

11. Conclusions and Recommendations

This chapter summarizes major conclusions and provides recommendations for improving transportation system efficiency and equity.

Chapter Index

11.1 Costs and User Pricing.....	1
11.2 Transportation Decision Making.....	4
11.3 Equity	6
11.4 Land Use Patterns.....	7
11.5 Research Recommendations	8

11.1 Costs and User Pricing

A major conclusion of this study is that a significant portion of transportation costs are currently either fixed or external, and so are inefficiently priced. This price structure provides an incentive to driving more in order to “get your money's worth.” Motor vehicle travel would decline significantly if prices reflected full costs. This overuse reduces social welfare and economic efficiency.

Inefficient pricing squanders much of the potential benefits of motor vehicle travel. Vehicle owners have little incentive to limit driving to trips in which benefits exceed total costs, resulting in wasteful travel behavior that reduces transport system performance. Underpriced driving results in congestion increasing until it constrains further traffic growth. Problems such as pollution and community degradation are virtually unavoidable with current pricing.

According to conventional wisdom, traffic congestion is the greatest transport problem. This perception justifies planning and funding practices that emphasize increasing road capacity. In the long term, however, such practices increase total traffic and automobile dependency. According to this study, congestion is a moderate problem (cost), and efforts to reduce congestion by increasing roadway capacity are often wasteful. As expressed by Moore and Thorsnes,

“No rational concert promoter would decide how big to build a stadium based on the number of people who would come to see the Grateful Dead if the tickets were free. But that is often how transportation planners decide highway capacity: they estimate how many trips would be made on an unpriced facility, then try to build a facility big enough to accommodate that number of trips.”¹

¹ Moore & Thorsnes (1994), *Transportation/Land Use Connection*, American Planning Association (www.planning.org), p. 57.

“Raise My Prices, Please!”

There is a vivid and emotional vocabulary to describe overpricing. A consumer who paid too much is said to have been “gouged,” “ripped off,” or “fleeced.” It is easy to demonstrate that overpricing reduces economic efficiency and tends to be inequitable, so overpricing is a favorite target for political campaigns, debates, and government programs.

Underpricing has similar negative impacts. Underpricing causes economic inefficiency and tends to be unfair. It imposes social and environmental costs. But we are unlikely to hear a popular cry, “*Raise my prices, please.*” Low prices may be acknowledged intellectually as a problem, but because impacts are dispersed and nearly invisible it seldom creates emotional fervor. Educating policy makers, planners, and the public about problems created by underpricing is a key challenge to developing an efficient and equitable transportation system.

Although underpricing private automobile travel benefits some individuals and jurisdictions, these are mostly transfers. Each unit of underpricing imposes an equal or greater cost elsewhere in the economy. Underpricing encourages waste, which reduces economic efficiency. It is often claimed that Americans (or Australians, Germans, or other groups) have a love affair with the automobile, but high levels of automobile dependency are partly explained by decades of underpricing and skewed investments. At one time society may have benefited from economies of scale in vehicle and roadway production which justified underpricing, but no longer. Increased driving incurs diseconomies in most areas due to congestion and external impacts.

Economic efficiency, equity, and long term development are optimized if user prices incorporate total costs. Increasing prices to better reflect costs encourages more efficient use of our transportation system. In the long term this can reduce the need for subsidies to transit and other special programs, due to economies of scale. In the short term, however, in many areas increased transit investment is required to overcome decades of under investment.

Remarkable Findings

A remarkable finding of this study is that driving would decrease significantly if a few simple changes were made in *how* fees are paid, without changes in the total amount charged. For example, typically, 20-30% of commuters will switch modes given the choice provided by parking Cash Out, and even more if employee parking was not a tax-exempt benefit. Another 5-15% of driving would decrease if insurance was made a variable rather than a fixed cost. These changes would improve equity as well as reduce congestion, pollution and energy consumption, and save individuals money.

Another important finding is that transportation investment decisions are skewed by the tendency of planners to ignore the effects of generated traffic and external costs, which overstates the benefits of roadway capacity expansion projects. A better accounting of costs and benefits would result in significantly different transportation investments.

These findings indicate that some simple, incremental steps could substantially reduce many of our current transportation problems while increasing economic efficiency and equity.

Pricing recommendations:

Ideally, drivers should pay variable prices exactly equal to total marginal costs. Although it would be difficult to create an “ideal” price structure, a number of practical measures could greatly improve current pricing:

1. Increased fuel taxes is an easy and efficient way to internalize costs, but is not optimal as a stand-alone measure since it does not affect when and where driving occurs. A variety of charges are needed.
2. Congestion fees can improve traffic efficiency. Several charging methods are available to charge for travel on congested roads. It is important to prevent spillover onto un-tolled roads.
3. An easy way to marginalize costs is to make insurance, registration, licensing, and vehicle taxes proportional to mileage.
4. Another effective strategy for marginalizing costs is to require employers to cash out parking subsidies. Parking should be charged daily rather than monthly so commuters who drive part-time only pay for what they use.
5. As much as possible, commercial parking should also be short term user-paid. Parking must be managed at the regional level to prevent interjurisdictional competition, and to prevent spillover parking problems.
6. Pricing should be used to encourage individuals to buy fuel efficient and low emitting vehicles.

There is no single solution to our current transportation problems. Neither, improved bicycling and walking facilities, increased public transit service, “smart” highways, nor less polluting vehicles alone can solve our transport problems while prices are so low. Making prices reflect marginal costs is essential to encourage efficient transport. Changes in planning, land use, and infrastructure investments are also needed. An efficient and equitable transportation system offers users efficient mobility options and incentives to use each mode for what it does best.

11.2 Transportation Decision Making

As discussed above, improving pricing is essential but it is not sufficient to deal with the problems we face; improved decision making is also essential. Many significant impacts tend to be ignored during transport policy making and planning. Planning is often uncoordinated, resulting in a “tyranny of small decisions.” Current transport planning practices reflect five specific problems:

- *Limited scope.* Current planning and funding practices do not provide equal consideration to all options for meeting access needs. Demand management tends to be considered and implemented only where traffic congestion or air quality problems are significant, and ignored in other situations. Funding allocation tends to favor roadway expansion for private automobiles over other modes.
- *External costs ignored.* Current planning practices tend to ignore many costs, especially environmental and social impacts. Economic evaluation models can, but usually do not, incorporate monetized estimates of these costs. Even costs such as parking demand and public service demands of increased motor vehicle use are seldom considered in transportation planning and project evaluation.
- *Poor public involvement.* Although transportation decisions impact many aspects of individual and community life, transport planning is considered a technical field and the public is excluded from many critical decisions. Residents are seldom involved early enough in the planning process to place constraints or establish broad goals that reflect community values, and even with citizen involvement transportation decisions are highly influenced by professional biases and preferences.
- *Missing link between transportation and land use planning.* Although transportation and land use patterns are highly interrelated, they are seldom planned together. Transportation planning should be considered a subset of land use and community development planning. Since transport to a large degree determines long term land use patterns, transportation decisions should be based on long-term land use goals.
- *Generated traffic effects ignored.* Research shows that increasing road capacity increases total driving, especially in congested areas. As a result, projects that expand urban roadway capacity usually provide significantly less congestion reduction than predicted because latent demand fills much of the new capacity, and automobile use and the resulting congestion increases throughout the region.

Conventional planning tends to evaluate transportation performance based on travel distance, which favors mobility over accessibility, faster modes over slower modes, and speed over comfort. For example, conventional transport economic analysis can calculate the monetized value of travel time savings from highway expansion that increases travel speeds, but cannot provide monetized benefits from increasing local services, improving children’s ability to walk and cycle to schools, or from increasing the convenience and comfort of public transit travel, for example, by providing real-time bus arrival information or more comfortable transit stop waiting conditions.

Since most urban trips are relatively short (less than 5 miles), there is a “transportation gap” caused by overemphasis on long-distance travel and too little attention to bicycling, local transit, and low powered vehicles. This creates a self-fulfilling prophecy of increased driving, automobile dependency, inequity and sprawl. Electric cars and other alternative fuels reduce some external costs, particularly urban air pollution, noise, and petroleum externalities, but do not affect others such as accident risk, congestion, and parking subsidies.

Transportation decision making recommendations:

1. Transportation system effectiveness should be based on access. Policies and programs that reduce the need to travel should receive consideration and support equal to measures that increase mobility.
2. Transportation economic analysis must consider all costs. Non-market and indirect costs should be given the same weight as market costs. Non-market costs should be quantified and monetized as much as possible for use in economic evaluation.
3. Least-cost planning should be used as a model for transportation decision making. This means that a broad range of options are considered, including both supply and demand management, and evaluated considering all benefits and costs. “No-build” options that rely on transport and land use management should receive equal consideration and funding a road building.
4. Transport system performance evaluation should be based on travel *time* rather than *distance*. This tends to increase the value of non-motorized modes, and improvements in convenience and comfort.
5. Transport planners should become familiar with the environmental and social impacts of their decisions. Environmentalists, urban planners, and social policy analysts need to learn more about transport issues.
6. Transportation equity and diversity should be recognized as important goals in planning and policy making.
7. Non-motorized transportation modes deserve increased consideration in planning and funding. Special attention is needed for intermodal connections, such as the integration of bicycling with transit.
8. Traffic analysis must consider the effects of generated traffic. Generated traffic should be assessed using the “rule-of-half” which recognizes that these trips tend to have relatively low value, since they are trips that users forego if roads are congested.
9. The incremental external costs of generated traffic should be treated as a cost of projects that increase roadway capacity.
10. Resources currently devoted to large regional transport projects may provide greater benefit if used for local accessibility improvements. For example, improving walking and cycling facilities, local shopping districts, and services (parks, schools, etc.) can make communities more self-sufficient, reducing motor vehicle traffic and automobile dependence.
11. Transportation professionals and decision makers should make a habit of not using an automobile for at least two consecutive weeks each year in order to experience the practical problems facing non-drivers.
12. Impacts on human life and health, and irreversible environmental damage should be assessed with a low or zero discount rate for the sake of intergenerational equity.
13. Neighborhood car rentals and ownership co-ops should be encouraged to help reduce the need for residents to own cars and trucks.
14. Research is needed to understand how public policies and land use patterns affect travel decisions, and to develop practical strategies and programs that achieve transportation demand reduction goals.

11.3 Equity

The information and analysis tools in this report are useful for equity analysis by providing guidance on how benefits and costs are distributed between different groups. More research is also needed to better define transportation equity, determine ways to measure it, and identify how it is affected by various policies.

Pricing and planning reforms are justified for equity as well as economic efficiency objectives. Underpriced driving is inequitable. Underpricing forces non-drivers to subsidize automobile use, reduces travel options, and imposes land use and social patterns that increase travel requirements. This would be unfair even if drivers and non-drivers had comparable incomes and abilities (horizontal inequity), and is especially unfair because non-drivers tend to be economically, physically, and socially disadvantaged (vertical inequity).

The equity of increasing motor vehicle user prices depends on how revenues is used. Price increases can be progressive if revenue is used to benefit low-income people. Using road pricing revenue only for roadway transportation improvements is not necessarily fair or efficient since driving incurs external costs borne by all of society. Investments in alternative modes are justified on vertical equity grounds, by improving mobility options for transportation disadvantaged groups, and on horizontally equity grounds if they help internalize external costs.

Equity recommendations:

Many, although not all, strategies to increase transport system efficiency also contribute to equity. Here are specific ways to support transportation equity objectives:

1. A basic level of access and mobility should be defined in each community. This might include, for example, freedom to walk safely, access to public services, employment, schools, recreation, and social activities.
2. Transport user price increases should be predictable and gradual to allow individuals to adjust travel patterns (housing and job locations, vehicle purchases, etc.).
3. Transportation equity and option value costs should be borne by all of society, not just users of a particular mode. For example, the incremental costs of handicapped access for transit systems should not be incorporated into the base price of all transit riders.
4. Transportation policies and programs should be evaluated in terms of how they affect disadvantaged groups.
5. A significant portion of revenue from increased automobile user charges should be targeted at refunds, tax reductions, and services that benefit disadvantaged people.
6. A variety of non-automotive modes should be considered to increase access and mobility of non-drivers, including walking, bicycling, ride sharing, taxis, delivery services, telecommuting, and land use pattern changes, not just transit service.
7. Transition costs associated with reduced automobile dependency and use, such as unemployment in automobile industries, should be anticipated and minimized.

11.4 Land Use Patterns

Transportation and land use are interrelated and should be considered together. Transport decisions have substantial land use impacts and land use decisions affect travel activity. Transportation planning decisions should reflect land use goals such as openspace preservation, urban redevelopment and neighborhood livability. Specific transport policies and projects should be evaluated in terms of their impacts relative to these goals.

Traffic impacts on community livability deserve special attention. The road system is a valuable public asset. In addition to accommodating vehicle travel streets define a community's character, accommodate walking and cycling, and allow community interactions. Motor vehicle traffic tends to degrade these functions. New urban neighborhood design and traffic calming programs can reduce traffic impacts and return streets to multi-function use. Implementing these improvements requires changes to transport planning and funding practices.

Many of the benefits of urban-fringe development are offset by the external costs of increased vehicle travel and land use sprawl. More efficient pricing is needed to insure efficient land use development.

Land Use recommendations:

1. Transportation and land use planning should be integrated so policies and projects are mutually supportive.
2. Prior to developing a transportation plan, communities should establish land use and environmental goals and objectives.
3. Full-cost pricing of public services should be used to encourage smart growth.
4. Efficient parking pricing and management are needed to encourage efficient use of parking facilities and address problems such as parking spillover impacts.
5. Communities should insure that at least a portion of housing is accessible without driving to stores, employment, and other public services.
6. Zoning laws and development policies should encourage diversity of housing types, infilling and appropriate land use mixing.
7. Greater attention should be paid to streetscape design and development of local activity centers to encourage walking, bicycling and neighborhood interaction.
8. Parking requirements should be flexible, and decline when automobile ownership (for residential developments) or use (for commercial developments) decreases.
9. Zoning laws, development standards, home buyer programs, and other land use and land development policies should be modified as needed to conform with and support community transport goals.
10. Rail stations and bus route areas are particularly appropriate for mixed use communities and affordable housing.
11. Local services, such as neighborhood stores, local schools, and small parks should be encouraged to reduce travel needs.
12. Zoning and development policies that preserve greenspace and discourage urban sprawl should be implemented.
13. Traffic Calming and other traffic management strategies should be used to reduce traffic impacts and improve walking and cycling conditions.

11.5 Research Recommendations

More research is needed to better estimate transportation costs under various conditions and locations. Transport equity and diversity appear to be significant values which deserve more research. Decision-makers need better information on consumer demands, such as the value people place on improved travel convenience and comfort. Research is also needed to evaluate the synergistic effects of combined planning decisions.

Transportation land use impacts need more research to understand how transport decisions affect land use, and methods to measure and monetize these effects. This research should cover impacts to both natural environments, such as the loss of wildlife habitat and landscapes, and impacts on the built environment, such as the degradation of neighborhood life from high traffic volumes. These appear to be significant costs with major implications for many transport decisions.

The barrier effect (severance) has been studied and measured in Scandinavian countries, but their quantification techniques have not been applied to the same degree in North America or other areas of the world. Research is needed to test the Scandinavian formulas here and develop estimates of this cost per vehicle mile under a variety of conditions.

Latent demand has important implications on transport decisions. Some progress has been made to develop tools for predicting generated traffic. More information is needed to predict generated traffic under typical conditions. Most current studies focus on traffic generated on single roads. Of equal or greater importance is the overall increase in regional automobile use that results from increased road capacity.