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Routing

Roadmap to Gridlock
The Failure of Long-Range Metropolitan Transportation Planning

by Randal O'Toole

Executive Summary

Federal law requires metropolitan planning organizations in urban areas of more than 50,000 people to write long-range (20- to 30-year) metropolitan transportation plans and to revise or update those plans every 4 to 5 years. A review of plans for more than 75 of the nation's largest metropolitan areas reveals that virtually all of them fail to follow standard planning methods. As a result, taxpayers and travelers have little assurance that the plans make effective use of available resources to reduce congestion, maximize mobility, and provide safe transportation facilities.

Nearly half the plans reviewed here are not cost effective in meeting transportation goals. These plans rely heavily on behavioral tools such as land-use regulation, subsidies to dense or mixed-use developments, and construction of expensive rail transit lines. Nearly 40 years of experience with such tools has shown that they are expensive but provide negligible transportation benefits.

Long-range transportation planning necessarily depends on uncertain forecasts. Planners also set qualitative goals such as "vibrant communities" and quantifiable but incomparable goals such as "protecting historic resources." Such vagaries result in a politicized process that cannot hope to find the most effective transportation solutions. Thus, long-range planning has contributed to, rather than prevented, the hextupling of congestion American urban areas have suffered since 1982.

Ideally, the federal government should not be in the business of funding local transportation and dictating local transportation policies. At the least, Congress should repeal long-range transportation planning requirements in the next reauthorization of federal surface transportation funding. Instead, metropolitan transportation organizations should focus planning on the short term (5 years), and concentrate on quantifiable factors that are directly related to transportation, including safety and congestion relief.

Randal O'Toole is a senior fellow with the Cato Institute and author of The Best-Laid Plans: How Government Planning Harms Your Quality of Life, Your Pocketbook, and Your Future.

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Sacramento's plan to spend $3 billion on transit capital improvements was projected to increase transit's share of rush-hour commuting from 2.6 percent to a mere 3.0 percent.

An Attachment to Failure

Sacramento, California's, 2006 Metropolitan Transportation Plan admitted that transportation plans written for the region "during the past 25 years have not worked out."

- Despite building light rail and making other efforts aimed at "luring drivers out of their autos," the share of transit riders who "have access to an automobile [and] can otherwise choose to drive" was decreasing.
- Despite efforts to promote alternatives to driving by discouraging sprawl and promoting high-density infill, sprawl "continues to out-pace infill . . . and businesses increasingly prefer suburban locations."
- "Even though gasoline prices are at an all-time high, the total amount of driving has more than doubled since 1980."
- Revealingly, the report added, "lack of road building and the resulting congestion have not encouraged many people to take transit instead of driving."[1]

Planners did have one piece of good news: "Total smog emissions from motor vehicles are now half what they were in 1980." However, that was not due to anything the planners had done, but because "technology has reduced auto emissions by 98 percent from 1980 models."[2]

Sacramento planners remained undaunted by those results. Their new long-range transportation plan "continues the direction of" previous plans. The new plan would use "transportation funds for community design, to encourage people to walk, bicycle, or ride transit" and give "first priority to expanding the transit system."[3] In particular, planners proposed to spend nearly $3 billion on transit capita improvements, but only $2 billion on improvements to state highways.[4] The Sacramento Area Council of Governments, which wrote the plan, also agreed to use "'smart growth' strategies" such as "mixed use and compact development, infill," and similar land-use policies—some of which would be subsidized with transportation funds—designed to "reduce the number and length of auto trips."[5]

Yet the planners' own analyses projected that the new plan would work no better than the previous ones. The huge investments in transit were expected to expand transit's share of total travel from 0.9 percent in 2005 to just 1.1 percent in 2027. Transit's share of rush-hour commuting would increase from 2.6 percent to a mere 3.0 percent.[6] Despite spending nearly $300 million on bicycle and pedestrian improvements, walking and cycling's share of travel and commuting were projected to decline. Even though "congestion will continue to worsen inside the urban area," planners predicted that per capita driving would continue to grow.[7]

Since 1962, Congress has required all metropolitan areas—regions of more than 50,000 people—to write long-range metropolitan transportation plans and to update those plans at least every four to five years.[8] Sacramento is one of a growing number of regions whose transportation plans focus on using *behavioral tools* to address congestion, toxic pollution, greenhouse gases, and other problems created by the automobile. These tools, which together are sometimes called *smart growth*, include the following:

- Making urban areas more compact (i.e., increasing population densities) by downzoning lands on the urban fringe and increasing the zoning densities of lands in developed areas, in the hope that people won't travel as far on typical trips.
- Promoting developments that mix residential with retail and commercial uses so more people will be able to walk to shops and services instead of drive.
- Encouraging more pedestrian-friendly design, such as retail shops that front on sidewalks instead of parking lots.
- Investing heavily in transit, especially rail transit, as well as bicycle and pedestrian facilities.

- Reconstructing streets and highways with the aim of slowing auto traffic and making the streets more attractive to pedestrians and cyclists.

Though only a few plans have been candid enough to admit it, many planners see increased congestion as one of the tools they use to discourage auto driving. "Congestion is our friend," says Gainesville, Florida, planner Dom Nozzi. Congestion "is a powerful disincentive for sprawl [and] creates political pressure to create a quality transit, bicycle, and walking system."[9]

Planners in Portland, Oregon, and Minneapolis-St. Paul agree. "Congestion signals positive urban development," say Portland planners, who have decided to allow rush-hour congestion on most major highways in the region to deteriorate to stop-and-go conditions.[10] In fact, they say, "transportation solutions aimed solely at relieving congestion are inappropriate" in most of the region.[11]

Minneapolis-St. Paul's 1996 transportation plan noted that the region's roads "are approaching or exceeding capacity." Yet planners decided that "expansion of roadways will be very limited in the next 25 years." "As traffic congestion builds," the plan stated hopefully, "alternative travel modes will become more attractive."[12] So when planners say they need to do regional transportation planning to reduce congestion, what they often mean is that they want to do regional planning to *increase* congestion in the unlikely hope that (as the Sacramento plan put it) the "lack of road building and the resulting congestion [will encourage] people to take transit instead of driving."[13]

These behavioral tools—congestion, rail transit, and compact development—are expensive. The Texas Transportation Institute estimates that congestion cost the nation's commuters $78 billion in 2005 and that the amount of time people waste sitting in congestion has hextupled since 1982. That has forced drivers to waste 2.9 billion gallons of fuel a year, adding 28 billion tons of CO2 to the atmosphere.[14] And that doesn't even count the cost of congestion to businesses, which some estimates indicate are comparable to the costs to commuters.

The typical light-rail line costs as much per mile as a mile of four-lane freeway, yet carries only 15 percent as many people as a single freeway lane.[15] Heavy rail, such as Washington Metro and San Francisco BART, carries more people but costs more. Commuter rail costs less but carries fewer people. Meanwhile, urban-growth boundaries and other efforts to make urban areas more compact necessarily drive up land prices and increase housing costs by two to four times.[16]

Behavioral tools are also intrusive. Instead of providing a level playing field, government must favor certain property owners, housing types, and modes of transportation over others. While no one can say that government planners are forcing them to live or travel a certain way, when planners divert highway user fees into transit with the expectation that highway congestion will increase, they are imposing huge costs on auto drivers and giving huge subsidies to transit riders. Similarly, when planners restrict low-density development and subsidize high-density housing, they are denying many families access to the form of housing that most Americans say they prefer—a single-family home with a yard.

Some people might excuse the behavioral tools their expense and intrusive nature if they worked as promised—but they do not. As Sacramento planners found, transportation plans can emphasize alternatives to the automobile, but most people still drive. Cities can subsidize the construction of mixed-use developments, but most people living in those developments will still mostly travel by car. Regions can impose more compact, higher-density development, but the percentage of travel by car will not significantly decline.

If anything, the behavioral tools make matters worse. Higher density development combined with minimal new road construction necessarily means more traffic congestion. Cars in stop-and-go traffic use more energy and emit more toxic fumes and green-

"Congestion is our friend," says one urban planner.

house gases (something that many metropolitan transportation plans fail to account for).[17] Even if residents of compact cities drive slightly less than residents of so-called sprawl, the energy and pollution costs of congestion may more than make up for any savings.

Despite those problems, the number of regions adopting these tools seems to grow each year. Part of the blame can be placed on the urban planning profession, which promotes these ideas incessantly and which is slow to learn from its mistakes.[18] But much of the blame should be placed on Congress, which effectively gave authority over the nation's urban transport systems to urban planners in the Intermodal Surface Transportation Efficiency Act of 1991.

A review of transportation plans for the nation's largest urban areas reveals that too many plans focus on behavioral tools when technical tools could solve congestion, pollution, and other problems at a much lower cost. But even if planners followed a rational process, long-range metropolitan transportation planning as mandated by Congress would fail. Long-range regional problems are simply too complex for anyone to predict or fix. Congress should repeal long-range planning requirements in federal law and replace them with a short-range planning process built around incentives and user fees.

Too many metropolitan plans focus on expensive yet ineffective behavioral tools when technical tools could solve congestion, pollution, and other problems at a much lower cost.

History of Urban Transportation Planning

The Bureau of Public Roads' 1947 proposal for an Interstate Highway System called for 37,700 miles of highways between, but not through, the nation's major urban areas. Bureau leaders believed that urban highways should be funded locally, not by federal taxes.

However, the mayors of America's big cities lobbied Congress to modify the proposal so that they could share the benefits of federal highway funding. So, when Congress created the Interstate Highway System in 1956, it added 2,300 miles of radial and ring roads through and around major urban areas.[19]

The federal government paid 90 percent of the cost of these roads out of federal gasoline taxes dedicated exclusively to this purpose. Some federal grant funds are essentially an open-access resource, meaning that the states and cities that apply for the most expensive projects tend to get the most money. But highway funds were distributed to the states according to a strict formula based on population, land area, and road mileage. Since each state knew how much money it would get, it had an incentive to spend the money effectively.

In 1962 Congress added a requirement that urban areas have "a continuing, comprehensive transportation planning process carried out cooperatively by states and local communities." This became known as the "3Cs" process, for "continuing, comprehensive, and cooperative." Congress required that between 1.5 and 2.0 percent of federal highway funds be spent on this planning process.[20]

Congress did not provide detailed guidance about what the plans should consider. But in 1963 the Bureau of Public Roads developed a planning process that included identification of local goals and objectives, forecasting future travel needs, developing and evaluating alternative transportation networks, and recommending a plan that could be funded with available financial resources. The plans, the bureau added, should cover 10 basic elements: economic factors affecting development, population, land use, transport facilities including mass transit, travel patterns, freight facilities, traffic control, zoning and land-use codes, financial resources, and social and community values such as parks and historical sites.[21]

Up to this point, nearly all federal funding for urban areas was limited to interstate freeways and a few other major roads, so plans did not need to be very complicated. In 1964 Congress passed the Urban Mass Transportation Act, providing federal funding, out of general funds, for mass transit. But initially, Congress allocated very little money to transit.[22]

In 1975, the Department of Transportation issued rules requiring joint highway and transit planning. The rules required every state to create or designate a metropolitan planning organization (MPO) for each urban area that would write the plans. While the MPOs were still expected to write long-range plans, most of the emphasis in the new rules was on short-term plans known as the transportation improvement program, or TIP, which identified the actual projects to be built in the immediate future. While long-range plans typically looked ahead for 20 or more years, the TIPs only covered the next five years. The TIPs, says one historian, "changed the emphasis from long-range planning to shorter range transportation system management, and provided a stronger linkage between planning and programming."[23]

San Francisco began operating the Bay Area Rapid Transit system in 1972. BART's planners expected that the system would lead to higher-density development in rail corridors, thus giving more people easy access to rail service.[24] But subsequent evaluations revealed that BART had little impact on local land uses. One analysis found that, if anything, population densities increased more in areas distant from BART lines than near BART stations.[25] That was partly because existing residents opposed any changes in zoning and land uses near BART stations.

In response, the Urban Mass Transit Administration (forerunner of today's Federal Transit Administration) required communities proposing to spend federal money on rail transit to commit themselves to "local supportive actions," such as rezoning areas around transit stations for higher densities, in order to increase rail transit ridership.[26] This was the first time that any federal transportation rule required cities to regulate land uses in order to be eligible for federal funding.

Through the early 1970s, federal funds for transit were so sparse that most cities spent their share on buses rather than expensive rail projects. BART, for example, had been built entirely with local funds. But in 1973, Congress allowed cities to cancel planned interstate highways and use the funds for transit capital improvements.[27] Since many inner-city residents opposed the construction of new freeways through their neighborhoods, several cities took advantage of this law. But doing so created a dilemma because the funds could only be used for capital improvements; no transit system had enough operating revenues to run all the buses that it could purchase with the cost of an interstate freeway.

Rail transit was the solution to this dilemma. Rail transit had huge capital costs, yet its operating costs were not significantly greater than operating buses. Portland and Sacramento were among the cities that decided to build new light-rail lines with freeway money precisely because rail was expensive.

When Congress created the Interstate Highway System in 1956, the Bureau of Public Roads projected that it would be completed by 1968. Yet portions of the system remained unfinished through the 1980s. A major reason was that the gas tax used to pay for the system did not automatically adjust for inflation, and a 4-cent-per-gallon tax as of 1980 was inadequate to complete and maintain the system. In 1982 members of Congress proposed to increase the tax by 4 cents per gallon, but transit supporters in Congress threatened to oppose the measure unless transit received a share of the increase. Congress agreed to increase taxes by 5 cents per gallon, dedicating 1 of those cents—the equivalent of $1.1 billion per year—to transit.[28] Since then transit has received 20 percent of most increases in highway user fees.

The Department of Transportation declared the Interstate Highway System to be completed in 1991. This led to the question of how federal gas taxes, so long dedicated to the Interstate Highway System, should be spent in the future.

Congress's answer, contained in the Intermodal Surface Transportation Efficiency Act of 1991, was muddy at best. The law created a National Highway System consisting of the interstates plus another 100,000 or so miles of major highways, and allowed states to spend federal money maintaining and expanding

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any of those roads. With respect to urban areas, Congress specified that a large portion of funds previously dedicated to highways was now "flexible," that is, MPOs could spend the money on either highways or transit.[29]

ISTEA also created a new pool of money called *New Starts* that would be used for new rail transit lines and other transit capital projects. Unlike highway money, which was distributed to states based on a strict formula, New Starts money was offered to urban areas on a first-come, first-served basis. This meant that MPOs that proposed expensive rail projects would get more federal funds per capita than MPOs that were satisfied with bus service. Under ISTEA, 40 percent of federal transit grants were distributed in this way. Naturally, the number of regions proposing rail lines grew rapidly.

Even though congestion is a major cause of air pollution, Congress discouraged regions from trying to reduce pollution by relieving congestion.

ISTEA also made long-range transportation planning far more important, and the requirements for it more elaborate, than ever before. Metropolitan planners were required to consider air pollution, the connections between land use and transportation, and quality of life issues.

Historically, transportation engineers had handled the highly quantitative issues involved in planning: safety, efficiency of movement, and so forth. But the broader issues raised by ISTEA were beyond the engineers' training or abilities. In fact, they were beyond anyone's training or abilities, but members of the urban planning profession believed they could handle such questions.

In short, ISTEA did two things. First, it freed up the use of federal highway user fees so that urban areas could spend them on a wide variety of activities, not just interstates. Second, it imposed a broad planning process that relied on both qualitative values, such as "quality of life," and long-range unknowns, such as future oil prices and American's responses to those prices.

Planning under ISTEA was made even more complicated by the Clean Air Act Amendments that Congress passed in 1990, the year before ISTEA. The CAAA placed severe constraints on what urban areas could do if they were rated by the Environmental Protection Agency as out of compliance with air pollution rules. Even though congestion was a major cause of air pollution, the CAAA discouraged regions with severe pollution problems from building more roads to relieve congestion, and instead encouraged them to use behavioral tools to discourage driving.

When combined with the Clean Air Act Amendments, ISTEA contrasted strongly with the planning process developed by the Bureau of Public Roads in the 1960s. The BPR process considered land uses, regional growth, and personal travel preferences to be outside of transportation planning. ISTEA regards all of those things as variables that the planners can manipulate: planners can restrict development over here, force increased growth over there, and redesign cities to shape people's future travel decisions. While the BPR goal was to provide a safe and efficient transportation system, ISTEA's goal is to promote the general welfare by reducing pollution, saving energy, improving the efficiency of land use, and taking other steps to make cities more "sustainable."

In a 1950 conference organized by the Bureau of Public Roads, economist Shorey Peterson noted that, "It is in character for the engineer to be mainly concerned, not with broad matters of public interest, but with specific relations between road types and traffic conditions." Peterson specifically warned against trying to account for the "public interest" when planning roads. "Control of road improvement through judging its relation to the general welfare is as debatable, as devoid of dependable benchmarks as deciding the proper peacetime expenditure for national defense or the right quantity and quality of public education," said Peterson. "Controlled in this way, highway projects are peculiarly subject to 'pork barrel' political grabbing."[30]

Federal transportation funding since the passage of ISTEA has proven Peterson correct. Federal transportation earmarks, unheard of before 1980, have exploded from 10 in 1982 to about 500 in 1991 to more than 6,000 in 2005.[31] Cities are competing to outdo one

another in building the most expensive rail projects. And in a growing number of urban areas, transportation planning seems to be about almost anything but transportation.

Congressional authorization for the federal gasoline tax expires every six years, so Congress has reauthorized the tax twice since ISTEA, each time preserving or adding to long-range planning requirements. The next reauthorization is scheduled for 2009, which gives Congress an opportunity to revisit this process.

Procedural Problems with Transportation Plans

Virtually all of the long-range transportation plans reviewed contained severe procedural shortcomings. To understand these flaws, it is important to know how the planning profession itself believes that such plans should be written.

The Rational Metropolitan Transportation Plan

Accepting for the moment the idea of long-range transportation planning, what should such a plan contain? The *rational planning model* is supposed to find the best way to achieve society's goals. "In this model," says one planner, "goals are first identified and priorities set among desired consequences of policy. Alternative strategies (means to the goals) are then examined and a choice made of the 'best' alternative."[32]

The process described by the Bureau of Public Roads in 1963 is based on that model, according to which planners first define their goals and criteria. At least some of those criteria should be measured in terms of quantifiable outputs so that the plan and its alternatives can be fairly evaluated. Tons of toxic air pollution is quantifiable; "sustainability" is not.

Planners should also insure that their criteria are *outputs*, not inputs. The amount of walking people do is an output; the "walkability" of a neighborhood is an input. When planners rely on vague terms like *sustainability* and *walkability*, they run the risk of writing plans that are judged on basis of their intentions, not their results. An appropriate set of criteria might include the number of transportation-related fatalities, hours wasted in congestion, tons of air pollution, and BTUs of energy consumption.

Next, planners need to forecast future travel needs and expectations. The best travel models today are based on detailed observations of how people actually live. Such observations, usually collected from thousands of people in the form of travel diaries, are used to predict how people will respond to changes in their incomes, educations, family sizes, travel costs, congestion, transportation alternatives, and urban design features such as density and mixed-use developments.

Even if the travel diaries are an accurate reflection of how people live today, many things about the future remain unknowable, including local population growth, energy prices, other transportation costs, and how people will respond to those costs. This means many of the inputs needed for future travel forecasts will necessarily be based on best guesses.

One way planners can handle this is through a *sensitivity analysis*, which asks how transportation outputs vary in response to fixed changes—say, plus or minus 20 percent—in assumed inputs. If changing a particular input does not greatly change the outputs, then the accuracy is not important. If a particular input does have a large effect on outputs, then planners should put some effort into making certain that input is as accurate as possible and in reporting to the public the effects on the plan if the assumption proves inaccurate. They could even build *feedback* into the plan to automatically change if some of the assumptions prove wrong.

The next step is to devise alternative transportation plans. To do this, planners must make a list of all possible transportation projects: new roads, new transit lines, new bicycle and pedestrian facilities, other improvements such as traffic signal coordination, and new ways of managing facilities such as high-occupancy vehicle lanes or tolling. To this list some

The planning profession developed the rational planning model, which involves setting goals, preparing alternatives, evaluating those alternatives, and developing the preferred alternative.

Plans should be transparent, that is, it should be clear to readers how planners developed their preferred alternative.

planners might add different forms of land-use regulation such as urban-growth boundaries, incentives for infill development, form-based zoning codes, and other rules designed to change people's travel preferences.

For each project, planners should estimate the cost to taxpayers, the cost to everyone else, and the benefits in terms of the criteria developed in the first step: for example, the effects of the project on fatality rates, congestion, pollution, and energy consumption. Capital costs should be annualized by amortizing them over the life of each particular project so that both benefits and costs can be compared on an annual basis. Each of the benefits can then be divided into each project's annual dollar cost to get cost per life saved; cost per hour of congestion relief; cost per ton of air pollution relief; and cost per BTU of energy saved. The projects can then be ranked using those criteria.

For the actual alternatives, many planners might develop a transit-emphasis alternative, a highway-emphasis alternative, and so forth. But that would be unnecessarily polarizing. A better way is to build alternatives around each of the major criteria: a maximum-safety alternative, a minimum-congestion alternative, and so forth. The maximum-safety alternative would include all of the projects with the highest safety rankings that the region can afford with available funds. Thus, the region might have four alternatives—safety, congestion, pollution, and energy—each of which cost the same but which produce different levels of outputs and meet the criteria in different ways.

At that point, planners could compare the projects and criteria to see which are complementary and which conflict. For example, traffic signal coordination can improve safety and reduce congestion, pollution, and energy use. But building a new highway might reduce congestion at a cost of consuming energy during construction. Planners could first ask: it is possible to redesign the project so that it produces a net energy savings? If not, then planners have to consider tradeoffs: how much energy are we willing to spend to save an hour of congestion? Some trade offs, such as people's time and energy, are easy because both can be valued, but others, such as fatalities, will require more subjective judgment.

Based on the tradeoffs, planners could design a preferred alternative that attempts to provide the best-possible balance of outputs for the fixed amount of funds that are available. The alternative should also specify where it would make sense to spend more money if more became available through, say, a local tax increase or increased federal grants.

After the plan is adopted, planners should monitor to insure that the goals are being achieved. If possible, monitoring should include feedback mechanisms so that the plan can self-correct if any of its assumptions prove wrong. For example, if a particular project turns out to cost much more than planners originally projected, the plan could provide for the substitution of alternative projects that would be more cost effective.

Each of these steps should include consultation with the public to insure first, that planners do not neglect any important criteria, potential transportation projects, or alternatives and second, that the tradeoffs planners make in developing the preferred alternative meet public approval. Moreover, the plan should be transparent; that is, it should be clear to any reader how planners made each step along the way toward development of their preferred alternative.

In sum, a rational transportation plan should include the following:

- Quantitative output criteria by which the plan can be judged;
- State-of-the-art forecasts of travel needs and travel behavior;
- Sensitivity analyses for questionable assumptions;
- A list of all possible transportation projects with projections of costs and benefits, with the benefits firmly associated with each major criterion;
- Project rankings in terms of cost per each criteria-related benefit;
- Several alternatives, consisting of vari-

ous collections of potential projects, possibly one for each major criterion;
- Estimates of the financial costs and the transportation, environmental, and other benefits of each alternative;
- A preferred alternative that proposes a list of projects in an attempt to balance the various criteria;
- Consultation with the public at key stages along the way, with efforts to make the planning process transparent so that reviewers can understand why planners made their recommendations;
- Monitoring to insure that the plan is working as intended with feedback mechanisms that would add or subtract projects if more money becomes available or if certain assumptions prove wrong.

Actual Metropolitan Transportation Plans

To compare metropolitan transportation planning with the standard rational planning model, I read the most recent plans for more than 75 regions, including plans covering the 67 largest urban areas and several smaller ones. None of the plans come close to the rational process described above or even the more basic process defined by the Bureau of Public Roads in 1963.

No plan did sensitivity analyses of critical assumptions. None bothered to project potential benefits or cost-effectiveness of projects considered. All but a handful of plans failed to include any realistic alternatives, and many failed to project the effects of the proposed plan on transportation. As a result, plans lacked transparency: taxpayers and other readers of most plans would have no idea how projects were selected, whether those projects or the plans themselves were cost effective at meeting plan goals, or even, in many cases, whether the plans met any goals.

Criteria. Most metropolitan transportation plans include goals and objectives that serve as evaluation criteria. However, most of the criteria in most of the plans are qualitative. Even when the criteria are potentially quantifiable, planners rarely list the quantitative measures they use to evaluate alternatives.

As previously noted, such factors as hours of congestion delay, tons of air pollution, or transport-related fatalities are all highly quantifiable. But many plans include such goals as:

- Promote livable communities;[33]
- Foster vibrant communities;[34]
- Build community structure;[35]
- Provide environmental justice;[36]
- Provide a multimodal transportation system;[37]
- Increase accessibility;[38]
- Create walkable districts;[39]
- Protect wetlands;[40]
- Preserve open space and agricultural land;[41]
- Discourage urban sprawl;[42]
- Plan for workforce housing;[43]
- Safeguard historical, cultural, and archeological resources:[44] and
- Support economic development.[45]

Many of those goals, such as livable communities or community structure, are not quantifiable at all. Other goals are quantifiable, but not in terms that are comparable to other goals. How many units of environmental justice are people willing to trade off for more open-space protection? How many units of workforce housing are people willing to trade off for safeguarding historical resources? How many units of economic development are people willing to trade off for adding another mode to their multimodal system? Given that most plans contain many of such goals, there is no way to find an optimum plan. The resulting decisions are necessarily political, not rational.

Some goals, such as accessibility and walkability, are really inputs, not outputs. Just because planners judge a neighborhood to be walkable doesn't mean that anyone is actually walking. One plan defines *accessibility* as "the number of opportunities (such as jobs, shopping, etc.) that can be reached from a given location within a given amount of

Nearly all of the plans reviewed used an abbreviated planning model that failed to identify or evaluate alternatives, making it impossible for people to know if the plan was the best way of achieving goals.

travel time by auto, transit, or nonmotorized modes."[46] Like walkability, this is an input, not an output.

Other terms, such as *sustainable*, *livable*, and *multimodal*, are code words, and in most cases they are codes for the same thing: alternatives to the automobile. "Sustainability" is often used to mean nonpetroleum-based transportation. "Livability" often means designing cities for pedestrians and cyclists, not autos. "Multimodalism" means spending money on any transportation mode except for autos even if most people continue to use autos.

Part of the problem is that Congress has required planners to include or consider a number of vague goals, including supporting economic vitality, enabling global competitiveness, promoting energy conservation, and accessibility.[47] Having set the precedent by requiring unquantifiable, vague, and/or conflicting goals, Congress has effectively encouraged planners to add more such goals of their own.

Most plans offer little hint as to how planners account for the tradeoffs between these goals. But the plan for Nashville includes a system of scoring projects that provides a revealing glimpse into planners' priorities. The most important scores include the following:

- Public transit capital improvements—21 points
- Has a positive impact on transit—9 points
- HOV use—4 points
- Travel demand management (carpooling, vanpooling, etc.)—9 points
- Bike/pedestrian facilities—8 points
- New highway lanes—8 points
- Congestion pricing—2 points
- Eligible for federal and state funding—50 points[48]

The Nashville plan scores transit projects four times higher than highway projects even though less than 1.5 percent of Nashville commuters take transit to work.

The Census Bureau says that nearly 97 percent of all Nashville-area commuters get to work by car, while less than 2 percent walk or bicycle and less than 1.5 percent take transit to work.[49] Yet bike-pedestrian facilities score the same as new highway lanes, and transit scores nearly four times as many points as new highway lanes. Interestingly, the highest number of points is scored by projects "eligible for federal and state funding."[50] In other words, if someone else will pay for it, it doesn't matter what the project is, Nashville will build it.

Nashville's scoring system makes the biases of regional planners readily apparent. Most transportation plans do not include such a scoring system, which helps to hide whatever biases planners may have. As will be shown below, many plans still spend far too much money on forms of transport that move very few people, indicating that the biases of Nashville's planners are shared by many other metropolitan transportation planners.

Forecasts and sensitivity analyses. Nearly all plans contain at least some forecasts of population growth and future travel demands. Few describe how reliable the travel forecasts might be. No plan reported that planners did any sensitivity analyses to deal with questionable assumptions and forecasts.

Project listings with benefits and costs. Most plans listed projects that would take place under the proposed plan. Some plans included additional projects that planners considered desirable but for which no funding was available.

Typically, the metropolitan planning organizations compiled these lists by asking state, regional, and local transportation agencies for lists of the projects they would like to complete in the next 20 years or so. The Jacksonville plan calls this the "wish list."[51] MPOs rarely, if ever, add alternative projects to the list.

In most cases, the wish lists ended up being far more expensive than the total financial resources available to the region. That puts the MPO in the position of having to determine which projects will get funded and which will not. That decision is really the essence of the long-range plan.

This process is open to abuse. If we assume that government agencies regard tax dollars as a common-pool resource, then they will have an incentive to submit lengthy wish lists and may have an incentive to propose expensive solutions (such as rail transit)

when low-cost solutions (such improvements to bus transit) would work just as well.

For example, the Ft. Collins plan used an elaborate scoring system to rank projects within several categories—highway, transit, bike/pedestrian, and so forth. When it came time to select from the high-ranking projects among those categories, the MPO essentially punted, saying it would "spend the resources that have been allocated to each project category at an equal rate."[52] In other words, if funding was available for only half of all projects, it would fund half (by dollar value) of each category's projects. This, of course, would motivate the various agencies to make their project lists as long as possible.

Transportation planning models allow planners to estimate the effects of individual projects on congestion and other outputs. Yet no plans listed any such effects, other than financial costs, for their projects. In one case, an MPO assessed the effects of individual projects on congestion, but did not include its assessment in the plan itself. For its 2025 long-range plan, the San Francisco Metropolitan Transportation Commission published a separate "evaluation report" which listed dozens of highway and transit projects.[53] The report included one set of tables listing the cost of each project and a separate set of tables estimating the number of hours of congestion relief each project would provide.

Unlike the plan itself, the report was not available for download on the Internet. But those people who obtained copies of the report could calculate the cost per delay hour and rank projects by this measure. There is no evidence that the MTC ever made that calculation itself. Its plan proposed to fund several projects that had the highest costs per delay hour saved while it did not fund many projects with much lower costs per hour, so it is clear that the MTC did not consider this to be an important criterion.

This MTC report has been used by low-income advocates in a discrimination lawsuit against the MTC charging that it is building expensive transportation facilities for high-income neighborhoods while neglecting low-cost transportation improvements that would serve low-income neighborhoods.[54] Perhaps not surprisingly, the MTC published no comparable report for its more recent 2030 plan.

Alternatives. The biggest gap in metropolitan transportation planning is the lack of alternatives. Of the more than 70 plans reviewed, only two—those for Jacksonville and Salt Lake City—included real alternatives and evaluated the effects of those alternatives.

Some plans considered no alternatives at all to the proposal. That makes it appear that the proposed plans are completely arbitrary or that they are based on some hidden (or not-so-hidden) agendas and that planners do not want to reveal to the public how badly the plans perform compared to other alternatives.

Many plans include a "no-build" alternative, meaning no new capital improvements after ones that are already in progress are finished. Planners usually project a huge increase in congestion under this alternative, which allows them to say that the preferred alternative "reduces" congestion—when in fact it merely increases it by a smaller amount than the no-build plan. In Austin, Texas, where more than 90 percent of commuters drive to work, planners predict that no-build will increase the amount of time people waste in traffic by more than 100 times, but under the proposed plan, it will increase by "only" four times.[55] Since no other alternatives were evaluated, people have no way to know whether some other plan could have prevented such an increase.

Some plans, including Portland's, add a "priority" or "needs" alternative, which could also be called the "wish-list" alternative, as it includes all of the projects submitted to the MPO by the various transportation agencies in the region. Since the total cost of all projects is, in some cases, many times the total amount of funds available, the needs alternative, like no-build, is not a realistic option.

The 2030 plan for Sacramento included the 2025 plan as an "alternative" to the proposed plan. Since part of the 2025 plan has already been accomplished and the 2030

Of the more than 70 plans reviewed here, only two included real alternatives and evaluated the effects of those alternatives.

plan extends five more years into the future than the previous plan, the 2025 plan is not a real alternative.[56]

A few plans, such as one for Pittsburgh, considered different "vision scenarios." Pittsburgh's included four visions: current trends, dispersed development, compact development, and corridor/cluster development. These are all land-use alternatives, of course, not transportation alternatives. Whatever kind of alternatives they are, Pittsburgh planners made no effort to evaluate the transportation or other effects of each scenario. Instead, they settled on a preferred scenario and based their transportation plan exclusively on that.[57]

Albuquerque's plan provides "extensive opportunities" for alternatives to driving but does not bother to estimate whether anyone will take advantage of those opportunities.

Buffalo's 2025 transportation plan considered three alternatives. Alternative A emphasized highway capacity improvements, B emphasized transit improvements, and C emphasized investments that would promote economic development. The proposed plan called for equal investments in all three.[58]

In addition to a no-build alternative, Jacksonville also considered highway emphasis and transit emphasis alternatives.[59]

Salt Lake City offered three alternatives: continuation of the previous plan; freeway emphasis, and arterial emphasis. Despite the names, however, the differences between the alternatives were actually very minor. All three alternatives included five light-rail and commuter-rail lines, as if those lines were not in question. All also included several streetcar lines, though not necessarily on the same streets.[60]

Projections of Costs and Benefits. An important step in the federally mandated planning process is insuring that the proposed plan is feasible considering available financial resources. So most plans estimated the costs of the proposed plan. But many did not bother to estimate the benefits or other effects of the plan. Will the plan lead to more or less traffic congestion? Will heavy investments in transit shift travel from automobiles? Will such shifts reduce congestion and air pollution? Planners for Boston, Ft. Lauderdale, Miami, Minneapolis-St. Paul, San Diego, the San Francisco Bay Area, and many other major urban areas could not be bothered with answering these and other questions relating to plan performance.

For example, Albuquerque's plan notes that, in 2005, 77.4 percent of commuters drove alone to work and only 1.4 percent rode transit. Their plan provides "extensive opportunity for commuters to move away from the 'Drive Alone' category to other non-'SOV' [single-occupant vehicle] modes," including commuter rail, bus-rapid transit, and bikeways. However, they did not estimate how many people would actually take advantage of such opportunity. Opportunities, of course, are inputs; actual use would be an output.

While Buffalo planners went to the trouble of identifying alternatives to its 2025 plan, they failed to estimate the effects of those alternatives.[61] Moreover, Buffalo did not include any alternatives in its more-recent 2030 plan.[62]

For each of the alternatives in the Jacksonville plan, planners estimated such things as number of hours of congestion delay, average rush-hour travel speeds, and numbers of transit riders for each of these alternatives along with the selected plan.[63] Jacksonville's plan was unusual in that it was written by outside consultants rather than in-house planning staff; perhaps other MPOs should go that route.

For each of their alternatives, Salt Lake City planners estimated such impacts as the number of hours of congestion delay, average commute speeds, tons of air pollution, and many other effects.[64] Curiously, they did not make a comparable evaluation for the preferred alternative. Though the plan devotes 65 pages to the impacts of the selected plan (compared with 17 pages for the three alternatives, 16 pages of which describe methods and 1 page of which presents results), readers will search in vain to find total hours of congestion delay, average commute speeds, tons of air pollution, or many of the other impacts estimated for the alternatives.[65] That greatly reduces the usefulness of the alternatives.

Preferred Alternative. Every plan includes a preferred alternative, though, of course,

since many present no other alternative, they simply call the preferred alternative "the plan" or the "fiscally constrained plan." Most plans included projections of the effects of the plan on future transportation: congestion, pollution, the share of travel using transit, and so forth. But without alternatives for comparison, members of the public have no way of knowing whether the selected plan is the best way deal with metropolitan transportation issues.

For example, as evidence that the draft Los Angeles metropolitan transportation plan is cost-effective, planners say that the projected benefits are slightly more than twice the expected costs.[66] But this does not prove that a plan is cost effective. Suppose a plan consists of three projects, each of which costs a dollar. One project produces $5 worth of benefits, one $0.75, and one $0.25. All three projects together earn twice the benefits of their costs, but the second and third projects are not efficient. Further, merely knowing the benefit-cost ratio of selected projects says nothing about whether potential projects that were rejected or not considered at all might have produced even greater benefit-cost ratios. If the plan could have adopted projects that cost a dollar and returned $2, but adopted the projects that returned less than a dollar instead, then it is not cost effective.

Transparency. Few of the plans are transparent to members of the public. How did planners select the projects being considered in the plans? How did they select the projects that would be funded under the proposed plan? How did they weigh the relative importance of congestion relief, safety, pollution abatement, land-use manipulation, or providing alternatives to the automobile? The plans provide few answers to these questions.

Monitoring and Feedback. Most of the plans claim that the agencies will monitor implementation. However, few include many details about how the monitoring process would work, and none included any feedback mechanisms or triggers that might require plan amendments or revisions. For the most part, it appeared that planners included language about monitoring more to meet federal planning guidelines than because they believed monitoring was important or that it could lead to improvements in on-the-ground decisionmaking.

Substantive Problems with Transportation Plans

Although less than 8 percent of Portland-area commuters take transit to work, Portland, Oregon, has become famous for its plans that emphasize compact urban development and public transit over new highways. But in January 2007, the Federal Highway Administration sent Metro, Portland's MPO, some unusually critical comments about its draft metropolitan transportation plan. Among the agency's comments:

- "It is difficult to find the transportation focus" in the plan. "The current focus is about land use and attaining land use goals through other means, specifically by controlling transportation."
- "The plan should allow for highway expansion as a viable alternative. The transportation solution for a large and vibrant metropolitan region like Metro should include additional highway capacity options."
- "The plan should acknowledge that automobiles are the preferred mode of transport by the citizens of Portland—they vote with their cars everyday."[67]

The comments also criticized Portland's zoning codes that allow unusually narrow streets; the region's failure to do anything about high crime rates on its light-rail lines; and street designs that require buses to block traffic instead of pulling into loading bays when stopping for passengers. If nothing else, the letter revealed that at least some transportation professionals in the U.S. Department of Transportation are not persuaded that behavioral solutions are the answer to Portland's transportation needs.

"It is difficult to find the transportation" in Portland's transportation plan, said the Federal Highway Administration.

Plans that spend disproportionate amounts of money on transit or focus on controlling land use are relying on behavioral tools to modify people's transportation choices.

The lack of alternatives, sensitivity analyses, and transparency in the planning process allows regional planning agencies to gloss over the fact that many plans are not really about solving transportation problems. Instead, like Portland's, too many are about social engineering—that is, changing people's behavior by artificially increasing the costs of some kinds of transport while artificially reducing the costs of others. Even if the public supported such behavioral modification, the plans provide no way of knowing whether it works, that is, whether the plans produce any meaningful changes in behavior and whether those changes are worth the cost.

Polls frequently show that urban residents consider traffic congestion to be one of the most serious problems with living in American cities.[68] As previously noted, the Texas Transportation Institute estimates that congestion costs American commuters $78 billion per year.[69] Most metropolitan transportation plans pay lip service, at least, to relieving congestion. But few end up doing anything more than slowing the rate of increase in congestion, and a few won't even promise to do that.

The presence of one or both of two indicators can reveal if transportation planners are placing undue emphasis on behavioral tools. The first is the share of the region's capital funds that planners propose to devote to transit. The second is the emphasis planners place on regulating land use to achieve transportation objectives.

An Overemphasis on Transit

New York is the only U.S. metropolitan planning area where transit carries more than 15 percent of commuters to work. In only four other regions—Boston, Chicago, northern New Jersey, and Washington—does transit carry more than 10 percent of commuters. Yet more than 30 metropolitan transportation plans—well over half of those for which data are available—propose to spend more than 20 percent of the region's capital funds on transit.

New York's plan to spend 56 percent of the region's capital funds on transit is not significantly out of line with the 40 percent of the region's commuters who use transit (Table 1). But the Twin Cities' plan to spend 70 percent of the region's capital funds on transit is far out of line with the 4.8 percent of commuters who take transit to work.

The transportation plan for St. Louis rejected the regional transit agency's proposal to spend $4.9 billion on light-rail lines and other capital improvements. The plan noted that the transit agency's projected revenues could not even cover its operating costs, much less the cost of light-rail expansion. The plan added that county voters had rejected a tax increase needed to support transit operations and that, even with that tax, the agency's revenues would be insufficient to support the proposed expansions.[70]

With the exception of St. Louis, all regions propose to spend a greater share of capital funds on transit than the share of commuting carried by transit. Transit also costs more, per passenger mile, to operate and maintain than highways. Moreover, tax subsidies are needed to cover more than 70 percent of transit capital and operating costs, while subsidies to highways total only about 12 percent of highway costs.[71] So, in one sense, all of the urban areas in Table 1 except St. Louis are spending too much on transit. But assuming that some basic level of support is needed for people who have no access to autos, the really serious problems are in regions that are spending more than about 20 percent of their funds on transit *and* are spending several times more on transit than transit's share of commuters.

In deciding to spend a large share of its funds on transit, Salt Lake City used a scoring system to rank projects on the basis of congestion relief, cost effectiveness, safety, environment, and community factors. Several rail transit projects scored very high. However, a state auditor found computational errors in the process.[72] Correcting the errors reduced the ranking of one rail project from 2 to 19 and a second project from 7 to 18, while several highway projects were pushed ahead of those rail projects. Together, the two downgraded projects absorbed 80 percent of state

Table 1
Overspending on Transit?

Metro Area	Transit's MTP* Funds (%)	Share of Commuters (%)	Metro Area	Transit's MTP* Funds (%)	Share of Commuters (%)
Minneapolis-St. Paul	70	4.8	Tucson	25	2.5
San Francisco	68	9.6	Savannah	25	2.5
Miami	68	5.5	Dallas	24	1.9
Hartford	67	3.0	Sacramento	23	2.4
Honolulu	57	8.7	Baltimore	23	7.6
New York	56	39.9	Cleveland	21	4.9
Boston	55	11.6	Little Rock	21	0.9
Philadelphia	55	9.7	Madison	19	4.9
Ft. Lauderdale	53	2.6	Portland ME	19	2.1
Springfield	49	1.5	El Paso	18	2.4
Denver	47	4.3	Tampa	18	1.4
Portland OR	43	7.6	Bridgeport	17	9.3
Atlanta	38	4.0	Jacksonville	16	1.4
Houston	37	3.2	Richmond	13	2.1
Seattle	36	7.0	Bakersfield	13	1.6
Phoenix	34	2.5	Austin	12	3.8
Albany	33	2.9	Akron	11	0.9
Durham	33	4.9	Detroit	11	1.7
Ft. Collins	32	1.0	Oklahoma City	11	0.7
San Diego	31	3.1	Charlotte	10	2.6
Washington	31	14.7	Cincinnati	10	2.8
Albuquerque	28	1.5	Las Vegas	10	3.5
Memphis	28	1.6	Milwaukee	10	3.5
Buffalo	28	3.6	Birmingham	9	3.2
Los Angeles	27	4.5	Anchorage	5	1.5
Salt Lake City	27	3.9	St. Louis	0	2.8

Source: Transit's share of metropolitan transportation plan funds from the most recent draft or final metropolitan transportation plans for each region. Transit's share of each regions' commuting from *2005 American Community Survey*, Table GCT0804, Percent of Workers 16 Years and over Who Traveled to Work by Public Transportation for urbanized areas or for counties in cases (such as New York) where metropolitan regions do not coincide with urbanized areas.
Note: Regions not shown on this list, such as Chicago and Pittsburgh, did not include enough data in their plans to calculate this number.
*Metropolitan transportation plan.

funds.[73] "Instead of providing funding for both road and transit projects which are essential to congestion relief," noted the auditor, planners "used almost all of the funds for transit projects."[74]

On reviewing the auditor's report, the council of governments decided to ignore the new ranking and continue funding the transit projects. "The reason for selecting the same projects is that transit provides a balanced transportation system," said the council.[75]

The council was also unfazed by a report issued at about the same time finding that Salt Lake City's transit agency has systematically overestimated light-rail ridership by about 20 percent.[76] If existing light-rail lines carry fewer people than the agency has claimed, then new light-rail lines are likely to

The Utah Transit Administration admitted it had overestimated transit ridership.

Increasing transit's share of travel from 2 to 3 percent is a trivial return from spending 40 to 50 percent of a region's transportation capital funds on transit.

do less to relieve congestion than planners predict.

The president of the council of governments responded by saying, "I'm satisfied that regardless of what the numbers are, UTA makes an impact." Despite the new numbers, "I only see us going forward" with transit.[77] In other words, the actual amount of congestion relief or cost-effectiveness of that relief is irrelevant despite the scoring system in the planning process. Clearly, in this case, the planning process is less important than the preconceived notions of the members of the council of governments who make the final decisions.

Those preconceived notions are often wrong. In 1979, University of California (Irvine) economist Charles Lave observed that many people assume "that public transportation is vastly more energy-efficient than automobiles" and "that investing money to improve transit facilities will attract many more passengers."[78] Both of those assumptions, Lave said, were wrong in 1979. They remain wrong today: transit is not particularly environmentally friendly, and even if it were, no U.S. region has been able to attract more than about 1 percent of commuters out of their cars by making huge investments in transit.[79] Those metropolitan transportation plans that estimate future transit usage confirm this: none project that transit will significantly gain market share over the automobile.

Transit planners prefer to compare mode shares in terms of trips, as in "transit carries 5 percent of trips and autos 90 percent." But that is misleading when dealing with congestion and mobility because transit trips tend to be slower and shorter than auto trips, and a shorter trip offers less mobility than a longer one. A 10-mile trip potentially accesses four times as much land area, and four times as many potential jobs or other destinations, as a five-mile trip. So passenger miles are a better indicator of mobility.

Portland, Oregon, planners, for example, optimistically project that their plan will increase the share of trips that use transit from 3.55 to 5.11 percent.[80] That is equivalent to increasing transit's share of passenger miles from 2.0 to 2.9 percent.[81] Similarly, the plan for Denver projects that transit's share of trips will increase from 2.3 to 3.1 percent, which is the same as increasing transit's share of passenger miles from 1.4 to 1.9 percent.[82] Such gains are a trivial return from spending 40 to 50 percent of each region's transportation capital dollars on transit. This is especially true when it is considered that growth means there will be many more cars on the road and the diversion of funds to transit means there won't be enough roads to accommodate those cars.

An Overemphasis on Land-Use Regulation

The second indicator of the excessive use of behavioral tools is an undue reliance on land-use programs to alter transportation choices (Table 2). At least 27 plans place a strong emphasis on manipulating land uses in order to promote alternatives to auto driving, and another baker's dozen place at least some emphasis on land-use manipulation. In contrast, most of the rest of the plans regard land use as something that transportation planners must respond to, but not something they can or should try to control.

"Traditionally, development patterns have been allowed to determine the distribution of travel demand, which government has then accommodated by expanding infrastructure," says Cincinnati's 2030 plan. "In contrast, growth management involves governments in influencing the timing, location, pattern, intensity, and budgeting of development so as to reduce the need for transportation facilities as well as address environmental, social, and fiscal issues."[83]

Reflecting changes in planning jargon, Cincinnati's 2004 update of its plan used identical language but substituted the words "smart growth" for "growth management."[84] Both versions "recommended that local governments adopt and implement comprehensive land use and transportation policies which support SOV alternatives."[85] Since that is only a recommendation, not a man-

Table 2
Planning Emphasis on Land-Use Regulation

Strong	Moderate	None or Minor
Albuquerque	Albany	Akron
Atlanta	Buffalo	Anchorage
Austin	Chicago	Bakersfield
Baltimore	Cincinnati	Birmingham
Boston	Cleveland	Charlotte
Bridgeport	Ft. Lauderdale	Columbus
Denver	Little Rock	Dallas
Ft. Collins	Miami	Des Moines
Hartford	Raleigh	Detroit
Honolulu	Sarasota-Manatee	Durham
Houston	Springfield	El Paso
Los Angeles	St. Louis	Fresno
Madison	Washington	Hampton Roads
Minneapolis-St. Paul		Indianapolis
Nashville		Jacksonville
Northern New Jersey		Kansas City
Orlando		Las Vegas
Philadelphia		Louisville
Pittsburgh		Memphis
Portland		Milwaukee
Sacramento		Montgomery
Salt Lake City		New York
San Diego		Oklahoma City
San Francisco		Omaha
Seattle		Phoenix
		Portland ME
		Providence
		Richmond
		Rochester
		San Antonio
		Savannah
		Tampa
		Tucson

Source: Reviews of most recent draft or final long-range metropolitan transportation plans for each region.

date, Cincinnati's plan falls in the "moderate emphasis" category.

Plans such as Cincinnati's that moderately emphasize land use may promote transit-oriented developments through subsidies, or sometimes merely by exhorting local governments to zone for such developments. They do not rely on coercive land-use measures such as growth boundaries.

The plan for St. Louis, for example, says that transportation facilities "should be supported by land use policies that harmoniously mix residential, retail, and office development near transit stations." Although a 2020

Plans with a moderate emphasis on land-use regulation rely on subsidies or other incentives.

Plans with a strong emphasis on land-use regulation rely on coercive measures.

plan considered spending up to $1.5 billion on "sustainable development," neither that nor any subsequent plan has rated this a high enough priority to reach the final projects list.[86]

Like the moderate plans, plans with a strong land-use emphasis promote transit-oriented developments, often with tax-increment financing and other subsidies. But unlike the moderate plans, strong plans also employ coercive measures such as growth boundaries. Outside the growth boundaries or some other boundary, they use large-lot zoning or other restrictions to prevent development. Inside the boundary, they promote more compact development, perhaps through minimum-density zoning or perhaps merely with subsidies to high-density infill.

"Influence land use policies to improve access to jobs, services and housing to everyone in the region by using market forces and the regulatory process," says goal 7 of Sacramento's 2006 plan.[87] The plan proposes to "rein in sprawl" and promote "compact development" by dedicating $500 million of transportation funds to subsidies to developers of high-density, mixed-use projects.[88]

The 2030 plan for the San Francisco Bay Area proposes to use land-use regulation to limit greenfield development to 15,600 acres instead of the 128,000 acres that planners project would be developed without such regulation.[89] The plan also dedicates $27 million per year to subsidize transit-oriented developments.[90]

The regulation and enforcement of land-use policies in transportation plans is eased when the same agencies plan both and when those agencies are granted strong powers by either the states or the communities within the metropolitan area. Oregon state land-use rules require every city or metropolitan planning organization in the state to draw urban-growth boundaries, so those requirements naturally were incorporated into the transportation plans for Portland and other Oregon urban areas. Cities and counties in the Denver metropolitan area have agreed to let Denver's MPO draw an urban-growth boundary, something that a majority of municipalities can impose on any dissenters by virtue of the MPO's ability to withhold federal grants from recalcitrant cities.

Denver's transportation plan includes an urban-growth boundary, restrictions on large-lot subdivisions, and financial and other incentives for transit-oriented and other high-density developments.[91] Portland's transportation plan links to the region's 2040 land-use plan.[92] The 2040 plan emphasizes "maintaining a compact urban form" through an urban-growth boundary and densification of neighborhoods within the boundary so that the region can grow with minimal expansions to the boundary.[93]

Los Angeles' transportation plan is tied to an aggressive land-use plan that focuses on transportation outcomes. While the details are somewhat vague, the plan proposes to put nearly 40 percent of all new residents in high-density infill developments in transit corridors on just 2 percent of the region's land area.

Just as spending billions on transit does little to increase transit ridership, there is little evidence that either compact urban areas or transit-oriented development will significantly reduce auto driving. Los Angeles planners project that their land-use plan, along with new rail transit lines and bike paths, will reduce average commute trip lengths by 2 percent, increase transit's share of trips from 2.1 to 3.0 percent, and increase walking and cycling's share of trips from 8.3 to 9.2 percent. The net result is a projected 3.3 percent reduction in per capita driving.[94]

That may sound small, but Los Angeles planners are more optimistic about the effects of land-use changes on transportation choices than planners in other regions. Plans for both Denver and Portland project an increase in per capita driving despite new rail-transit lines, increased population densities, and scores of new transit-oriented developments.[95]

Such predictions are not exactly a revelation to planners. Denver's metropolitan planning organization, the Denver Regional

Council of Governments (DRCOG), began assessing the viability of behavioral strategies for reducing congestion and air pollution more than three decades ago. A 1977 report found that more compact development would have little effect on driving and no effect on air pollution.

The number of trips people make by car is primarily a function of household income, noted the report, and not very sensitive to development patterns or housing types. The report cited a study in Boston that simulated the shifting of 20 percent of the region's population from the suburbs to the urban core and found it would reduce driving by only 1 percent.[96]

Even if more compact development could shorten the length of trips, noted Denver's report, it is the number of trips that count when it comes to air pollution. That is because catalytic converters only work after engines warm up to normal operating temperatures, so most pollution from today's cars comes from "cold starts." Thus, a 2-mile auto trip generates almost as much pollution as a 20-mile trip. "Cold start engines mean the number of trips is more significant than VMT" (vehicle-miles traveled), warned the report.[97]

Nor will changes in density combined with huge investments in transit make a difference. "Likely, no more than 15 percent of total personal trips can be accommodated by transit—most [estimates] see no more than 10 percent."[98] Even that is optimistic considering that, even in the New York urban area, less than 10 percent of all travel is by transit, while the number is less than 5 percent in every other U.S. urban area.

A 1979 report analyzed various strategies such as transit improvements, high-occupancy vehicle lanes, increased parking charges, and other "transportation system management strategies." Any one of these strategies had fairly insignificant effects on driving, and even when combined the strategies reduced per capita driving by less than 10 percent.[99]

Despite such findings, plans issued by DRCOG since 1977 have increasingly relied on behavioral tools to reduce driving. For example, a 1981 plan focused on promoting "activity centers" of mixed-use developments throughout the Denver region in the hope that such developments would reduce driving.[100] The most recent plan calls for building nearly 80 such transit-oriented developments throughout the Denver metro area.[101]

Why Behavioral Tools Don't Work

Since passage of the Clean Air Act in 1970, federal, state, and local governments have relied on two types of tools to reduce air pollution and other negative effects of auto driving. First, they have used technical tools such as catalytic converters, which reduce tailpipe emissions, or improved traffic signal coordination, which reduces the amount of time and fuel wasted in traffic. Second, they have used behavioral tools, such as investments in mass transit and urban designs aimed at discouraging driving.

Controlling tailpipe emissions has worked phenomenally well. Between 1970 and 2002 (the latest year for which pollution data are available), U.S. driving increased by 157 percent and driving in urban areas (where pollution problems are most serious) increased by more than 200 percent.[102] Yet Environmental Protection Agency data show that, over the same period, total auto emissions of carbon monoxide declined by 62 percent, nitrogen oxides declined by 42 percent, particulates by 58 percent, and volatile organic compounds by 73 percent.[103]

Meanwhile, behavioral tools have been a complete failure. Though urban areas in California, Oregon, and other states have emphasized transit and land-use regulation for several decades, not a single one can claim that it has reduced per capita driving by even 1 percent.

Yet plans continue to rely on behavioral tools. That appears to be due to planners' poor understanding of the relationship between land use and transportation. The Nashville plan's number one goal is to "link land use and

Since 1970, technical tools for reducing air pollution, such as catalytic converters and coordinating traffic signals, have been a phenomenal success, while behavioral tools have been a complete failure.

transportation."[104] "Transportation affects land use and land use affects transportation," says Albuquerque's plan.[105]

It is true that transportation affects land use. Development of the streetcar allowed middle-class families to move from crowded city centers to single-family homes. Development of the mass-produced automobile allowed working-class families to do the same. Both streetcars and automobiles led to reduced urban-area densities, and autos especially led to new forms of retailing that emphasized auto access and parking.

Although transportation affects land use, University of Southern California planning professor Genevieve Giuliano points out that the reverse is not true: "Land use policies appear to have little impact on travel outcomes."[106] This is partly because most urban facilities are already in place, so huge changes in density and design are needed to produce even small changes in mode shares or trip lengths. Few residents of Manhattan drive to work, but Manhattan is more than 20 times denser than most urban areas, and increasing the density of any urban area to Manhattan levels would be impossible.

Within the range of modern urban densities, the effects of land use on transportation are very limited. The 2000 census found that urban-area densities ranged from 850 to 7,000 people per square mile, a variation of more than 700 percent. Yet, outside of the New York urban area, household auto ownership rates ranged from just 82 to 97 percent, a variation of only 18 percent. Moreover, there is little correlation between density and auto ownership rates (correlation coefficient = 0.10). While only 68 percent of households in the New York urban area own autos (mainly due to low ownership rates in Manhattan), New York is not the nation's densest urban area, and ownership rates are much higher in those that are denser, including Los Angeles, San Francisco-Oakland, and San Jose.

Transportation affects land use, but land-use policies have little impact on transportation choices.

Some researchers have found that people who live in denser, mixed-use developments drive less than people who live in low-density suburbs.[107] However, that is largely the result of a self-selection process: people who want to drive less tend to locate in dense, mixed-use neighborhoods with intensive transit service. When urban areas are examined as a whole, density, transit, and design have almost no effect on the amount of driving people do. For example, one study ranked several urban areas by density, pedestrian-friendliness, and intensity of transit service. The highest ranked urban area in all three categories—San Francisco—also had the highest per capita driving.[108] That urban area might have been more convenient for those who don't want to drive, but not enough to attract significantly more people out of their cars.

Once the demand for high-density living on the part of those who want to minimize driving is met, construction of more transit-oriented developments will have little effect on driving. "If the aim is to reduce environmental damage generated by automobiles, the effective remedy is to directly price and regulate autos and their use, not land use," Giuliano concludes.[109]

What distinguishes New York (as opposed to just Manhattan) from other urban areas is not population density but job density. More than 2.5 million jobs are located in a few square miles of Manhattan, and most workers in this area walk or take transit to work. In most urban areas, however, only a small share of jobs is located downtown. Moreover, jobs are rapidly suburbanizing, further eroding downtown's share.

Forty years ago, most urban transportation plans were based on a *monocentric* model of the city, that is, on an assumption that most jobs and transportation needs were focused on downtown. But that model became obsolete as early as the 1920s, as both residents and jobs began to move to suburban areas.

Today, urban planners rely on a *polycentric* model, calling for transit services to regional and town centers as well as downtowns. But that model is just as obsolete as the monocentric model was 40 years ago. Economist William T. Bogart has shown that, in a typical U.S. urban area, no more than 30 to 40

percent of jobs are located in downtowns and suburban centers.[110]

That means the land-use and transportation plans that focus on providing transit to regional centers will serve well under half the commuters in their regions. For example, Denver has built or is planning nearly 150 miles of rail transit lines, yet after all the lines are built Denver planners project that only 26 percent of the region's jobs will be within one-half mile of a rail station.[111]

Planners offer several remedies that look attractive on paper but do not work well in practice. Among these are substituting *accessibility* for *mobility* and creating a *jobs-housing balance*.

The idea behind focusing on accessibility instead of mobility is that, if cities are designed so that people are close to shops and services, they won't need to drive as much or as far.[112] The problem with that idea is that consumers rely on a competitive market in retail and services to promote innovation and keep costs low. Consumers who are captives of one or a limited number of stores end up paying higher prices, often for lower-quality goods. Moreover, even in a world with limited energy supplies, there is no guarantee that having local stores within walking distance of residential areas is the optimal pattern. Some experts in the retail industry suggest that higher energy prices will give an advantage to big-box supercenters where people can do all of their shopping in one auto trip.[113]

The idea behind a jobs-housing balance is similar to the accessibility notion: if each community in an urban area has as many jobs as workers, then workers won't have to commute as far each day. But that assumes that people base their residential location decisions primarily on their job locations. In reality, many other factors influence residential locations, such as housing affordability, school quality, and other personal preferences. Thus it is not surprising that University of California (Berkeley) planning professor Robert Cervero found that jobs and housing in many San Francisco Bay Area communities "are nearly perfectly balanced, yet fewer than a third of their workers reside locally, and even smaller shares of residents work locally."[114]

Moreover, just as retail competition benefits consumers, a wide range of job opportunities benefits both workers and employers. One study found that a 10-percent increase in travel speeds led to a 3-percent increase in worker productivity, mainly by offering employers a larger pool of potential workers.[115] Conversely, reducing travel speeds or distances by half reduces the number of potential jobs or workers by three quarters, and so can have a dramatic effect on incomes and productivity.

Despite their negligible benefits, behavioral tools are very expensive. A mile of rail transit line typically costs more to build than a four- to eight-lane freeway and typically carries fewer than half as many people as a single freeway lane mile. Federal funding for rail transit comes out of gasoline taxes and other highway user fees, and in most cases those funds would be more cost effective if spent on other transportation facilities. Meanwhile, land-use regulations that try to influence people's housing choices drive up the cost of housing, require huge subsidies to developers of high-density housing projects, or both.

Why Long-Range Transportation Planning Can't Work

Despite the high costs and minimal benefits of behavioral tools, more than a third of the plans reviewed for this report rely heavily on such tools, and another 20 percent use them to some degree. Moreover, virtually none of the plans seriously evaluated alternatives or attempted to find the most cost-effective solutions to congestion, air pollution, and other regional transportation problems. Whether due to laziness or a desire to cover up the inefficiency of their plans, most plans used an abbreviated rational planning model that left out alternatives and other important steps.

The failure of planners to use the full rational planning model illustrates the bank-

Despite their negligible benefits, behavioral tools are very expensive, driving up the cost of both transportation and housing.

ruptcy of the long-range transportation planning process required by Congress. But the problems cannot be remedied by simply insisting that planners strictly follow the rational planning model. Even if that model were followed to the letter, the process would still fail for several reasons.

First, a long-range plan requires information about the future that is essentially unknowable. Forecasts of future populations, construction costs, energy costs, travel demands, job locations, housing preferences, tax revenues, and so forth will, in many cases, be no better than guesses or, in some cases, wishful thinking. Yet, on the basis of guesses alone, many cities are committing billions or tens of billions of dollars to transportation projects that may prove to be useless.

Once government has written a plan, no matter how flawed, those who benefit from it form special interest groups that view the plan as an entitlement.

Second, comprehensive plans that attempt to account for such diverse factors as vibrant communities, workforce housing, cultural resources, and economic development are simply too complicated to analyze or comprehend. As previously noted, many such variables are not quantifiable, and those that can be quantified cannot be easily weighed against other variables.

Third, as Shorey Peterson predicted in 1950, whenever a plan must deal with long-range unknowns or nonquantifiable benefits or costs, the final decision ends up being political rather than rational. That means that the decisions are made by politicians whose preconceived notions may be entirely at odds with reality, as in the case of the Salt Lake City commission that supported rail transit even when its corrected analysis found that rail transit was not cost effective and carried fewer passengers than the transit agency had reported. Furthermore, decisions that are entirely up for grabs and not based on any rational process give special interest groups a powerful incentive to influence the process in their favor.

Fourth, long-range planning offers planners and decisionmakers little or no incentive to make sure the decisions they make are the right ones. They are spending other people's money and the people whose money they are spending will have to live with their decisions long after the planners have changed jobs or retired and the politicians have left office.

Finally, if new information becomes available indicating that a long-range plan is flawed—if, for example, costs are higher or benefits lower than expected—it is very difficult to correct the problem even in a regularly scheduled update. Any long-range plan will stimulate special-interest groups that benefit from the plan to will work very hard to prevent any changes in the plan.

For all these reasons, Congress should abandon long-range planning requirements when it reauthorizes federal surface transportation funding in 2009. Instead, it should focus on the short term, give transportation agencies incentives to improve transport outcomes, and encourage regions and agencies to rely more on user-fee-based funding mechanisms.

What Should Be Done Instead

Peter Drucker once observed, "Any government activity almost at once becomes 'moral.'"[116] In other words, once the government begins an activity, no matter how flawed, it becomes viewed as an entitlement by those who will benefit from it. So what if costs turn out to be double the original predictions? So what if the benefits turn out to be far smaller than hoped? The plan must be carried out.

In this way, by imposing and funding long-range planning on metropolitan areas, Congress has created a special-interest coalition of government planners, private consultants, and other interest groups who work on or benefit from such long-range plans. The fact that the plans do more harm than good to many urban areas does not prevent this coalition from feeling entitled to its historic share of federal funds.

This illustrates the dangers of federal involvement in what are essentially local or regional matters. Congress should get out of the business of funding and dictating

requirements for metropolitan transportation. As a second-best solution, Congress should stop requiring—and funding—long-range transportation plans.

In place of long-range planning, Congress should do the following:

- Encourage metropolitan areas to rely on short-term (five years or less) plans that address today's problems, not future visions.
- Offer budgetary incentives to regions that meet selected goals, such as increased transit ridership or reduced congestion.
- Encourage state and local transport agencies to increasingly rely on user fees for funding rather than general taxes.

Like electricity or phone service, transportation is a marketable service, and it should act like one. Electric and phone companies do not worry about the effects of their investments on urban sprawl or livable communities. Instead, they provide services to anyone who will pay the cost. While service companies may have long-term goals, their planning horizons tend to be short, their plans are flexible, and they are often able to rapidly change directions in response to new technologies, tastes, or demands.

Electricity shortages are rare, and telephone users hardly ever get an "all-circuits-busy" message. In contrast, urban roadway congestion costs more than $78 billion a year. While aggravating, congestion has become so commonplace that Americans don't even notice that, among marketable services, it is the exception rather than the rule. This congestion is partly because transportation planning has focused more on capturing federal and other tax dollars for economic development and special interest groups than on providing effective transportation.

A short-term planning process can overcome many of the defects in long-range planning. There is no need to forecast populations, costs, or travel needs in the distant future. Congress should specify that short-term planning must focus on a few quantifiable variables, primarily safety and congestion, and possibly also air pollution and/or energy efficiency. When limited to these variables, planners can apply the Rational Planning Method, as described above, to regional transportation decisions.

To reinforce this process, Congress should offer budgetary incentives to regions that are successful in dealing with transportation issues. Federal transit funding should be based on a strict formula that includes transit ridership, so regions that increase ridership faster than the national average will be rewarded with more funds. The New Starts program and similar funds that are distributed on a nonformula basis should be eliminated because they encourage waste.

Federal highway funding formulas should also be revised to include some measure of congestion, so that regions that demonstrate reduced congestion get larger budgets. The Texas Transportation Institute has developed several measures of congestion, including the travel time index and per capita hours of delay. But those measures are based on formulas whose results are not always comparable between regions. Congress should use something that is simpler and easier to measure, such as average travel speeds or the percentage of roads that are at level of service F (a transportation engineering term for stop-and-go traffic).

Congress may also want to include safety or other factors in funding formulas. For example, urban transportation incidents led to 7.6 fatalities per billion passenger miles in 2006.[117] Congress could provide bonuses to regions that either do better than this or reduce fatalities from their historic rates.

Finally, Congress should encourage states and regions to make greater use of user-fee-based funding mechanisms. User fees give transportation providers positive feedback for promoting mobility and they give users feedback about the cost of providing transportation facilities.

For example, congestion-priced toll roads make more sense than gasoline taxes that are

Congress should encourage states and regions to make greater use of user-fee-based funding mechanisms.

Private buses, or publicos, in San Juan, Puerto Rico, are 98 percent funded out of transit fares and carry more people than the public buses and rail system combined.

not indexed to either inflation or fuel efficiency. The tolls benefit users by reducing the time they waste in traffic even as they provide the funding necessary to make worthwhile transportation improvements. Whether the roads are privately owned, franchised to private operators, or publicly owned should be more a question of finance than politics, and the benefits of toll roads should not be obscured by xenophobic demagogues who try to generate opposition to tolls by pointing to the "sale" (actually leasing) of Indiana and Chicago toll ways to foreign investors.[118]

Transit systems can also be improved by basing them more on user fees than on taxes. For example, private buses or *publicos* in San Juan, Puerto Rico, get 98 percent of their funds from transit fares and carry more riders than all other San Juan bus and rail systems combined.[119] Such private competition to public transit agencies are outlawed by most U.S. states. Even where subsidized transit is deemed to be needed, it could be provided in the form of vouchers to transit riders rather than huge grants to transit bureaucracies. This would make all public and private transit providers responsive to riders' needs rather than to appropriators' preconceived notions or desires for urban monuments.

Conclusion

In the third volume of *Lord of the Rings*, J. R. R. Tolkien wrote:

> It is not our part to master all the tides of the world, but to do what is in us for the succor of those years wherein we are set, uprooting the evil in the fields that we know, so that those who live after may have clean earth to till. What weather they shall have is not ours to rule.[120]

It comes down to this: Government planners can't accurately predict what future generations will want or need, yet long-range transportation plans can lock agencies into plans and projects that make no sense. Twenty years ago no one predicted that the Internet would lead telecommuters to outnumber transit riders in the vast majority of urban areas, or that intercity bus service (driven by online ticket sales) would be growing for the first time in decades, or that FedEx, UPS, and DHL would be making daily deliveries of online purchases on almost every residential street in America. Just as plans written 20 years ago would be wrong about those things today, plans written today for 20 years from now will also be wrong.

In short, any long-range plan is guaranteed to be wrong. Yet, as Drucker observed, that fact that it is a government plan makes it is very hard to change. That means long-range transportation plans are locking more and more urban areas into dubious programs of increased congestion (in the hope of discouraging a few vehicle miles of travel), unaffordable housing (in the hope of encouraging a few more people to crowd into transit-oriented developments), and costly rail projects the environmental and transportation benefits of which are dubious at best.

Short-term planning can focus on today's problems, including congestion, safety, and deteriorating infrastructure. Transportation agencies that solve those problems will bequeath a much better urban environment to the future than ones that ignore those problems in an attempt to create some unattainable vision. Because short-term planning is less dependent on distant forecasts, it is less likely to make mistakes that lock regions into bad plans. Short-term planning should also focus only on quantifiable values directly related to transportation, not on broader community concerns that are difficult to measure and debatable in any case.

Safe, efficient transportation literally drives our economy and has made America one of the wealthiest nations in the history of the world. The recommendations to Congress in this report—to repeal long-range transportation planning requirements, offer regions incentives to achieve transportation goals, and encourage more user-fee-based finance of new transporta-

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