, each state can issue a maximum of $50 per capita or $200 million per state, whichever is greater.

States, however, have found other ways to direct public funds to private activities. Minnesota, for example, has recently decided to use general obligation bonds to help finance a loan to a local airline. General obligation bonds are not backed by the private company receiving the state aid, but by the full faith and credit of the state's taxpayers. They are not subject to the federal cap. South Dakota recently pursued a more direct approach. It passed an additional 1 percent sales tax, raising $40 million to make low interest rate loans to private companies who are willing to locate or expand their business in the state. Again a program that does not create jobs, but moves them around.

Let me conclude by saying I think a case can be made that the shortage in infrastructure is real. Shortages generally do not persist in a market economy but that may not be the case with certain types of goods like those that make up an economy's infrastructure. These are goods that unfettered markets may not provide enough of. Consequently, since governments have limited resources, it shouldn't surprise us that we could have periods of under-investment. And, it appears that we have. With the passage of the 1991 Surface Transportation Act, we should be able to correct some of the shortfall, but we need to make better use of public funds if we are to ultimately solve this problem. I'm looking forward to hearing the rest of the comments at this conference regarding ways that we might do that. Thank you.

Transportation's Relationship to the Economy

Recently in the New York Times, transportation was included among the six most important determinants of America's economic future, reflecting increased national attention to a relationship which has long been important.

The interstate era has ended, and the current transportation system must change to reflect challenges of global economic competition.

Only strategic investments are likely to produce substantial economic benefits, primarily by leading to higher productivity in the private sector.

Long-term economic benefits from improved transportation outshadow short-term benefits related to jobs provided in new project construction.

Federal Highway Administration Policy Objectives

The Federal Highway Administration has six policy objectives which include:

- Maintaining and expanding the American transportation system.
- Fostering a sound financial base
- Keeping the transportation industry strong and competitive
- Ensuring that the system supports public safety and national security
- Protecting the environment and quality of life
- Advancing U.S. transportation technology and expertise

Multimodalism

The future of transportation policy does not lie with highway (or other single modes) but in a multimodal, market cluster approach.

Development of a federal surface transportation administration would be a logical move in this direction, and is probably inevitable. State and local governments will seek to coordinate federal activities through one agency.
ISTEA's Impact on Transportation Planning and Funding

The Intermodal Surface Transportation Act of 1991 allows for a restructuring of the way transportation funding decisions are made. ISTE A gives state policy makers and metropolitan planning organizations new transportation responsibilities, and the private sector more input into the decision making process.

Since ISTE A is basically a block grant program, it expands flexibility in funding and places a higher burden on local choice. The Federal Highway Administration will now provide more support instead of control.

Federal transportation funding has been restructured to target diverse needs, including bridge replacements, equity provisions, and demonstration projects.

To fully utilize this flexible funding and to make strategic investments, state governments, local governments and metropolitan planning organizations need transportation planning.

The quality of future infrastructure investments will thus depend heavily on whether adequate personnel exist at non-federal levels.

ISTEA may lead to increased privatization and use of toll facilities because increased national urbanization and a shortage of funding to support increased urban infrastructure needs call for such new approaches to fund infrastructure.

Future Needs for Successful ISTE A Implementation

To meet ISTE A's challenge, steps must be taken to increase the supply of qualified transportation professionals.

Significantly more investment in research and development will be required.

TRANSPORTATION AND ECONOMIC DEVELOPMENT IN THE UPPER MIDWEST

Arthur J. Rolnick
Director of Research
Federal Reserve Bank of Minneapolis

Summary of Remarks
Minnesota Policy Consultation I
Hubert H. Humphrey Institute of Public Affairs
February 24, 1992

Infrastructure Shortages/Public Goods Theories

Shortages are possible because infrastructure goods are special goods. Economic theory implies markets will not provide adequate transportation infrastructure. Markets undersupply such public goods because public benefits and costs may be different than private ones. Moreover, unregulated prices may fail to equate marginal benefits to marginal costs.

Approaches to government intervention to insure adequate provision of public goods include regulating prices, providing subsidies, or direct governmental production of the good or service.

Since precisely efficient levels of intervention are difficult to estimate, and since political constraints often prevail, shortages can persist for infrastructure and other public goods.

Comparison of past and present spending levels on infrastructure are suggestive of a shortfall. According to the National Council on Public Works Improvement, public works outlays by all levels of government fell from 2.5 percent of GNP in 1963 to 1.4 percent of GNP in 1984.

Current conditions suggestive of a shortfall include congested highways and airports, collapsing bridges, deteriorating roads, periodic water shortages and faulty waste disposal. The Federal Highway Administration (FH A) reported that 40 percent of the nation's bridges are either structurally deficient or functionally obsolete. The FHA forecasts a 436 percent increase in urban congestion by year 2005 if improvements to the interstate system are not made.

Infrastructure Linkages to Economic Development

Infrastructure is a major ingredient in business location decisions.

David Aschauer played an important role in bringing increased attention to the general linkage between infrastructure and economic development, although other have suggested the empirical work he has cited is flawed, and the magnitude of the relationships he suggests are likely overstated.

On balance, a review of pertinent research suggest a positive relationship and that underspending on infrastructure may have been a contributor to the slowed national growth of recent decades.
Recent Federal Action May Not Fully Cover Infrastructure Shortfalls

Although the Intermodal Surface Transportation Efficiency Act of 1991 authorizes the spending of $151 billion over the next six years for highways and mass transportation systems, the funds may not be enough. Moreover, the entire authorization may not be spent, given persistent federal deficits.

Alternative approaches to meeting infrastructure needs, including more efficient pricing, should be considered.

Clifford Winston, Senior Fellow at the Brookings Institute, has suggested large benefits from making better use of current infrastructure by pricing infrastructure more efficiently. Winston offers suggestions which include improving the durability of roads by increasing their thickness, taxing those who put the most stress on the roads (an axle weight charge rather than a gasoline tax), and congestion pricing.

Public funds are often diverted to private activities, which may be inefficient given levels of infrastructure needs. An example is the Northwest Airlines airbus facility situation in Minnesota. Between 1975 and 1985, over $400 billion of state revenue bonds were issued for private activities. Some states are now using general obligation bonds to fund private activities.

UNIVERSITY OF MINNESOTA

State and Local Policy Program
Hubert H. Humphrey Institute of Public Affairs

TRANSPORTATION AND ECONOMIC DEVELOPMENT
IN THE UPPER MIDWEST

Summary of Panel Discussion
Hubert H. Humphrey Institute of Public Affairs
February 24, 1992

Senator Gary DeCramer
Chair, Minnesota Senate Transportation Committee

- Important items on the agenda for the Senate Transportation Committee include: bridge bonding; lane mileage changes; Senate File 1750, a transportation alliances package; and a Transportation Leadership Group.

- Transportation funding must include both transit and highway components. Any bill that contains only one of these components will not be passed.

Darryl E. Durgin
Deputy Commissioner, Minnesota Department of Transportation

- Important issues in transportation include major policies influencing transportation-related estimates, regional transportation problems affecting the highway system, and regional opportunities for inter-governmental cooperation provided by the new Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).

- The mission of the Minnesota DOT corresponds to the goals of ISTEA:
  -- The multi-modal emphasis of ISTEA corresponds to Minnesota’s organizational structure.
  -- The provision of the Act establishing a national highway system is very important to Minnesota because of the great distance to markets.
  -- The Act’s emphasis on transportation research and technology development insures the continued development of new ways to handle increasingly complex transportation issues.
  -- The new legislation gives Minnesota more flexibility in determining where money should be spent.
  -- The Act creates an environment that will help meet transportation needs across jurisdictions.

- To implement ISTEA, the state of Minnesota will hold workshops involving diverse transportation interests in the implementation of the Act. The objectives of the workshops include: sharing information; building relationships; promoting awareness; identifying key issues; and recommending a process for implementing new planning policies and programs required by the Act.
Mary Anderson
Chair, Twin Cities Metropolitan Council

- The Metropolitan Council's vision for the region is to "achieve the highest quality of living in a community setting with the flexibility to accommodate the changing population and compete in a world economy."

- One transportation goal is to achieve an integrated system to move people and products efficiently without negative environmental impacts.

- The Metropolitan Council's Transit Facilities Plan:
  -- Re-emphasizes the themes advanced in the Federal Transportation Act.
  -- Is the result of a cooperative effort by agencies, organizations, and individuals in the region concerned about transportation and transit.
  -- Is built on the premise that the region will not attempt to build enough highways or highway miles to let everybody drive alone.
  -- Relates land use and development to traffic management and to the investment in transportation and transit.

- ISTEA supplies the Metropolitan Council with the tools of funding flexibility, encouragement of traffic demand management, and the authority to direct investments.

- Regional cooperation is essential. The relationship between the metro region, greater Minnesota, and neighboring states must be developed further. The economic health of the metro region and the adjacent states is interdependent. Transportation is critical to economic health and to improved interaction.

- Two important considerations exist:
  -- The relationship between transportation land use and economic development.
  -- The secondary impacts of transit and transportation decisions.

Allen Housh
Vice President, Transportation, Cargill

- Cargill's primary business is the movement of large quantities of commodities from production areas to customers. The different roles of Cargill include:
  -- Merchant
  -- Warehouse
  -- Processor
  -- Transporter of agricultural and industrial commodities
  -- Owner and operator of barges, trucks, ocean vessels, and rail cars

- The difference between capturing and losing business in the competitive market often rests on the availability, the cost, and the quality of transportation services.

- A national transportation policy should include one set of policies covering all modes of transportation, insuring an adequate modern infrastructure with usage guided by competitive efficiency, effective access, and equitable treatment.

- The outlook for the future includes:
  -- The globalization of the economy and more open trading systems will mean opportunities to sell more U.S. products abroad and greater foreign competition at home.
  -- A U.S. transportation policy appropriate to this emerging environment is best achieved through a market-oriented approach that improves the competitiveness of both the shippers and the carriers.
  -- The U.S. transportation policy should create an efficient system built on the strengths of each mode.
  -- A new vision is needed that will foster both inter-modal competition and inter-modal integration.

- The nation's premier road systems are meant to foster commerce.

Richard Braun
Director, Center for Transportation Studies, University of Minnesota

- The five states involved in the project are basically rural in nature. This means that there are rural problems and rural transportation problems. The issue is often mudlock, not gridlock.

- Infrastructure needs are escalating, but these needs themselves are also changing and adjustments must be made. A key to being able to cope with new circumstances is education.

- Transportation taxing is not just taxing what goes into the gas tank. The future will be concerned with what moves, how far it moves, and when it moves.
TRANSPORTATION AND ECONOMIC DEVELOPMENT
IN THE UPPER MIDWEST

Summary of Participant Discussion
Hubert H. Humphrey Institute of Public Affairs
February 24, 1992

All of the participants were asked to voice their comments and concerns about transportation policy in Minnesota. Several major themes emerged including the need to define and implement "strategic investments", geographic issues around urban-rural needs in a changing world market, and the environmental impacts of different transportation strategies. A common thread of nearly all those responding was the need for more comprehensive and integrated transportation policy-making.

COMMON THEMES

Integrated Transportation Policy and Strategic Investments

It was suggested that integrated transportation policy requires making strategic investments. Many commentors attempted to define what we mean by strategic investments in transportation infrastructure. There appeared to be a consensus that such investments would require more long-term thinking and new institutions, but the details of implementation remained. For instance, "What is efficiency, and where and how do we downsize?," and "how do we balance concerns about efficiency and fairness?

Efficiency concerns were also raised in regards to industry-chasing via transportation investments and the appropriateness of the present regulatory climate. One participant suggested that we "need to standardize interstate regulations." A broader look at efficiency was raised by concerns about the "quality of life" impacts of various transportation strategies.

Questions about the role of different transportation modes and how they would fit together in a multi-modal future were raised as were questions about intergovernmental cooperation. One respondent pointed out that "the state needs to clarify institutional roles in various governmental jurisdictions," and several others wondered whether localities and the states can meet federal goals and mandates given recent resource cutbacks. In light of this challenge, several respondents relayed the importance of keeping local, bottom up, participation in transportation planning viable.

Another theme related to the need for more integration was the importance of public-private partnerships. It was suggested that there is "a need for more formalized cooperative agreements", and a need for more private investment in infrastructure and private representation in the policy consultations. One participant suggested that a goal of the policy consultations should be to determine how industry is likely to respond to different policy initiatives.
Geographic Coordination

Geographical issues were voiced relating to balancing urban-rural needs, inter-modal linkages, the need to improve north-south goods movement, and the impact of the North American Trade Agreement on transportation flows through Minnesota.

Regarding the urban-rural balance, demographic projections will be critical to policy-making. Congestion, a major concern for urban areas, was addressed in several comments about the role of pricing mechanisms and the Surface Transportation Act’s attempt to promote a shift to high occupancy vehicles. On the other hand, one participant asked whether “we are too pre-occupied with metro issues?”

The importance of Minnesota’s relation to the world economy was a common concern. Comments about increased trading with Canada and the potential of Minnesota to become a regional distribution center in a major north-south corridor reflected this concern.

Environmental Concerns

According to the participants, the environmental impacts of various transportation schemes, and new environmental regulations pose many issues for transportation policy in Minnesota. Meeting the new Clean Air Act regulations will require inter-agency cooperation. There is a growing need to explore alternatives to single occupancy vehicles, and to traditional transportation fuel sources.

A general environmental concern was conveyed by the need “to use existing infrastructure rather than create a new [one].” And finally, the role of rail transport was considered through comments about the future of high-speed rail, and railroad representatives statements that rail transport represents the most energy efficient and environmentally benign transportation mode.

Other Concerns

An important concern raised by several participants was the urgent need for greater personnel training and recruitment in the transportation planning field. Other miscellaneous but important concerns included; the future of waterway infrastructure, road bearing capacity, and funding alternatives to property taxes.

UNIVERSITY OF MINNESOTA

State and Local Policy Program
Hubert H. Humphrey Institute of Public Affairs

Transportation and Economic Development in the Upper Midwest New Models for Federal, State and Local Cooperation

February 24, 1992

Session Evaluation

1. Was the purpose of the session clear?

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COMMENTS: • Not at first—but it was defined • Very broad

2. Did the session achieve its purpose?

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COMMENTS: • Good chance to network and see how transportation affects so many aspects of society. • Somewhat hard to determine
3. How valuable was the *Welcome and Introduction* by G. Edward Schuh?

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**COMMENTS:**
- Late and not needed at the end
- Short and therefore good

4. How valuable was the presentation *Introduction to the Transportation and Economic Development Project* by Lee Munnich?

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5. How valuable was the presentation *Infrastructure and Economic Development* by Arthur Rolnick?

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6. How valuable was the presentation *Opportunities for Federal, State and Local Cooperation Given the Intermodal Surface Transportation Efficiency Act of 1991* by Thomas Larson?

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**COMMENTS:**
- Too little time, very little substance
- Vague and too general
- We could have done without these folks

7. How valuable was the Panel Discussion: *Regional Problems and Opportunities in Infrastructure Investment and Reinvestment, Intergovernmental Cooperation, and Financing*?

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**COMMENTS:**
- Too much time, better to ask for volunteers
- I'd be more interested in the answers to those questions, although I imagine that will come in the next sessions
- Hard special interests don't help advance discussion

8. How valuable was the *Participant Discussion*?

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**COMMENTS:**
- Good to see different ideas presented
- Took too much time, better to ask for volunteers
- More interested in the answers to those questions, although I imagine that will come in the next sessions
- Hard special interests don't help advance discussion
9. How valuable was the Quality Check and Wrap-Up by Dennis Cavanaugh?

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COMMENTS: • Excellent critique from perspective of citizens. No shared vision. • He was able to focus on his concerns but he got better

10. Were you satisfied with the facility and arrangements?

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11. I am employed by

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12. What did you like best about this session, and why?

- Diversity of the speakers.
- Diversity of participants; timeliness; task at hand.
- Building linkages from transportation to other important sectors of national economy and government responsibility.
- Information dissemination.
- Larson's speech, even though it ran overtime.
- Participant's discussion, maybe it should have come first.
- Dissemination of broad ideas from several different perspectives broadens thinking.
- Presentations by Rolnick and Larson.
- Early morning presentation by Rolnick; Larson was also interesting.
- Hearing from the broad interests of the group.
- Cavanaugh was good; he spoke hard truths, especially about need for focus.
- Chance to hear diverse views.
- Session helped broaden my horizons on subject area. Session has left me with a great deal to think about and to go back and discuss with associates.
- Panel was good but rushed; the members needed an opportunity to present their perspective.
- Information given.
- Opportunity to hear diverse points of view.
- Speakers.
- Opportunity for input into transportation thinking.
- Information presented by Thomas Larson.
- The two major speakers.
- The quality of the panel was also excellent.
- Tom Larson.
- The individual presentations.
13. What would you change about today’s session, and why?

Need more time.

Panel discussion should be more rounded and effective.

More emphasis on problem solving or dealing with difficult issues that will be facing us.

No panel.

Too large a group for discussion input to be more than cursory; either more time or breakouts in groups would make it possible for us to tell you more.

Follow-up with afternoon; more priority setting discussions.

O.K. for this session; other sessions should allow participants to discuss issues—such as in small groups.

Issue oriented)—can combine ideas for overall picture.

I wish the panelists were a little more freewheeling in their remarks to get our creative ideas flowing. Instead, it sounded like press releases. Also, you need to be a bit more ruthless with speakers who run overtime.

Limit verbal comments of participants—took too long. Have them written and distribute them.

Eliminate the panel or reduce its size—focus the discussion in breakouts; not enough time; panel should not just leave.

Keep speakers on time; Larson tried to present too much information; overheads were presented too quickly and if he didn’t comment on all aspects, why present it?

Need more focus. Do fewer things in the session, given the limited time. Give the session a whole day.

More time required.

More time.

I’m interested in how we can go about putting together a strong regional infrastructure to remain internationally competitive.

Set it up so the speakers can stay through the session, especially the panel.

More business participation.

Longer time for more thorough discussion.

Shorten it or make it all day.

The scope should be somewhat narrowed or focused on setting the stage for more productive future sessions.

Project staff should be sure the critical questions are asked of the major speakers and of the panel.

Make a lot more time for the panel to interact with the audience.

The panel was underused.

Agenda was too packed.

Direction was unclear.

More interaction opportunities - consider breakout sessions.

14. Other comments or reactions?

I feel very disappointed in the Humphrey Institute. Out of 30 steering and research members, only 3 are women. This type of discrimination is routine in the transportation field, but shouldn’t be practiced by any organization associated with Hubert Humphrey. Ditto, only 1 woman speaker out of 10 speakers and 1 monitor.

I would appreciate an international perspective on transportation infrastructure investment. How do Japan and Western Europe make these decisions? How much of GNP is devoted to transportation capital? What is the pay off?

Focus on economics - especially on how to free up costs of moving goods and providing markets for alternative to single driver autos in metro area.

I feel a lot of people did a lot of preparation and were unable to present all of their work.

Project has to focus on key issues, not enough time to address all noted.

Include more discussion about water transportation.

You are to be commended for providing this form for discussion.

Comments from audience were very helpful.

Ambitious agenda, but process is a good start.

Not clear how this relates to Center for Transportation Studies efforts - are they separate.

Dennis Cavanaugh should have been briefed on his role.

With this quality of speaker (Cavanaugh) - more time.

At what point will this project focus in order to develop specific recommendations? Or, will the recommendations be of only the most general nature.

Photographer was a distraction.