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Will Urban Rail Improve Mobility in North Carolina?

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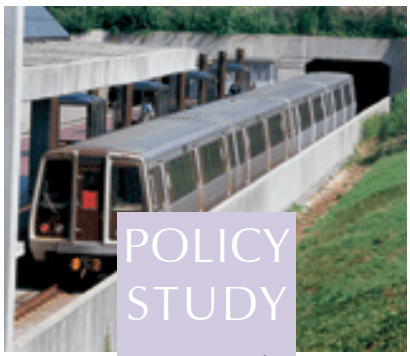


POLICY STUDY 321

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Executive Summary

If policymakers want citizens to approve of their plans, they must first gain the public's trust. When arguing in favor of a particular transportation project, policymakers may point to projections and project goals. They may also note that many others have taken similar routes. However, perhaps a more effective way to gain the public trust is to point to specific successes that other areas have enjoyed and explain how it is likely that local demographic features will yield similar success. Stakeholders may ask themselves: "Based on the experience of others, what is the best case scenario?" And since the best-case scenario is, by definition, atypical, stakeholders may ask a second question: "Based on our area's specific characteristics, what can we realistically expect?"

Unfortunately, urban rail has provided little evidence that it can improve mobility, air quality, local economies, or the prospects of the transit-dependent poor. And since the demographic and geographic features and travel patterns of Charlotte, the Triangle and the Triad are particularly unfriendly to rail, these areas are particularly unlikely to enjoy significant rail-related benefits.

Local stakeholders can match their area's transportation needs to the most effective policies by:

1. Paring down the list of potential goals;
2. Focusing on a clear core mission, and
3. Taking a realistic approach to the benefits and limitations of each policy option.

1. Pare Down the List of Goals

Today's transportation planners are expected to please many different interests, and accomplish much more than their predecessors. With so many competing demands, the political process encourages planners to be ambitious and take on many goals. It is no longer enough for transportation policy to tend to transportation needs—planners must also restrain sprawl, improve air quality, spur economic development, and so on. However, as transportation policy assumes more goals, each individual goal receives less attention and priority.

Consequently, measuring success gets muddied. With more goals it becomes increasingly difficult to define and monitor success. Some goals are worthy, but better achieved through different means, while some goals simply should not be pursued.

Sprawl: North Carolina policymakers are clearly very concerned with sprawl, and this concern is deeply embedded in the various urban rail proposals. However, even if it were desirable to use public policy to battle certain sprawl-related trends, such battles may be hugely expensive and, perhaps, impossible to win. Policymakers will find it more productive to work with demographic trends instead of against them. There may be instances—such as improving air quality—where a common goal could be better achieved through means not suggested in the reports that analyze the three proposals.

Air quality: The rail proposals would not take enough cars off the road to make any real contribution to air quality improvement. For example, the Charlotte proposal expects to reduce regional auto travel by only one-tenth of 1 percent.

More fundamentally, when it comes to air pollution, all cars are not created equal. Since a small percentage of autos produces the majority of air pollution, the heartiest environmental gains will be realized not through increased rail ridership, but through policies that target gross polluters. And public policy that fails to distinguish between dirty and clean cars is like a diet plan that does not distinguish between Twinkies and celery sticks. Banking on rail for pollution reduction is the air quality equivalent of cutting back on celery to lose weight. Since targeting gross polluters offers at least 200 times the pollution reduction impact of rail, policymakers should go straight to the fat and target those who pollute the most.

Economic Development: Even with rail-friendly demographics and aggressive public subsidies, the experience of other areas reveals that it is difficult for transit-oriented development to take root.

North Carolina's particularly low population density and particularly high rates of auto use make rail's ability to generate economic gains all the more unlikely. Those who would provide revitalization—homeowners and business leaders—favor more straightforward approaches to greater economic development. By, for example, improving schools and keeping business taxes at a reasonable level, policymakers can provide a better product and lure those who would provide revitalization.

2. Focus on the Core Mission

The important process of paring down possible goals makes it easier to choose a worthy core mission. And after the paring down process we are left with a goal not explicitly called for in the North Carolina urban rail proposals: cost-effective mobility improvement. This concept returns to the first principle of transportation

policy—mobility improvement. The pursuit of mobility will be constrained primarily by one ever-present and formidable factor—funding. Policymakers should only adopt those transportation options that offer the best mix of cost-effectiveness and mobility improvement.

Cost-effectiveness: Hefty cost overruns have plagued urban rail for decades, and, unfortunately, the North Carolina proposals have continued this trend. Both the Charlotte and Triangle proposals have exceeded initial cost projections. In Charlotte, a proposal that once cost just over $200 million now approaches $400 million, while in the Triangle, a proposal that was long thought to cost $250 million now stands at well over $800 million. Since the Triad proposal is in an earlier stage of development, it is too soon to determine if it will experience similar cost escalation.

Mobility improvement: Although dozens of cities have turned to urban rail, they have yet to realize substantial mobility improvement. No comparable urban rail system in the nation carries even 1 percent of travel. Moreover, after the adoption of rail, transit's share of work trips tends to actually decrease. Once again, the North Carolina proposals will likely follow the experience of their predecessors. Its own proponents note that the Charlotte proposal would reduce regional congestion by about one-tenth of 1 percent. Even though the Triangle rail proposal would cost nine times more than the next most expensive alternative, it would decrease congestion by less than 1 percent. Moreover, the annual cost per new rail passenger would be rather striking—$6,747 for Charlotte and $10,358 for the Triangle. If the Triad were to adopt rail for each corridor, the total capital cost would be $2.1 billion and provide 16,730 daily passenger trips. If the bus rapid transit (BRT) alternative were adopted for each corridor, the total capital cost would be $657 million, and it would provide 15,858 daily passenger trips. In other words, under the all-rail plan, the Triad would spend over three times as much to purchase 872 more daily passenger trips.

3. Be Realistic

If investing heavily in urban rail is unlikely to bring cost-effective mobility improvement, what will?

Forging a Realistic Framework: First, policymakers must adopt a realistic approach to transportation policy—one that analyzes society with sober eyes, and recognizes the world as it is and as it is likely to be in the future.

Urban rail can only succeed if increasing suburbanization and auto use reversed, but the strength of these trends suggests that embarking on a battle against them would be unrealistic, hugely expensive and probably futile. These trends are particularly strong in North Carolina, making any campaign against them in this state especially futile.

Asking what transit can accomplish? Second, policymakers must be realistic about what transit can and cannot accomplish. Sadly, transit agencies often shift resources to woo middle-class motorists to rail and neglect those with the fewest transportation options.

However, it is far more cost-effective to serve those of modest means than to try to attract "choice" riders to public transit. Instead of focusing on those who already have many transportation options, policymakers should serve those most in need of mobility improvement—the transit-dependent poor and those with other mobility limitations.

Transit patrons are rarely concerned with the ambitious goals often used to justify urban rail projects—they simply want more routes, and faster, more frequent, more reliable service. However, when transit agencies tilt resources to boost rail ridership, bus service often deteriorates.

Moving From Framework to Concrete Solutions: Finally, a realistic approach to cost-effective mobility improvement needs more than a clear framework. It requires concrete policy tools, such as:

- **Competitive Contracting for Transit:** In the United States and Europe, major transit systems use competitive contracting and achieve reductions in operating costs ranging from 20 to 51 percent.
- **Bus Rapid Transit:** With the proper attention to improving the bus's aesthetics, BRT can offer fast, flexible, and convenient service at a fraction of the cost of rail.
- **Added Capacity:** The Texas Transportation Institute found that areas in which added capacity kept closest pace with traffic increases did the best job of keeping congestion in check. Moreover, many approaches—such as improving traffic light signaling—add capacity without adding lanes.
- **HOT Lanes:** High Occupancy Toll (HOT) lanes are limited-access lanes reserved for buses and other high-occupancy vehicles, but open to single occupant vehicles upon payment of a toll. A variable toll that rises during peak hours and drops during off-peak times keeps traffic moving briskly even during rush hour, by limiting demand to the number of vehicles consistent with high throughput. Since it eliminates the need for tollbooths, electronic toll collection allows for payment at full speed.
- **HOT Networks:** Combining HOT lanes with BRT offers something for everyone. With an entire network of uncongested, premium-service lanes, bus patrons get to avoid general-purpose traffic, private motorists get to purchase a way out of congestion, and the transportation system gets a much-needed new source of revenue. Even motorists who don't use the HOT lanes benefit because more cars on the HOT Networks means fewer cars in the regular lanes.
- **Telecommuting:** Telecommuting offers a cost-effective way to decrease the number of cars on the road simply by allowing workers to stay home. If current trends continue, soon more Americans will be telecommuters than transit commuters. Since North Carolina's transit work trip share is typically less than half the national average, telecommuting's comparative advantage could be even greater. Indeed, in Charlotte, Greensboro and Raleigh, telecommuters outnumber transit commuters by more than 2 to 1. By dismantling barriers to telecommuting, policymakers could allow technology to ease congestion.

All stakeholders must recognize that when it comes to end goals there is much common ground. It is likely that if a survey were taken of residents in Charlotte, the Triangle, and the Triad, the vast majority would favor quicker travel times over slower ones, cleaner air over dirtier air, and economic growth over stagnation. Decisions should not be made on the basis of a fondness for one particular mode, but on choosing the best tool for the job.

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Part I

Introduction

Each North Carolina resident is an expert in his or her commute. When should I use the highways? When should I use surface streets? Can I get there by bus? Commuters can answer these questions for themselves, but they do not have a wider view of transportation options. They rely on policymakers to decide how to improve mobility in their city or county.

When transportation policymakers propose a new project—such as urban rail lines in Charlotte, the Triangle and the Triad—they ask the public to trust their judgment. After all, such projects are publicly funded and unlike many other government-funded programs whose cost and effects may be spread across the nation, the effects of urban transportation policy are concentrated locally. In fact, the issue of cost is more complicated since initial costs are not concentrated locally, but long-term costs are. Since they will bear the direct effects, the public demands answers to important questions, such as: How much will it cost? What alternatives are we passing up? Will it work?

A. A Matter of Trust

As policymakers work to gain the public's trust they may study a specific proposal and offer projections on criteria such as cost, ridership, and vehicle miles traveled. The projections may seem sensible, but of course there is no way to tell how accurately the projections will reflect reality. Why should the public trust projections? When deciding how much trust to place in projections, the public and the policymakers themselves might consider how well past projections have predicted reality. When contemplating any large financial investment, potential investors commonly comb through the evidence of past performance, which is often regarded as a good indicator of future success. Even when making personal transportation decisions such as buying a car, consumers don't rely solely on the claims of the seller. Rather, they find out if others who have purchased this kind of car have been pleased, if it has lived up to the seller's claims of safety, reliability, and so on.

The three urban rail proposals under consideration do not exist in a vacuum; their predecessors stretch back to the early 1980s and can be found in cities across the nation. In this case, policymakers have the benefit of hindsight. They can find out if past urban rail projects have accomplished their goals. If past urban rail projects had been smashing successes, then North Carolina commuters could be cautiously optimistic. However, if past performance is indicative of future success, North Carolina commuters have reason to worry.

Commuters' experience with urban rail projects and several decades of research reveal that sizable gaps between promises made and promises delivered are routine. Typically, policymakers and consultants underestimate costs and overestimate ridership. Most fundamentally, even when actual ridership meets projections, urban rail's effect on overall mobility is very slight. In fact, a focus on rail ridership can lead to a myopic view of a region's transportation needs, and prompt policymakers to neglect the core mission of transportation policy.

Particularly with regard to Charlotte and the Triangle, the urban rail projects under consideration have undergone much planning and discussion. Each project has substantial political momentum behind it. When projects are in the latter stages of development it is especially tempting for residents and policymakers to root for their success. However, now is a crucial time for stakeholders in Charlotte and the Triangle to ensure that rail is a wise choice. Even if such a reassessment will have little impact on the rail lines that now approach groundbreaking, it is extremely valuable when considering future rail expansion. The Triad's stakeholders also have much to gain from a reassessment of that area's mobility needs. They benefit not only from observing the nationwide rail systems that precede them, but also from noting how their neighbors will address the subject.

Instead of relying on projections, promises and hope, stakeholders should adopt a "just the facts" mentality. North Carolinians must carefully analyze other areas' experience with urban rail and factor in local demographics to determine to what extent their projects are likely to mirror their predecessors.

B. Setting the Stage: The State of Transportation in North Carolina

Before a sensible course of action can form, stakeholders must have a clear picture of the transportation challenges that face them. As chronicled in an extensive report by University of North Carolina, Charlotte's David T. Hartgen, North Carolina has seen strong growth in population and auto use, and strong growth is expected to continue. The largest absolute population growth occurred in the urban centers of Charlotte and Raleigh-Durham, although Table 1 shows that from 1990 to 2000 all the urbanized areas considering rail have experienced population growth above the statewide average of 21.4 percent. [1]

Table 1: Characteristics of Urbanized Areas, 1990-2000

Urbanized Area	Population 2000	Change (1990-2000)	Population Density (people per square mile) in 2000	Change (1990-2000)
Charlotte	758,927	67.3%	1745	-7.0%
Raleigh	541,527	77.0%	1694	-2.5%
Winston-Salem	299,290	61.6%	1191	-22.4%
Durham	287,796	40.1%	1836	-5.4%
Greensboro	267,884	37.7%	1978	-6.3%
High Point	132,844	22.2%	1412	9.7%

Source: David T. Hartgen, Ph.D., P.E., "Highways and Sprawl in North Carolina," (Raleigh, North Carolina:The John Locke Foundation, September 24, 2003).

Table 1 also shows that, except for High Point, each urbanized area decreased in population density. The areas considering urban rail mirror statewide trends: larger urban areas grow more rapidly in geography than they do in population, while the opposite occurs in smaller urban areas. The result is declining density in larger urban areas (even though they are slowly adding people) and increasing density in smaller areas.

When considering the greater commuting regions (Charlotte, Triangle, Triad), population density has increased throughout, but has done so faster in the suburbs. (The Triad is comprised of Winston-Salem, Greensboro and High Point. The Triangle is comprised of Raleigh, Durham and Chapel Hill, but the first phase regional rail project would not serve Chapel Hill.) Traffic has also increased in these commuting regions. Table 2 compares the three North Carolina commuting regions against national trends. In each case the North Carolina areas grew faster than the national average, and in each case they added drivers at or above the national average. Even so, average journey-to-work times were at or below the national average.

Table 2: Journey-to-Work Census Data Trends

	Increase in Population 1990-2000	Increase in Drivers 1990-2000	Increase in Average Journey to Work 1990-2000 (min.)	Average Journey to Work 2000 (min.)
National	13 %	15 %	4:00	26:00
Charlotte	29 %	28 %	4:00	26:00
Triangle	39%	36%	5:00	25:00
Triad	19 %	15%	3:00	22:00

Table 3 reveals that daily vehicle-miles traveled increased in each area except Winston-Salem. All other would-be rail areas realized increases above the statewide average of 42.7 percent. Many major traffic routes—such as I-85, I-40 and I-95—experienced traffic increases of 30 to 70 percent.

Table 3: Daily Vehicle-Miles Traveled 1990-2001

Urban Area	Percent Change
Charlotte	92.78
Raleigh	92.63
Winston-Salem	-6.48
Durham	70.94
Greensboro	50.87
High Point	59.36

Source: Hartgen, "Highways and Sprawl in North Carolina."

Hartgen notes that while North Carolina has realized significant increases in traffic, the state still has less congestion than the nation in general. Only one would-be rail area (Charlotte) has per-lane freeway congestion above the national average.

Of the three areas considering rail, only Charlotte is included in the Texas Transportation Institute's annual Urban Mobility Report. The report charts changes in congestion on the basis of a Travel Time Index, which measures how much longer a trip takes during peak hours compared to non-peak. For example, a Travel Time Index of 1.10 means that a trip during peak hours would take 10 percent longer. Within the category of "medium-sized urban areas" Charlotte's 2001 index of 1.27 tied Tacoma, Washington and was second only to Austin, Texas (1.31). Table 4 shows how Charlotte's congestion has increased since 1982.

Overall, the three North Carolina areas considering urban rail have seen increases in traffic congestion and are likely to experience further growth in population and auto use. However, with the notable exception of Charlotte, congestion is still more manageable in these areas, compared to the rest of the nation. Still, all three areas must take great care in crafting a sensible transportation policy. Only a sensible strategy will allow these areas to enjoy the kind of mobility that will help them remain attractive to residents, businesses and tourists.

Table 4: Charlotte Travel Time Index[2]	
Year	**Travel Time Index**
1982	1.08
1986	1.14
1990	1.16
1996	1.20
2000	1.27
2001	1.27
Long-Term Point Change (1982-2001)	19
Short-Term Point Change (1996-2001)	7

Source: David Schrank and Tim Lomax, "2003 Urban Mobility Report," (College Station: Texas Transportation Institute, Texas A&M University, September 2003).

C. Summary of Urban Rail Proposals

What plans have policymakers devised to meet future challenges to mobility? The following summarizes the three urban rail proposals that local policymakers designed to respond to North Carolina's transportation needs.

Table 5: Charlotte	
Proposed Project:	South Corridor Light Rail Transit (LRT) 9.6 Miles, 15 Stations
Total Capital Cost ($YOE):	$385.9 Million
Annual Operating Cost (2025 $YOE):	$27.0 Million
Ridership Forecast (2025):	17,900 Average Weekday Boardings 7,000 Daily New Riders
Opening Year Ridership Forecast (2006):	9,100 Average Weekday Boardings
Financing Sources	50% federal, 25 % state, 25% local

Source: "Annual Report on New Starts, 2005," Federal Transit Administration.

Table 6: The Triangle	
Proposed Project:	Phase I Regional Rail 35.2 Miles, 16 Stations Links Wake, Durham and Orange Counties
Total Capital Cost ($YOE):	$843.8 million
Annual Operating Cost (2025 $YOE):	$30.2 Million
Ridership Forecast (2025):	25,200 Average Weekday Boardings 8,300 Daily New Riders
Opening Year Ridership Forecast (2007):	13,800 Average Weekday Boardings
Financing Sources	50% federal, 25 % state, 25% local

Source: FTA New Starts 2005

Table 7: The Triad: Proposed Transit Corridors by Cost (in millions): Rail Diesel Multiple Units vs. BRT[3]				
	Rail DMU Costs		BRT Costs	
Proposed corridor	Capital	Operating	Capital	Operating
Burlington to Clemmons	$716	$32	$389	$12
High Point to Greensboro	$382	$12	$104	$3
High Point to PTI Airport	$443	$12	$106	$3
High Point to Winston-Salem	$545	$17	$58	$3

Compared to the Triangle and Charlotte's urban rail plans, the Triad's transportation plans are in an earlier stage of development. The Major Investment Study lists four corridors to consider for transportation improvements, specifically fixed guideway transit systems in the form of rail or exclusive bus facilities. The Piedmont Authority for Regional Transportation (PART) board has "maximum flexibility" to select the Locally Preferred Alternative (LPA), and to decide which corridors should be targeted for improvement, and if and where bus or rail—or different technologies—will be selected.[4] If rail were to serve all four corridors, the total project would be 110 miles long and have 22 stations. With all Bus Rapid Transit the project would be 90 miles long with 23 stations. The Triangle's financing structure has yet to be determined.

Of the three rail proposals, only Charlotte will use light rail cars powered with overhead electrical wires. Both the Triangle and Triad proposals use diesel multiple units (DMU), which are self-propelled cars. DMUs and light rail cars have several essential features in common: they are fixed-rail transit, they can operate as individual units or can link with other cars, and unlike heavy rail (e.g., New York City's subway system) they are not completely separated from auto traffic. This study uses the general term "urban rail" to refer to both light rail and DMU.

D. Thinking Smarter About Transportation Policy

It used to be that transportation policy could be thought of in simple terms. Policymakers might ask themselves, "How can we move people from point A to point B?" Technology would seem to make this simple question even easier to answer. After all, innovations always offer a new way to move people faster, safer, and more efficiently. However, as transportation technology advances, transportation policy grows more complex.

Increasingly, transportation planners are asked to consider how transportation policy affects many other issues, from housing to air quality to economic development and more. Everything has been magnified: more money is at stake, there are more interests to balance, larger populations to serve, and more transportation options to consider. As complexity increases it becomes all the more important to maintain a clear vision for transportation policy. In North Carolina, where burgeoning mobility concerns intersect with a large menu of policy options, it is particularly important to maintain a clear vision. Today's choices will play a crucial role in determining if future decades will bring improved or degraded mobility.

In order to clarify the purpose of transportation policy, planners may ask themselves some simple questions:

1. How can we identify worthy goals?
2. What should we accomplish?
3. How can we get there?

The following three guidelines can help answer these questions and allow communities to think smarter about transportation policy:

1. Pare Down the List of Goals

One of Aesop's Fables reveals how difficult it is to please everyone. A father who had two daughters was anxious to please them both. The first daughter wished for rain, because her husband was a gardener and rain would nourish his plants. The second daughter wished for dry weather, because her husband was a tile maker and dry weather would harden his bricks. Finally, the distraught father asks the second daughter, "If your sister wishes for rain, and you for dry weather, with which of the two am I to join my wishes?"

Today's transportation planners face a dilemma similar in nature, but magnified in scope. They are expected to please many different interests, and accomplish much more than their predecessors. With so many competing demands, the political process encourages planners to be ambitious and take on many goals. However, as transportation policy takes on more goals, each individual goal receives less attention.

The issue of measuring success also gets muddied. With more goals it becomes increasingly difficult to define and monitor success. The vagueness of certain goals adds to the difficulty of measuring success or failure. Some goals are worthy, but better achieved through different means. Transportation policy may simply be the wrong tool to accomplish certain worthy goals, and using the wrong tool is likely to result in a waste of time and money. Using the wrong tool also means passing up opportunities to use other tools that could offer better results.

2. Focus on the Core Mission

Before transportation policy was expected to accomplish so many different goals, it focused on the simple goal of facilitating mobility. Even as technology advances and our society grows wealthier, efficient mobility often remains elusive. As congestion mounts, commuters grow increasingly frustrated and increasingly eager for policymakers to fulfill transportation policy's first purpose. If planners focus on a core mission—one that is limited and clearly defined—the chance for success increases.

Since transportation funds come from taxpayers, and since those funds are always limited, policymakers must always search to squeeze as much value as possible out of each tax dollar. Today's debt-heavy federal, state and local governments make frugality even more important. Policymakers should return to the first purpose of transportation policy and embrace "cost-effective mobility improvement" as a worthy core mission.

Commuters stuck in traffic or trying desperately to make a cross-town appointment, simply want to get to their destinations on time—*how* they get there is less important to them. Achieving cost-effective mobility improvement means using all sensible, cost-effective means available—public and private—to improve overall mobility. Transportation policy expert Jonathan Richmond puts it well:

> *[W]hat we are after is mobility, and whether it is achieved by private or public means is less important than having it achieved speedily, efficiently, and at least negative impact on the environment …*[5]

3. Be Realistic

As we craft our personal transportation policy we often choose what is realistic over what is unrealistic. If we need to meet someone for lunch at a restaurant a short distance away, we may choose to walk. If we need to buy groceries at a store a few miles away, we're likely to drive. In other words, we consider our needs and the transportation options available to us and we make realistic decisions. A sensible, region-wide transportation policy adopts a similar strategy, only on a larger scale: Given the variety of mobility needs people have and the available transportation options, how can policy realistically fulfill the most needs? We would hope that our policymakers choose using the same common sense we employ for our personal transportation decisions.

Being realistic also means accepting what is likely to happen in the future. Of course, we cannot predict the future, we can only prepare for it. Therefore, flexibility and adaptability are key elements of a realistic perspective.

Often, being realistic means separating what you wish would happen from what is likely to happen. Take auto use. For a variety of reasons, some people wish that motorists would rely less on private auto travel. However, given what we know about societal trends, is that outcome realistic?

Rich Carson is an urban planner from the Pacific Northwest, and director of Clark County's Department of Community Development. He promotes a brand of planning called "urban realism," which among other things, takes a sober view of the auto's place in society:

> *There will be more cars in the future, not less. Until someone invents the Star Trek teleporter and gets to 'beam me up Scotty' there will be more automobiles.*[6]

Still, this is not necessarily bad news for those who wish for less auto use. After all, people usually wish for less auto use not as an end in itself, but because they have other goals in mind. Perhaps they want improved air quality. Often means cloud ends, but the good news is that if we focus on results to explore and weigh all possible means, we may achieve ends widely regarded as important. If, for example, there were a way to allow for an increase in auto use and still reduce air pollution, the person concerned with improving air quality would surely be pleased. After all, he or she would not have to hold out hope for an unrealistic outcome (dramatically reduced auto use), but could still enjoy what was really important all along (improving air quality). If we are willing to be realistic, we can find many areas where different methods can achieve goals we all have in common.

Part 2

Pare Down the List of Goals

As policymakers begin to ponder what should be done about transportation, they are soon provided with many suggestions from many different interest groups. Sometimes these groups have coinciding goals, but often interests collide. As the suggestions, requests and demands increase, policymakers are confronted with an ever-expanding list of potential goals. The prudent policymaker must, therefore, work hard to keep on task, to keep his or her eye on the ball. Policymakers must focus on what is important and feasible, and they must choose their goals carefully.

The first step in choosing what to do is deciding what not to do. In some cases, policymakers may decide that certain goals simply aren't worth pursuing. In other cases, policymakers may conclude that certain goals are worthy, but are better achieved through means other than transportation policy.

A. More Goals Lead to Less Focus

Too often cities saddle transportation policy with too many goals, and in this pursuit policymakers can lose sight of transportation policy's core mission. The ambitious and wide-ranging goals of past urban rail projects have aimed to, among other things, improve an area's image, spur economic development, attract tourism, improve air quality, and help make a city "world class."[7] The North Carolina urban rail proposals continue the trend of pursuing many goals, being as wide-reaching and as ambitious as their predecessors.

A goal of particular importance to policymakers is generating "fewer automobile trips," yet improving region-wide mobility (which would require improvements for motorists) is not stated as a goal. Concern about improving mobility is couched in transit terms and ignores the fact that North Carolinians' overwhelmingly choose to drive automobiles.

Some transit-oriented goals include:

- Providing high quality, time-competitive, transit services[8]
- Increasing quantity and usage of transit service[9]
- Maintaining or improving air quality[10]

Some goals are particularly laudable:

- Increasing the mobility of transit-dependent populations[11]

Many goals are rather ambitious, and are concerned with rebuilding society around transit:

- Focusing growth around transit corridors[12]
- Encouraging more compact forms of development[13]

The primary purpose of Charlotte's urban rail project is to "provide a time competitive transportation alternative," but compact development is "equally as important as meeting transportation needs for the corridor."[14]

Some goals, such as the "need to reinforce community identity" are particularly vague.[15] The Triad hopes to, among other things, "increase social interaction and cultural diversity."[16]

Many goals stem from aesthetic concerns:

> *Communities blend together at their borders, and currently distinct communities physically consolidate, so one does not know where one community ends and the next one begins.*[17]

Such an observation seems particularly far removed from transportation policy, yet it's indicative of the view that reshaping society must precede mobility improvement. Many policymakers consider it essential to couple transportation policy with land-use planning. However, such a coupling can encourage the kind of mission creep that loses sight of a region's transportation needs. It can also fail to give mobility improvement the priority it deserves.

Sometimes goals are only tangentially related to improved mobility and sometimes they are in conflict with other goals, such as getting the middle class out of their cars versus helping the poor. Others, for example improving community identity, are so abstract that their success or failure can never be measured. Some goals like economic development and environmental improvement, though worthy, are better achieved through other means. And many goals should probably not be pursued at all.

The proposals all express the goal of providing another transportation alternative.[18] Of course, taxpayers and commuters would also hope that the alternative provided is cost-effective and attractive enough to capture a large percentage of travel. After all, what good is another transportation alternative if it is expensive and barely used? As the proposals under consideration concede—either explicitly or implicitly—that reducing congestion is not a central goal, they surrender the most compelling reason to fund any transportation project. And so, a preoccupation with many goals has undercut transportation policy's core mission.

In order to avoid the mistakes of the past, local policymakers should prioritize their transportation goals. Only then can policy achieve a clearly defined core mission whose success or failure can be determined by objective performance measures.

It is beyond the scope of this study to address each project goal individually. Certainly, the proposals emphasize some goals more than others, so this study will address only those goals the proposals and the public find most important. Deciding what not to do must precede a decision of what to do. As the list of potential goals is pared down, there must also be a clear understanding regarding why transportation policymakers should not pursue certain goals. These goals are grouped into two categories:

1. Goals that should not be pursued.
    - Fighting sprawl (i.e. suburbanization, increased auto use)

2. Goals that are worthy, but better achieved through different means.
    - Improving air quality
    - Spurring economic activity

B. A Goal to Avoid: Fighting Sprawl

North Carolina policymakers are clearly very concerned with sprawl, and this concern is deeply embedded in the various urban-rail proposals. Since few land-use topics are more contentious, one must tread carefully when approaching the issue of sprawl. For some, sprawl is like crime—something that is unquestionably bad and clearly government's duty to fight.

Often, sprawl simply means suburban life. It's easy to create a caricature of the suburbs—where miles of soulless strip malls lead to endless tract homes, and where people drive everywhere, even to their mailboxes. However, the growth of suburban life, suburb-to-suburb commuting, and private auto use reflect the choices of millions of Americans who seek to improve their lives. Those who head for the suburbs may seek better schools, affordable housing, safe neighborhoods and a plot of land for gardening or tossing the baseball with the kids. These are not goals to be scorned or penalized through public policy.

Still, sprawl's definition stretches beyond what has been described above. Since sprawl has a cluster of meanings, it makes sense to separate those meanings and decide upon the appropriate course of action for each. In some cases, concerns about sprawl hinge on the perceived negative effects of suburbanization—both in housing and employment. In other cases, sprawl-related concerns are proxies for environmental concerns. The extent that air quality overlaps with sprawl-related concerns will be addressed below. Unfortunately, the highly charged nature of the sprawl debate may actually obscure solutions that offer the most environmental progress. Although local governments rarely cast the issue as such, improving air quality actually has very little to do with sprawl.

North Carolina cities should take a neutral position on sprawl—that is, policy should neither penalize nor subsidize suburban or city life. Local policymakers are mostly in agreement about their desire to curb sprawl; however, those who scorn sprawl often support—or fail to address—policies that show undue favor to sprawl. Property owners and developers should bear the full cost of property development, but should not be forced to subsidize the extension of sewers, roads and other kinds of infrastructure not associated with their own property.

Often the same local governments that vow to resist sprawl with urban rail, actually discourage high-density development. For example, local governments may give in to property owners who protest against condominium complexes. In other cases, restrictive zoning discourages mixed-use developments, or emerging trends like home offices, which can reduce traffic congestion.[19]

Even if it were desirable to use public policy to battle certain sprawl-related trends, such battles may be hugely expensive and perhaps impossible to win. Policymakers will find it more productive to work with demographic trends instead of against them. In some instances, a common goal—such as improving air quality—has little to do with sprawl. In other instances, sprawl-related trends may have more positive effects than conventional wisdom suggests.[20] For example, suburbanization is associated with shorter commuting distances and lighter household costs. Often policymakers eager to increase densities are less eager to

carefully investigate the consequences of higher densities. Higher densities may not provide the outcomes policymakers use to justify their pursuit.

1. Will Higher Densities Improve Mobility?

The three urban rail proposals rest on the assumption that higher densities will improve mobility. The Triangle's Final Environmental Impact Statement (FEIS) warns: "Without compact development supported by a fixed transit system, the pattern of sprawl in the region will continue."[21] While higher densities favor fixed transit systems like rail, North Carolina should closely consider whether resisting suburbanization will actually improve mobility. After all, commuters don't want higher density for its own sake—improved mobility is what they're after.

Urban rail tends to work best in cities where the population density is very high. For example, Hong Kong has a population density of over 120,000 people per square mile. However, no U.S. metropolitan area even approaches such density. Our three most dense metro areas are Los Angeles (about 7000 persons/square mile), San Francisco (about 6000) and New York (about 5300). Manhattan is not categorized as a separate metro area, but it is home to our nation's highest density (about 70,000).

However, high density does not necessarily mean rail will capture a large market share. In Los Angeles, transit's share of motorized passenger trips is 1.6 percent and rail's share is 0.4 percent. For San Francisco the figures are 4.7 percent and 3.0 percent. New York has the nation's highest transit share and rail share at 10.8 percent and 8.2 percent. By way of comparison, North Carolina areas proposals have very low population densities (Table 8).

Table 8: High Density Areas vs. North Carolina Densities

High Density Metro Areas	Population Density
Los Angeles	7,000
San Francisco	6,100
New York	5,300
Miami	4,400
Denver	4,000
Chicago	3,900
NC Densities	
Charlotte	1,700
Raleigh	1,700
Durham	1,800
Greensboro	2,000
Winston-Salem	1,200
High Point	1,400

Source: U.S. Census Bureau, "2000 Primary/Secondary UZA's."

Transit officials tend to de-emphasize average densities since a given project may have a rather narrow geographic focus. And certainly, a given corridor's density may be higher than an urban area's average density. Prudent, residents may ask if it is wise to devote so much money to such a small area, especially when other options are comparatively cheap and would offer more widespread mobility improvement.

Even the areas of highest density are rather sparse. In Charlotte, the average density of tracts within two miles of city centers is still under 2000. That figure is just under 3000 for the Triangle, and just under 2500 for the Triad. Radiating out from those concentrations, the highest densities drop off quickly. It takes only about six miles for all three areas to drop below the 750 persons per square mile mark.[22]

Policymakers in North Carolina acknowledge their regions' comparatively low population densities. In urban rail they see the power to transform population patterns. Policymakers hope that rail will reverse the trend of suburbanization (i.e. sprawl) and encourage compact development. The hope is that people will refashion their lives around a fixed-rail system, and in so doing, more will be closer to jobs and other destinations, such as markets and schools. Such compact development, they argue, will make public transit, walking and biking more viable, and thus improve mobility and reduce congestion.

Local policymakers take great care to place rail lines in relatively dense areas, but, particularly in North Carolina, even these areas don't lend themselves to transit. For example, Charlotte's South Corridor lacks the density to make rail pedestrian-friendly—projections expect only 9.8 percent of passengers to access rail by foot.[23]

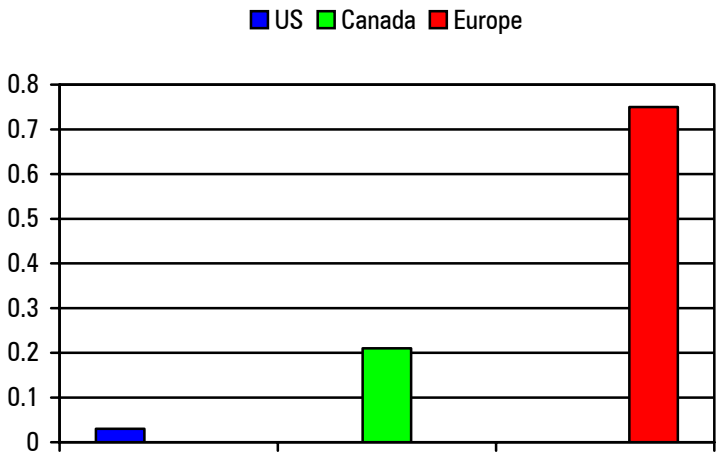
Of course, it is unrealistic to turn any North Carolina city into Chicago, let alone San Francisco or Los Angeles. Moreover, the hope that high densities will improve mobility belies the experience of tourists who are often overwhelmed by the congestion in high-density urban areas. For example, Los Angeles and San Francisco are our nation's densest urban areas, and they're home to the worst and second worst traffic.[24] New York—home to the vast majority of U.S. rail transit use—has a relatively low travel time index of 1.14. However, the figure is significantly lower than might be expected because the Texas Transportation Institute modelers who created the index give large "bonuses" for transit usage. In fact, New York has the highest journey-to-work travel time (34.1 minutes). The tendency for increased density to increase congestion grows even more apparent when examining trends in other nations.

Canada, Europe and Asia seem to have many of the demographic features that local policymakers wish to bring to North Carolina: higher densities, more extensive public transit service, higher transit market shares. Compared to the United States, urban areas are over two times as dense in Canada, over four times as dense in Europe and 14 times as dense in Asia. Compared to the United States, Canadian urban areas offer five times as much transit service per square mile, Europe 16 times as much and Asia nearly 70 times as much.

Higher densities and more transit service help support more transit ridership. Compared to the United States where transit accounts for less than 2 percent of urban travel, transit's market share in Canada is nearly 8 percent, nearly 20 percent in Europe and nearly 40 percent in Asia. However, what these other nations don't enjoy is congestion relief. Compared to the United States, traffic volumes per mile are nearly 20 percent higher in Canada, 50 percent higher in Europe and 80 percent higher in Asia.

While increased population densities make urban rail more viable, North Carolina comes nowhere near the level of density that supports high levels of rail use. More fundamentally, while higher density favors rail, it is generally associated with increased congestion. One reason for the density-congestion link is that—in areas that plan to increase density—there is typically little or no attempt to increase road capacity. Remarkably, not increasing road capacity is often a stated, integral part of local policymakers' vision.

Figure 1: Public Transportation Service Intensity
(Millions of Transit Vehicle Miles per Square Mile)



NOTE: Asian data not shown because it would be difficult to perceive the difference among the rest.
Source: Jeffrey R. Kenworthy and Felix B. Laube, "An International Sourcebook of Automobile Dependence in Cities: 1960-1990" (Boulder, Colorado: University Press of Colorado, 1999).

2. How does suburbanization affect mobility?

Often, public perception associates suburbanization with increased travel time. At first glance, the association seems sensible. After all, if jobs, homes and other destinations spread out, distances between destinations increase. All things equal, longer distances mean longer travel time. However, the suburbanization of housing has occurred alongside the suburbanization of employment and other destinations, which tends to lead to shorter distances. Still, North Carolina rail supporters share the view that suburbanization degrades mobility.

The regions considering urban rail are currently experiencing suburbanization, and related demographic features make these regions all the more difficult to adapt to rail. A rail supporter and former NC DOT planner who was involved with the early stages of the Charlotte and Triangle proposals notes that, for example, the Triangle cannot operate on the traditional hub and spoke premise. [25] The region has no single central business district, and such lack of concentration further complicates the use of a fixed-rail system. One might expect commuters to be less likely to use a transit system whose end station is still far from the workplace.

North Carolina rail supporters fight for something not necessarily worth fighting for (at least on congestion relief grounds)—higher density. Alternatively, rail supporters fight against something that provides many benefits to commuters—suburbanization.

An analysis of data from the Census Bureau's American Housing Survey (AHS) examined the relationship between employment suburbanization and commute *distance*. The authors found that when all employment is considered, job suburbanization shortens average commute distance.[26]

The most sprawling areas have the shortest average one-way work trips, while the densest areas have the longest. Texas Transportation Institute's Roadway Congestion Index averages 1.34 for the least sprawling cities, and 1.07 for the most sprawling.[27]

Table 9: Sprawl and Transportation

Degree of Urban Sprawl	Urbanized Population Density	Journey-to-Work Travel Time 2000	Roadway Congestion Index: 2000
Least	5,379	29.5	1.34
Less	3,542	28.0	1.30
Middle	2,956	28.0	1.14
More	2,639	24.2	1.09
Most	2,146	26.3	1.07
Average	3,318	27.2	1.19

Source: Wendell Cox and Ronald D. Utt, "Transit Advocates Want Working Poor to Use Bikes and Buses, Not Cars" (Washington, D.C.: Heritage Foundation: September 10, 2003).

And, although North Carolina policymakers worry about the cost of sprawl, household expenditures drop with suburbanization. Household expenditures tend to be lower where sprawl is greater. Examining transportation expenditures alone yields no clear trend—costs first rise as sprawl increases, then they fall. The most sprawling cities had the lowest transportation expenditures, with the highest expenditures found in the "middle" sprawl category. However, the combined expenditures of transportation and housing as well as the combined expenditures of transportation, housing and food at home drop as sprawl increases.[28] In other words, the suburbs generally offer inexpensive living.

Table 10: Consumer Expenditures per Household

Degree of Urban Sprawl	Urbanized Population Density	Transportation Expenditures	Transportation and Housing Expenditures	Transportation, Housing and Food at Home Expenditures
Least	5,379	$8,164	$25,552	$29,045
Less	3,542	$8,165	$24,125	$27,023
Middle	2,956	$8,426	$22,934	$26,341
More	2,639	$8,279	$21,602	$24,732
Most	2,146	$7,249	$20,334	$23,363
Average	3,318	$8,071	$22,910	$26,110

Source: Ranked using Bureau of Labor Statistics

C. A Goal to Pursue Through Different Means: Air Quality Improvement

In each of the North Carolina proposals, policymakers expressed great desire to implement transportation policy that would help spur environmental improvement, particularly with regard to air quality. But is urban rail the right tool for the job?

1. Will Urban Rail Improve Air Quality in North Carolina?

Among the top tier justifications for urban rail is that it will take cars off the street and improve air quality. However, to the extent that North Carolina policymakers turn to rail to reduce air pollution, they will invest

in something that has not proven it can achieve measurable reductions in air pollution.[29] The various rail proposals will not make any real contribution to air quality improvement. For example, the Charlotte proposal expects to reduce regional auto travel by only one-tenth of 1 percent.[30] Using optimistic assumptions about rail ridership, a joint report by the Charlotte Department of Transportation and NCDOT projects that rail will cause auto emissions to drop slightly overall, but to increase near station areas.[31]

Table 11 shows that after investing many billions of dollars in urban rail, transit's market share has remained virtually constant. Areas without urban rail have actually realized slightly *less* increase in per capita roadway use. Past experience shows that rail simply does not take enough cars off the street to have any real impact on air quality. Since North Carolinians drive even more than the national average, it is reasonable to be particularly skeptical about urban rail's ability to take cars off the road.

Table 11: Transit Market Share: Pre-Rail and 2000[32]
(for new urban rail systems since 1970)

Urban Area	Years since opening	Base Year	2000	Change
Atlanta	Note	2.5%	1.3%	-45.7%
Buffalo	16	2.4%	2.3%	-4.7%
Baltimore	14	1.3%	0.7%	-46.2%
Dallas-Fort Worth	4	0.5%	0.5%	14.6%
Denver	6	1.1%	1.3%	14.5%
Los Angeles	9	1.0%	1.4%	40.7%
Miami	16	1.2%	1.3%	9.3%
Portland, OR	13	1.9%	2.1%	8.3%
Sacramento	13	0.8%	0.9%	10.5%
Salt Lake City	1	0.9%	1.0%	19.5%
San Diego	18	0.9%	1.5%	62.1%
San José	12	0.8%	1.0%	20.0%
St. Louis	7	0.7%	0.8%	14.8%
Washington	Note	4.1%	3.7%	-10.5%
Average		1.4%	1.4%	-1.2%

Earliest roadway traffic data is 1982. The Atlanta and Washington metro systems opened before 1983, but expanded significantly after that date (150 percent in Washington and nearly 200 percent in Atlanta). Change is measured from 1982.

Assumes the natural urban average occupancy figure for automobiles (1.6). The San Diego light rail system opened before 1983, but has expanded 200 percent since that time. San Francisco's metro system is not included in this analysis because it has undergone little expansion since 1982.

Estimated from Texas Transportation Institute data and National Transit Database.

Base ridership uses average of three years before rail opening.

Source: Demographia, "New Urban Rail and Traffic Congestion," December 6, 2003. Slight discrepancies result from carrying more than one decimal point.

North Carolina's policymakers hope that urban rail will at least prompt compact development, which they hope will eventually lead to improved air quality. As discussed above, policymakers want cities to refashion themselves around transit. High-density, mixed-use developments would then allow more residents closer access to jobs, stores and entertainment. Increased transit ridership would combine with an increased preference toward walking and biking, and more automobiles would be left in the garage.

However, even if this vision does arrive, it may not reduce pollution. In fact, air pollution might even increase. Even in America's densest cities, transit still captures only a fraction of the market share, so most people will still get around by car. More cars headed for the same central district (instead of many dispersed destinations) means more air pollution there. The hallmarks of congestion—stop and go traffic and idling engines—also further increase air pollution. Other nations with higher densities and more transit use have worse air quality than the United States. [33] Even if rail transit could spur significantly higher densities, North Carolina must reexamine what effect it would have on air quality.

2. What Will Improve Air Quality in North Carolina?

a. Recognize That We're On The Right Course

Our nation's air quality seemed to have degraded overnight. When the Environmental Protection Agency announced new ozone standards on April 15, 2004, suddenly 60 million more Americans lived in areas that failed to meet government air quality standards. Even so, the air did not suddenly get dirtier, rather the standards got tougher. If a student passes algebra and then struggles with calculus we don't conclude he's getting dumber. Likewise, even though the EPA identifies Charlotte, the Triangle and the Triad as being in "nonattainment" of the new ozone standard, air quality in these areas has been improving.

The first step to improving air quality is to recognize that recent decades have seen dramatic improvements in air quality and this progress will continue. To many this seems inconceivable. After all, since 1970, the United States has exhibited the kind of growth that most people associate with increased pollution:

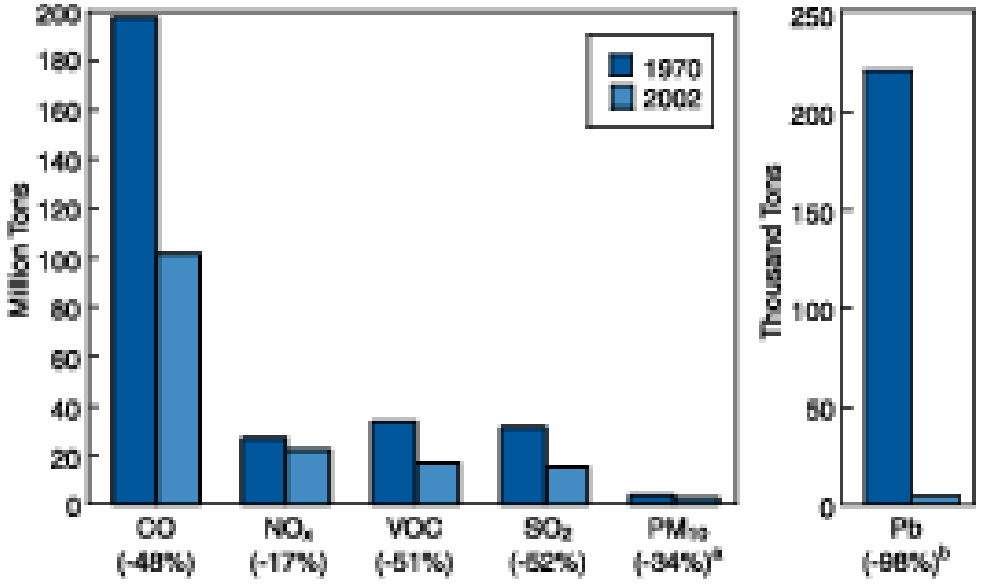
- Gross Domestic Product increased 164 percent.
- Energy consumption increased 42 percent.
- Vehicle miles traveled increased 155 percent.

However, during that time of dramatic growth the EPA reports a dramatic decrease in every major pollutant it measures: "Since 1970, aggregate emissions of the six principal pollutants have been cut 48 percent."[34] Figure 2[35] illustrates the dramatic progress we have made, and the EPA notes that ozone concentrations are at their lowest level since 1980. [36]

Like the rest of the nation, North Carolina has experienced much growth in population and auto use, and like the rest of the nation, air quality has continued to improve. Since 1980, North Carolina's EPA region has seen ozone concentrations fall 13 percent, and 2003 was the state's lowest ozone year in 23 years.[37] During the 1990s, many counties—such as Davidson, Davie, Durham, Forsyth, Guilford, Mecklenburg and Wake—achieved attainment of the 1-hour ozone standard. Counties such as Durham, Forsyth, Mecklenburg and Wake also achieved carbon monoxide attainment during the 1990s.[38]

Today nearly the entire state meets the 1-hour ozone standard, and Figure 3 shows that even those areas that exceed the 8-hour ozone standard do not exceed it by much.[39] Indeed, the EPA expects the entire state to be in 8-hour attainment by 2015,[40] and the entire state is now in attainment for carbon monoxide (CO), nitrogen dioxide (NO2), volatile organic compounds (VOC), sulfur dioxide (SO2), particulate matter (PM10) and lead (Pb). [41]

Figure 2: Comparison of 1970 and 2002 Nationwide Emissions

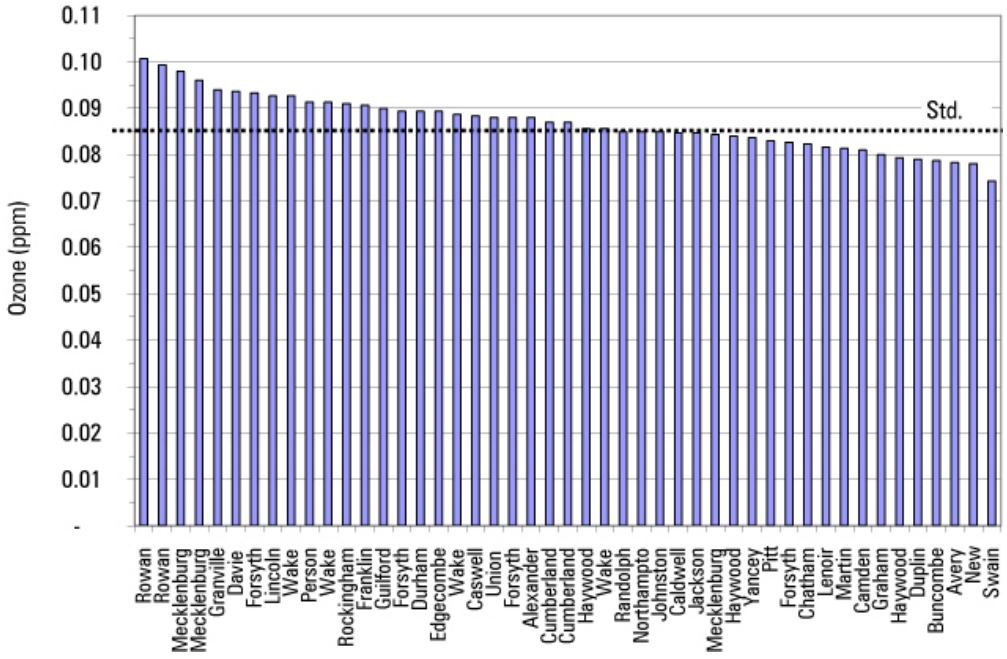


a Based on 1985 emission estimates. Emission estimates prior to 1985 are uncertain

b Values for lead are based on 2001 data; 2002 data for lead are not yet available

Source: United States Environmental Protection Agency, "Air Trends 2002."

Figure 3: Fourth Highest 8-hour Ozone Relative to Standard



Source: Schwartz, "Air Quality in America."

b. Air Quality Improvements Will Continue

Even if the three North Carolina areas have resisted degraded air quality so far, some worry that continued growth will eventually overwhelm the environment and air quality will suffer. However, it's far more likely that air quality will improve in the face of continued growth. The reason is simple: pollution reduction is outpacing growth.

We have yet to experience the full effects of pollution reduction measures already in place. Pollution will further subside as motorists continue to replace older, dirtier, less efficient cars with newer, cleaner, more efficient models. It's true that Americans are driving more, but emissions reductions are outpacing increases in driving. While total driving is increasing by 1 to 3 percent annually, average vehicle emissions are dropping by about 10 percent per year. This means that we are experiencing net annual emissions declines of about 7 to 9 percent.[42]

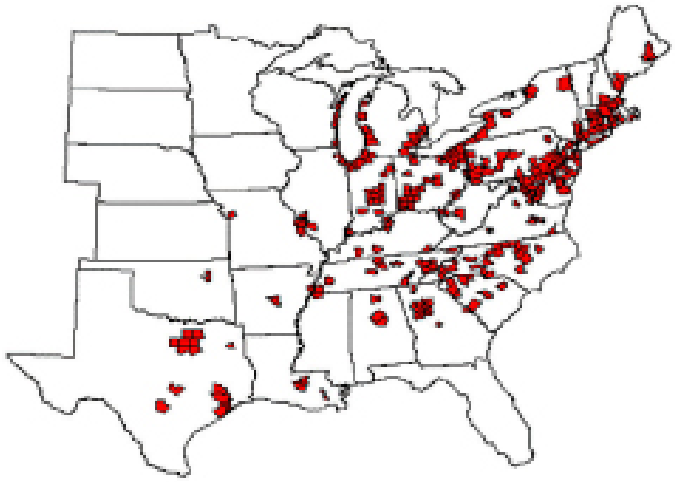
Apart from the continued air quality improvements we will realize from standards already in place, new, more stringent standards that the EPA will phase in during 2004 and 2007 will lead to even greater air quality gains. Depending on pollutant and vehicle type, the new standards will lower emissions by 70 to 90 percent below current standards. Even after accounting for increased growth, total vehicle air emissions will drop more than 80 percent during the next 20 years or so.[43]

The EPA called 2003 "one of the cleanest years on record," and is optimistic about the future:

> *Over the next decade, federal, state and local regulations are expected to further reduce ozone precursor emissions, and, as a result, ozone levels are expected to drop.*[44]

Figures 4A and 4B show the progress the EPA expects by 2015, including statewide attainment for North Carolina.

Figure 4A: Counties Violating the 8-hour Ozone Standard in 2002 (274)



Source: http://www.epa.gov/air/airtrends/pdfs/2003ozonereport.pdf#page=4

Figure 4B: Remaining Counties Like to Violate the 8-hour Ozone Standard in 2003 (34))

Source: http://www.epa.gov/air/airtrends/pdfs/2003ozonereport.pdf#page=4

c. Good News is Hard to Take

Still, people are hesitant to accept the good news. Polls often reveal that Americans think air quality has grown worse in recent years and will degrade even further in the future. Certainly, one source of the misunderstanding is the disconnect between what is plain to see and what is easily overlooked. We can't help but notice increases in population and auto use. We watch as new developments break ground and bring more residents with more cars. As we're stuck in gridlock we have plenty of time to reflect upon the increase in auto use that—all else equal—would lead to more air pollution.

Often there's a sense that Americans have grown complacent—that we aren't doing anything substantial to improve air quality. Of course, much has been done, and much continues to be done to improve air quality.

However, those factors that clean the air are often difficult to see. Most of us do not look over the shoulders of scientists as they try to develop new technologies that meet ever more stringent air quality and fuel efficiency standards. Today's autos are, on average, more than 98 percent cleaner than models from the late 1960s.

Another reason behind public incredulity in the face of air quality improvements stems from popular messengers' tendency to misrepresent the state of air quality. While a complete examination of the methods of misrepresentation is beyond the scope of this report, one common cause of confusion centers on how unhealthy ozone days are measured.[45]

Ground-level ozone forms when oxides of nitrogen (NOx) react with volatile organic compounds (VOCs) in the presence of heat and sunlight. Since the creation of ozone requires heat and sunlight, higher ozone levels occur during warmer summer months. Ozone levels also vary from place to place within a region. While one area of town may experience high levels, another area of the same town may have low levels. Because ozone

levels vary so much from place to place, many counties monitor ozone in several different locations. Unfortunately, air quality reports often fail to account for the highly localized nature of ozone.

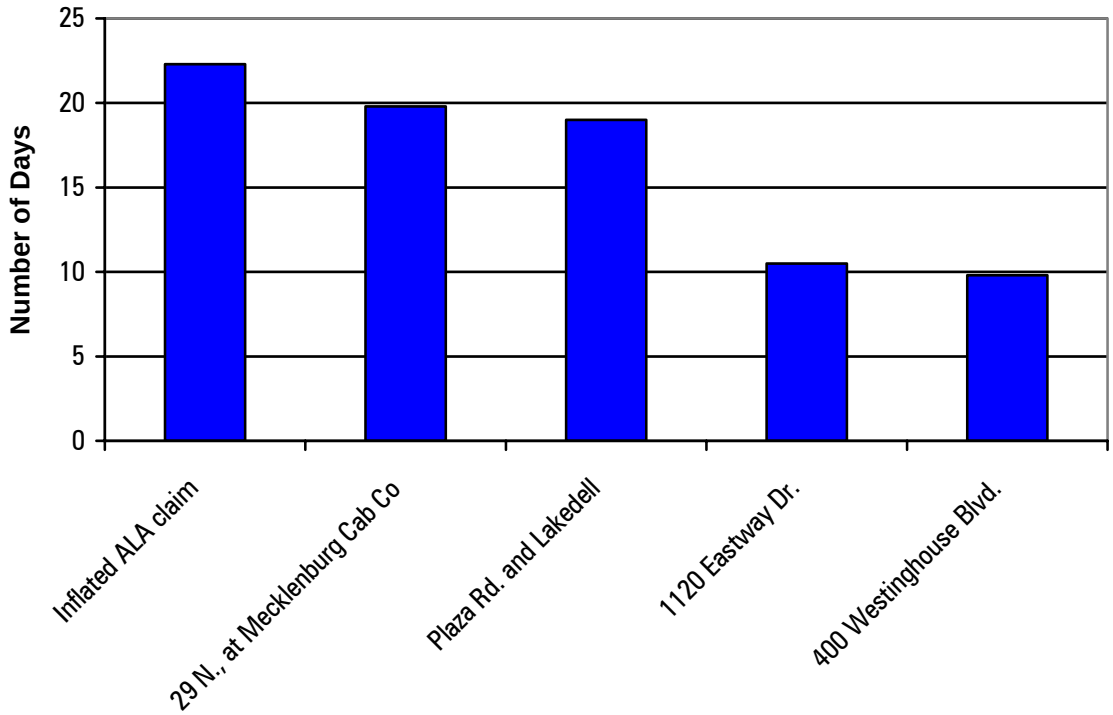
A news report which claimed that the Triad experienced "23 days of unhealthy air quality" during the summer of 2001 did not tell the whole story:

> *In reality, the highest number of exceedance days registered by any single location in the region was 11, and the average number of exceedance days per monitor was a little over seven.*[46]

Today, 38 percent of North Carolina's monitoring sites attain the tough new 8-hour ozone standard, and 94 percent of sites attain the 1-hour standard. Living in a non-attainment area does not mean one constantly breathes air that fails EPA standards. In fact, in 8-hour non-attainment areas, North Carolinians spend about 30 to 150 hours per year breathing air that exceeds standards (and only if they are outside during the afternoon). For the 1-hour standard, the figure drops to between one and 3 hours.[47]

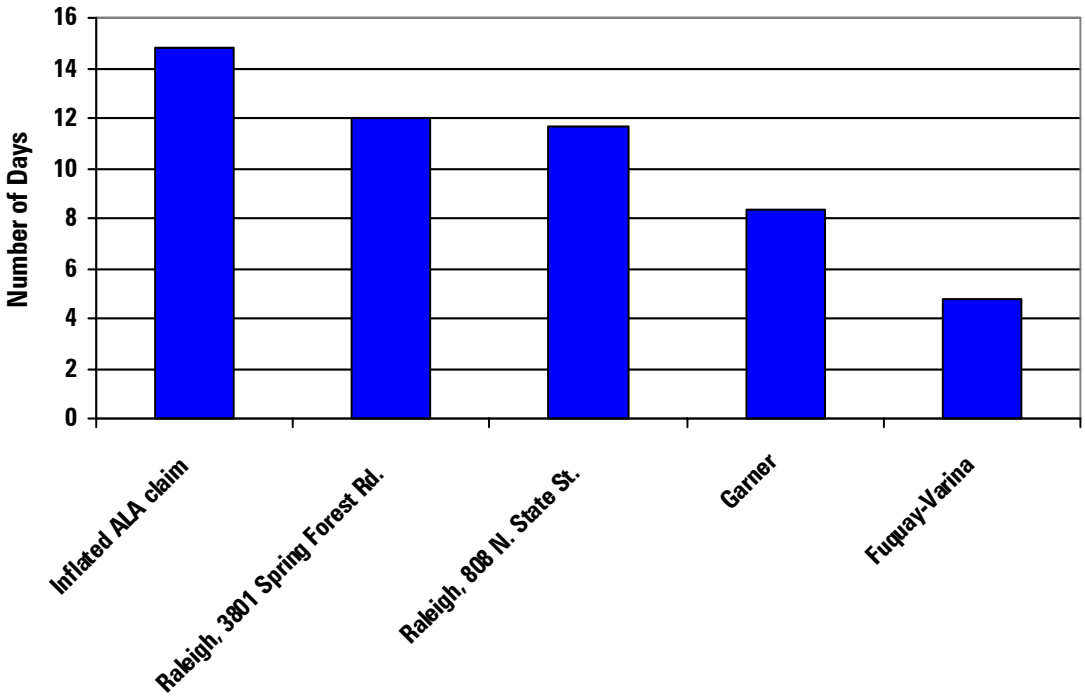
Even the trusted American Lung Association often provides misleading information about air quality. Figures 5A and 5B show how inflated ALA claims compare to actual ozone levels, and Figure 6 shows how ozone levels in Mecklenburg and Wake counties compare to other areas.[48] The ALA gives each county potentially affected by the urban rail proposals failing grades for air quality.[49] Giving Fs to so many North Carolina counties overstates the state's air quality challenges and places these areas in the same category as areas—such as Kern and San Bernardino counties—that have much greater air quality challenges.

Figure 5A: Mecklenburg County: Average Number of Days per Year Exceeding 85 ppb, 8-hour EPA Ozone Benchmark, 1999-2001



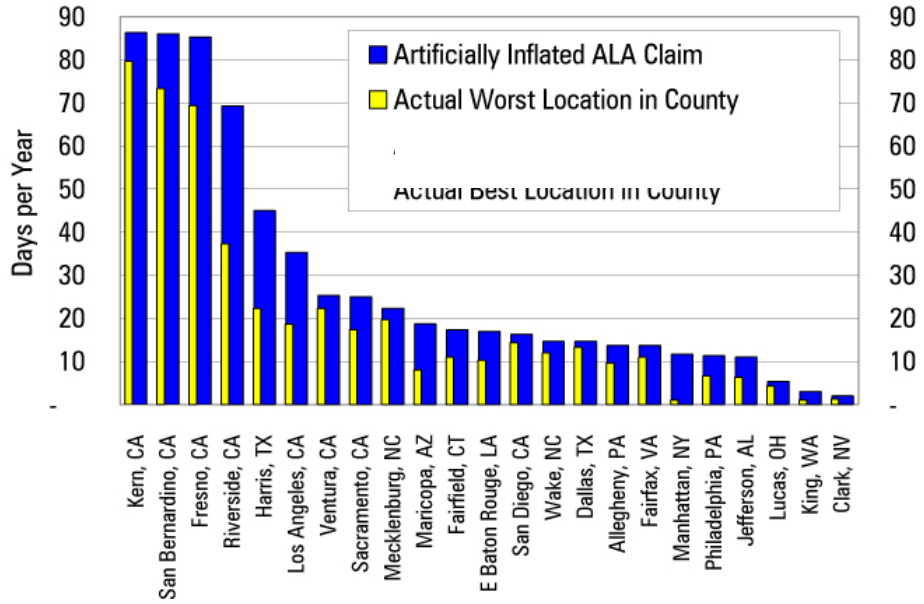
Source: Schwartz, "Air Quality in America."

Figure 5B: Wake County: Average Number of Days per Year Exceeding 85 ppb, 8-hour EPA Ozone Benchmark, 1999-2001



Source: Schwartz, "Air Quality in America."

Figure 6: Exaggerating Air Pollution Levels: ALA's "State of the Air 2003"



Source: Schwartz, "Air Quality in America."

If resources are used to clear air that is already clean, less will be available to tend to the areas that really do need improvement. In other words, exaggerating North Carolina's pollution problem may actually hamper further gains.

3. Are There Better Ways to Further Improve Air Quality?

a. Target Gross Polluters

In some respects, it is good that the public and policymakers do not dwell on the accomplishments of the past. After all, doing so might invite complacency, which could jeopardize future improvements. The Triad's Major Investment Study demonstrates this lack of complacency. Just after the report notes the progress the region has made it notes that tougher EPA standards could threaten the Triad's pollution compliance.

But recognizing air quality's dramatic improvement is not an invitation to complacency. Rather, if we are to continue to make gains we must be clear about what has worked in the past. Certainly, the only way to ensure that we plot a sensible course toward continued improvement is to have an accurate assessment of our starting point.

While only continued vigilance will quicken the pace of air quality improvement, we must ensure that public policy aims that vigilance at solutions that reduce pollution most effectively. Often debates on air quality focus on solutions that would have only a tiny impact on air pollution, and ignore those that would make meatier gains.

Many regard the motorist as the culprit. The unwillingness of so many to give up their private autos and ride transit often provokes frustration. If only more people would put environmental concerns before their selfish preference to remain in their cars, our nation would be able to further improve air quality. Yet this frustration is misplaced, for the issue is not necessarily how *many* autos are on the road, but *which* autos are on the road. The North Carolina proposals are concerned with getting cars off the street, but when it comes to air pollution, all cars are not created equal.

Saying that cars cause pollution is like saying food causes fatness—it doesn't make much sense unless you distinguish the good from the bad. Just like a Twinkie has more calories than a celery stick, so do older autos emit more pollution than newer models. Most pollution comes from a very small percentage of the cars on the road. About 50 percent of on-road carbon monoxide (CO) comes from just 5 percent of the cars. The same is true of hydrocarbon (HC) emissions. In each case the cleanest 90 percent of cars—the low and marginal emitters—taken together generate less than 15 percent of the pollution.[50] The "gross" polluters are typically older, less efficient, less clean autos.[51]

Policymakers often justify the high cost of rail on the grounds that only rail will extract comparatively wealthy motorists from their cars. However, since wealthier motorists are also more likely to drive cleaner cars, these policymakers would pay more to remove the cars that do the least damage to the environment.

Another factor that contributes to pollution—but has little to do with how many cars are on the road—is speed. Cars in congested traffic emit more pollution. Pollution tends to fall as speeds rise to about 50 miles per hour, after which point pollution rises again. While auto speed is another contributor to pollution, it is important to recognize that its significance is small compared to the significance of gross polluters.

> *While speed might make a factor of 2 or 3 difference in how much a given vehicle pollutes, the difference between the VOC emissions of the worst 5 percent of vehicles and the median vehicle is a factor of about 30. Find and repairing or scrapping the gross polluters is far more important than small changes in vehicle speed distributions.*[52]

While working to get motorists out of their cars tinkers around the margins, targeting these gross polluters will greatly reduce emissions. Some areas have already begun to target gross polluters with a technology known as remote sensing.

b. Remote Sensing

Air pollution is not a problem well suited to the broad strokes of most public policy solutions. Air pollution varies greatly from region to region and from car to car, and this variability makes precise emissions measurement essential to reducing pollution.

A remote sensor is an inexpensive and mobile device that offers such precision.[53] The remote sensor can be placed on many streets and highway ramps. As a car passes by, the device shoots an infrared beam across the road. The car's exhaust plume absorbs some of the beam's light waves, thus allowing the sensor to measure the concentration of pollutants in the exhaust.

Video and computer equipment attached to the remote sensor reads the license plates of passing cars, and this gives authorities the capability of sending gross polluter citations by mail. The citation would call for the polluter to take the appropriate action to bring his or her auto into compliance. Certain levels of pollutants or non-compliance may even call for monetary fines. Just as those who drive recklessly are made to compensate society for the costs they impose, so would gross polluters be made to pay for their pollution. Such an arrangement could help pay for the cost of the program. Remote sensing offers the added benefit of making it much more difficult for polluters to bribe smog check inspectors or tamper with a car so it will be clean just long enough to pass the smog check.

In order to ensure that the system does not treat the poor harshly, subsidies could fund repairs that would allow poorer motorists to comply with air quality standards. Even with such subsidies, a remote sensing system would cost far less—and accomplish far more—than our current system of smog checks. Remote sensing pilot programs have enjoyed success in Arizona, California, Colorado and Ontario.[54] California's South Coast Air Quality Management District recently announced plans to implement the nation's most widespread use of remote sensing.[55]

However, as more money is devoted to rail the "all cars are created equal" fallacy will be codified into policy, and less money will be available for more effective pollution reduction strategies:

> *[R]ail projects typically cost about $1 million per ton of ozone precursors eliminated, yet regulators do not consider an air pollution reduction measure to be cost effective unless it costs less than about $10,000 to $20,000 per ton of pollution eliminated. This means that every dollar spent on rail would achieve at least 50 to 100 times the pollution reduction if spent on almost any other pollution reduction measure. In particular, scrapping or repairing gross polluters would achieve at least 200 times the pollution reductions from rail for each dollar spent.*[56]

Those who would improve air quality by removing cars without accounting for the huge variability in emissions between the "typical" car and the few gross polluters, are like dieters whose eating habits don't distinguish between Twinkies and celery sticks. Since remote sensing allows policymakers to target those cars that pollute the most, this technology provides North Carolina with perhaps the most promising way to quicken the pace of air quality improvement.

D. A Goal to Pursue Through Different Means: Spurring Economic Activity

North Carolina policymakers regard urban rail as a tool of economic development and urban renewal. City leaders often maintain particular affection for downtown areas, which are often popular business, tourist and entertainment destinations. It is thought that a permanent structure (i.e. fixed rail) is more likely to spur economic activity, as merchants will enjoy a regular flow of passersby and higher density residential complexes will be able to offer people convenient access to transportation.

1. Will Urban Rail Spur Economic Activity in North Carolina?

Certainly, there are developers who feel comforted by rail's perceived permanence. John Roberts represents the hopes of those developers in the Triangle who have already purchased land near proposed rail stations. He says the rail line was "a 25 to 30 percent factor" in his decision to purchase four acres of property.[57] The $400 million in development near the proposed rail line in Charlotte has encouraged some local officials and even the head of the Federal Transit Administration.[58]

Transit officials interviewed by the GAO echoed the notion that permanent stations and routes are more likely to attract new businesses as well as residential and retail developments:

> *For example, Dallas transit officials cited $800 million in commercial development along its Light Rail line. The Light Rail line itself cost $860 million to build in 1994, so these officials saw the Light Rail line as an excellent investment.*[59]

Even so, the same study notes that other cities have not realized the kind of economic development that was expected. San José for example has seen little development. And certainly John Roberts' hopefulness is not shared by all those in the Triangle's development community. [60]

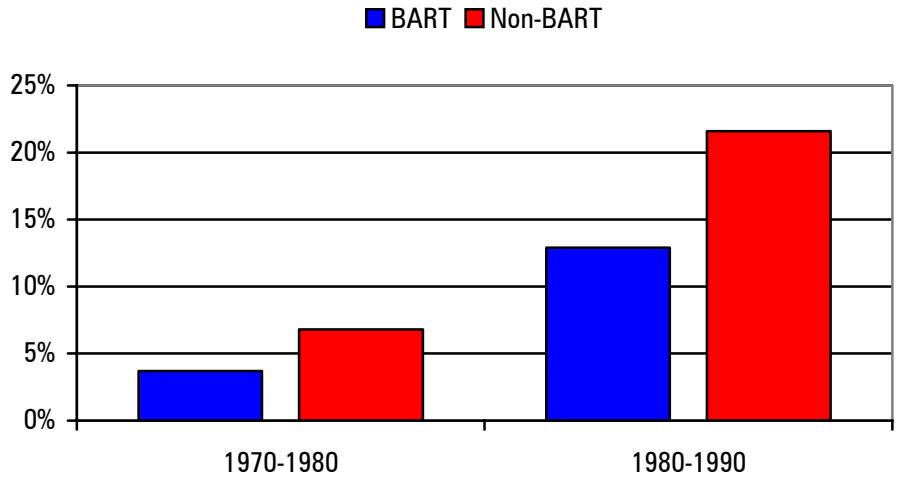
After more than 30 years in operation, even the famous BART system has done little to spur economic activity in the Bay Area. An analysis of BART's performance describes its development effects as "modest."[61] Planners hoped that BART would help the Bay Area resist sprawl and "serve as a catalyst promoting redevelopment and reinvestment in older areas of Oakland, Berkeley and Richmond, while promoting higher residential and mixed-use development in growing suburban jurisdictions."

However, apart from San Francisco itself, population and jobs have grown most rapidly in areas not served by BART. Figures 7 and 8 show population and employment growth in BART-served and non BART-served areas. Those who supported BART did so on grounds very similar to North Carolina's rail supporters. However, BART enjoyed advantages not available in the North Carolina proposals. For example, the BART system is very extensive (over 100 miles long) which means more people could have more access to jobs, shopping and so on. BART is heavy rail, meaning that since it does not have to contend with regular traffic, it can offer commuters faster, more convenient service. Moreover, the order of magnitude difference between

BART and light rail is staggering. During peak hours, BART carries the equivalent of 20 or more freeway lanes of capacity, but there are few light rail lines that reach even one-half lane during peak periods, and perhaps only one—the Long Beach-Los Angeles Blue Line—that exceeds one lane. If—with all its advantages—BART cannot spur significant economic activity, how likely is it that less capable rail will stimulate local economies in North Carolina?

Figure 7: Population Growth: BART vs. Non-BART[62]

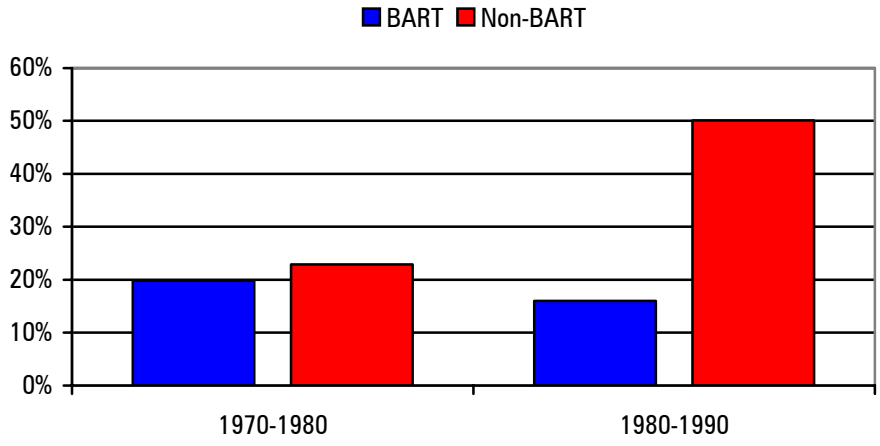
Percent population growth in BART-served (9) and non-BART served (5) superdistricts in Alameda, Contra Costa and San Francisco Counties.



Source: John Landis and Robert Cervero, "Middle Age Sprawl: BART and Urban Development," Access, Spring, 1999.

Figure 8: Employment Growth: BART vs. Non-BART

Percent employment growth in BART-served (9) and Non-BART served superdistricts in Alameda, Contra Costa and San Francisco counties.



Source: Landis and Cervero, "Middle Age Sprawl."

There is no guarantee that rail can even maintain development already in place.
The GAO notes that fixed rail lines cannot easily adjust to new patterns of housing and development:

> *For example, the western portion of the Los Angeles Light Rail Green Line was built in part to provide mass transit service for workers in defense production facilities in Los Angeles. However, by the time the Green Line opened these facilities had been closed.*[63]

When economic activity occurs near proposed rail lines it is often the case that rail simply slipped in front of a moving parade. Even a report prepared for the Charlotte-Mecklenburg Planning Commission concluded that, while rail may play some marginal role in attracting development, other factors drive economic development. In preparing their report, researchers from Robert Charles Lesser & Co., LLC interviewed officials from Dallas, Portland, Oregon and other transit agencies who credit rail with spurring development. However, the Lesser report strikes a skeptical tone:

> *While many on the public relations side of these systems would hope to take credit for drawing development around station areas, development coordinators found it difficult to distinguish between development that occurred as a result of the rail stations and that which occurred independently as a result of broader market driven forces.*[64]

The report applies this theme to Charlotte and credits the south corridor's revitalization to migration of demand from the popular Dilworth neighborhood. Area developers interviewed by Lesser agreed that revitalization is due "almost entirely to other market forces."[65]As is often the case, development wasn't spurred by rail, but by the natural evolution of a gentrification process that had been underway for many years.

The report takes a sober view toward rail's ability to spur development:

> *The most common element concerning development around station locations across the different systems was that while it is very difficult for stations to pull development to an area that would not have occurred otherwise, they can successfully attract a portion of development that is occurring elsewhere in the proximate area.*[66]

Even in the cases where economic activity follows light rail construction, such development may obscure larger development patterns. Development around light rail lines is plain to see, while development fostered by more flexible forms of transportation may be more dispersed, and therefore more difficult to see. Urban rail lines can provide incentives for city leaders to have an unnecessarily narrow view of economic development. Certainly, other areas are also deserving of economic development.

When transit planners devote many millions to urban rail projects they have an incentive to ensure that those projects are perceived as successful. They may resort to offering inducements like free or reduced fares and free parking in order to boost ridership. Similarly, city leaders may turn to subsidies and special inducements to encourage developers to build near rail lines. Even Portland, Oregon's celebrated Orenco Station received many subsidies.[67] The Lesser report notes that special inducements are widespread.[68] Of course, these subsidies are paid, directly or indirectly, by taxpayers.

2. Will Special Inducements Be Necessary in North Carolina?

Certain factors suggest that the North Carolina cities considering urban rail are particularly likely to turn to special inducements to spur economic activity. All the cities in question have very low population densities, and some extremely low densities exist in the Triad. For example, Winston-Salem (1,200 people per square mile) would have to experience enormous demographic shifts in order to support high-density-transit-oriented development. Portland, Oregon's subsidies were referenced above, and—by way of comparison—Portland's density is 3,300 per square mile. If aggressive government support is necessary for transit-oriented development to gain a foothold in areas with much higher densities, what sort of support will be necessary for such development to emerge in North Carolina?

Certainly, policymakers hope that rail will increase densities, but the areas' low-density starting points will make transit-oriented development all the more difficult to achieve. And since the areas have very little experience with high-density developments, developers are naturally apprehensive about investing in a design that has not yet proven it can be successful. It may be that only special inducements will be able to allay such apprehension.

More specific evidence that suggests the North Carolina cities will offer special inducements. Charlotte's Lesser report suggests that in order to generate enough ridership to sustain rail, the local government would have to purchase hundreds of acres surrounding the corridor and subsidize its development. Local developers agreed that the city "will need to be an active player in facilitating development."[69]

Then-Planning Commission Director Martin Crampton challenged the report's conclusions, but several local governing bodies seem to have warmed to subsidies. According to a policy document adopted by the Metropolitan Transit Commission, the City Council and the County Commission, the local government has committed to acquiring land within a quarter-mile of the transit stations. The plan includes business and housing subsidies, most of which will be funded from new taxes, new revenue sources or the expansion of existing sources. The city's director of economic development seemed friendly to the idea of subsidies: "I think that now as we look at redevelopment issues and transit development, we are beginning to recognize that we have to do more to provide assistance to the private sector in concert with their development initiatives. That's what these programs are all about."[70]

A study commissioned by the Triangle Transit Authority (TTA) outlines opportunities for transit-oriented development at each of the Triangle's 16 stations.[71] The study speaks of the public and private sector developing these properties jointly, and recommends that the transit agency take an "entrepreneurial" approach in which it seeks to "become an active participant in land development." This approach includes "direct financial participation" by the transit agencies, including "issuance of tax exempt bonds, low interest loans, loan guarantees, grants, and equity participation." The study also lists buying, selling and leasing land as strategies TTA might want to consider. Some suggested financing tools include tax abatement and "Tax Increment Financing, " which is "a way of pledging some of the increased taxes that result when property is redeveloped to pay the costs of associated investment."

The same study ranked each of the 16 proposed stations by their transit-oriented development potential. Only five were listed as having "high" potential (see Table 12). In other words, even in this corridor, which transit officials hope will have the best chance for robust transit-oriented development, the chances of such development are not promising. Perhaps these rather unfavorable conditions will make local officials particularly aggressive about offering special inducements to business.

Table 12: Station Area Transit-Oriented Development[72]		
Station Area	**TOD Potential**	**Probability of Commercial and/or Residential Development**
Duke Medical Center	Low	Poor
Ninth Street/ Duke East	Moderate	Good
Downtown Durham	High	Good
Alston Avenue/ NCCU	Moderate	Good
North RTP	Low	Poor
Triangle Metro Center	High	Good
NW Cary	High	Good
Downtown Cary	High	Good
West Raleigh	Moderate	Good
State Fairgrounds	Moderate	Good
NCSU	Low	Poor
Downtown Raleigh	High	Good
State Government Center	Moderate	Good
Highwoods	Low in foreseeable future, Moderate in long term	Poor
New Hope Church Road	Low in foreseeable future, Moderate in long term	Good
Spring Forest	Low in foreseeable future, Moderate in long term	Good

Source: Basile Baumann Prost & Associates, "Station Area Opportunities: Next Steps for the Regional Rail Corridor Market Study," Prepared for Triangle Transit Authority, May 20, 2003.

In each case, the proposed rail lines and hopes for transit-oriented development confront an issue that places this kind of development in conflict with rail ridership. To ensure a larger number of initial riders, transit agencies will build parking lots next to station stops. Available parking will likely make it more appealing to those who live out of station walking-distance to travel by rail. However, parking lots increase neighborhood traffic and—since there is less land for compact structures—they make transit-oriented development less likely. Transit agencies are left to try for higher initial ridership or hold out for transit-oriented development to take root.

3. What Will Spur Economic Activity in North Carolina?

a. Improved Mobility

It seems clear that transportation policy should concern itself with transportation. Those interested primarily in economic development should understand that an efficient transportation system is its own economic stimulus. Congestion is often a sign of poor traffic management, but it is also a sign of economic activity. The fact that all three regions experience population growth is an encouraging sign. The people of these areas have created products and services that interest others and congestion is a result of this bustling

economic activity. Those American cities that lose residents year after year are likely envious of the transportation challenges commuters in the Triangle, Triad and Charlotte face.

Even so, failing to address transportation needs will eventually stifle economic activity. The Texas Transportation Institute notes that congestion in the 75 largest urban areas cost Americans nearly $70 billion in 2001. If policy is implemented that actually improves regional mobility, economic activity and development will expand.

The potential economic benefits of transit-oriented development must be considered against the high capital cost of the system, the subsidies needed to prop it up, and potential subsidies to businesses, as well as the effects of passing up the economic benefits of more substantial mobility improvement.

b. Providing a Better Product

One simple yet powerful way to draw people to any area is to consider why people choose to live in one neighborhood instead of another. Homebuyers often seek detached, single family homes with backyards because such accommodations will provide enough space to raise a family. It is unlikely that policymakers intent on bringing people to North Carolina's center cities will be able to compete on these grounds. Suburban life simply offers more space for less money than city living. However, homebuyers don't choose their neighborhoods on the basis of one factor. By improving other aspects that are important to homebuyers, cities can attract more residents, and—by extension—more revenue. An analysis of growth trends by UNC Charlotte's David T. Hartgen suggests that local factors such as schools and taxes play an important role in influencing growth.[73] In other words, a favorable tax climate and good schools can serve as an effective revitalization tool.

A Center for Local Innovation analysis reveals that, compared against statewide averages, two would-be rail areas in particular have especially unfriendly tax climates. Mecklenburg and Durham counties rank in the state's top five for highest amount of taxes and fees paid to local government. Among the cities with populations over 25,000, Charlotte had the highest combined city-county tax and fee collections per capita, while Durham was among the top five.[74]

Washington D.C. is learning a harsh lesson about the link between revitalization and schools. The mayor's campaign to increase the city's population by 100,000 over the next decade has been hampered by a dismal school system. Many young professionals who were drawn to the city before they had children now have families themselves. Given the circumstances many now prefer to move to the suburbs to avoid subjecting their children to the city schools.[75]

c. Listening to Those Who Would Provide Economic Development

Just as North Carolina policymakers can realize revitalization of urban centers by simply providing a more appealing product to those who would live there, so can policymakers spur development by listening to those who would provide such development. As with homebuyers, the desires of business leaders are rather simple and predictable.

A John Locke Foundation survey of North Carolina business executives found that respondents place much importance on relaxing tax burdens and comparatively little emphasis on expanding transit.[76] Most of the

435 respondents reported that the state faces long-term economic challenges, and pessimism was particularly pronounced in the Piedmont Triad.

Other key findings include:

- Asked which factors were most harmful to the state's competitive position, respondents picked North Carolina's high state and local tax burden as the number one impediment to economic growth. A lack of skilled workers, an inadequate education system, and an onerous regulatory burden were also cited as significant factors. Airports, port and rail service, and recreational and leisure amenities were considered the least important.
- Improving the quality of existing roads and expanding North Carolina's highway system were by far the highest transportation priorities for survey respondents. Expanding intercity rail, improving the state ports, and expanding alternate modes of transportation such as walkways and bike paths received low rankings.

Of course, businesses prefer to set up shop and expand in business-friendly areas, and a recent nationwide analysis suggests that the North Carolina areas considering rail have much room for improvement when it comes to creating a business-friendly environment.[77] The analysis included Raleigh-Durham among the "Worst Metro Areas," list, and as Table 13 shows, Charlotte and the Triad were very close to the Triangle in the rankings.

Table 13: The Top U.S. Cities for Doing Business (out of 67 large cities analyzed)

Metro Area	Rank
Triad	49
Charlotte	52
Triangle	55

Urban rail has not shown that it can provide significant economic gains in other areas, and North Carolina's demographics, as well as the desires of those who would provide revitalization and development, make rail's ability to serve as a tool of economic stimulus all the more unlikely.

Part 3

Focus on the Core Mission

The important process of paring down possible goals makes it easier to choose a worthy core mission. And after the paring down process we are left with a goal not explicitly called for in the North Carolina urban rail proposals: cost-effective mobility improvement. This concept returns to the first principle of transportation policy—mobility improvement. The pursuit of mobility will be constrained primarily by one ever-present and formidable factor—funding.

Policymakers' choices are strictly limited by funding constraints. Since transportation funds come from taxpayers, and since those funds are always limited, policymakers must always search to squeeze as much value as possible out of each tax dollar. Today's debt-heavy federal, state and local governments make frugality even more important. Policymakers should only adopt those transportation options that offer the best mix of mobility improvement and cost-effectiveness. Since so much is won or lost in how terms are defined, pursued and measured, it is necessary to note the key features of cost-effective mobility improvement.

A. Key Features of Cost-Effective Mobility Improvement

1. System-wide Perspective

Realizing cost-effective mobility improvement does not necessarily mean increasing ridership in a particular mode of transit, nor does it mean increasing public transit ridership per se. It means using all sensible, cost-effective means available—public and private—to improve overall mobility:

> *[W]hat we are after is mobility, and whether it is achieved by private or public means is less important than having it achieved speedily, efficiently, and at least negative impact on the environment …*[78]

A system-wide perspective also avoids modal and geographic myopia. Policymakers who push for rail projects face enormous pressure to succeed. However, "success" is too often defined in terms of rail's success, and the temptation is for policymakers to succumb to myopia. Transit officials eager make urban rail a success may leave themselves vulnerable to troubling incentives that favor rail at the expense of larger goals. Transit agencies often adopt policies that boost rail's performance at the expense of bus service and other transportation improvements. Many cities set rail fares lower than bus fares or simply offer free rail service at certain times and places.[79] Other inducements, such as free parking at rail stations can inflate rail ridership figures. A Denver survey revealed that rail patrons' most commonly cited reason for riding rail was "free parking."[80]

In an attempt to boost rail rideship, policymakers may neglect other transit modes or private modes of transportation. Policymakers may judge their success based on the small geographic area served by rail and neglect the transportation needs of the larger community. A focus on rail further clouds a system-wide perspective by devoting a disproportionate amount of money to a mode that offers little to the goal of improving overall mobility. If such funding were shifted to less expensive and more convenient alternatives, cities could achieve much greater mobility gains.

2. Ends, Not Means

Commuters care more about getting to work or to an appointment quickly and conveniently, and less about how this goal is achieved. Policymakers should adopt a similar position—that is, use whatever works to achieve a particular transportation goal. Unfortunately, as discussed above, modal neutrality is often sacrificed when transit agencies grant rail preferential treatment. Only a level playing field can reveal if one mode is truly preferable to another or if the game has simply been rigged to ensure a particular outcome.

If a transportation system is to truly emphasize results, it must be measured by objective performance standards. Prior to embarking on a new proposal, the transportation system must have a mechanism in place that allows for success or failure to be judged clearly and objectively. With a cluster of ill-defined goals, measuring success becomes a difficult task. Without an objective barometer of performance, those who might have opposed the proposal initially will likely always be able to claim it was a failure, while those who supported it from the beginning will always be able to claim success. Thomas A. Rubin is the former CFO of the Southern California Rapid Transit District in Los Angeles. He likens urban rail's common lack of clear performance measures to an archer who shoots an arrow into a wall and then draws a bull's-eye around the spot the arrow hits. Since urban rail proposals require large amounts of taxpayer support, it is important that policymakers and taxpayers all have a clear understanding of how performance will be gauged.

Often success is judged by myopic standards, such as cost and ridership projections. A transit agency may deem a rail project cost-effective if it stays within budget. However—as will be examined later—transit agencies generally fail to measure cost-effectiveness using cost projections made at the time of the decision to fund the project, preferring instead to use subsequent projections that have been ratcheted up. Even if the project stays within original cost projections, it cannot be deemed a success if other more cost-effective options were passed up.

Similarly, mobility improvement is typically gauged by ridership projections that are often ratcheted down after the decision to fund the project has been made. Even if the project meets original ridership projections, it cannot be said to have improved overall mobility if ridership represents the familiar "drop in the bucket" when compared against total travel. For this reason, accurately measuring how well a transportation system achieves cost-effective mobility is critical. If the statistics are unclear or incomplete, so will be the actions taken in their name.

Texas is embarking upon a results-based congestion reduction plan that is refreshing in its clarity. The goal is straightforward: The state plans to cut its travel time index "penalty" in half—from 1.30 to 1.15. The standard used to judge possible projects is straightforward: cost per delay hour reduced. North Carolinians could use the Texas example as a template to create their own results-based transportation plan.[81]

B. Will the North Carolina rail proposals provide cost-effective mobility improvement?

Unfairly or not, certain kinds of products develop dubious reputations. Friends or loved ones may advise us to be particularly cautious when, say, buying a used car. The would-be buyer may receive advice of all sorts: Don't pay too much, have the car inspected by an impartial mechanic, don't fall for slippery financing schemes. Certainly, it's wise to exercise extra caution when considering a large purchase, particularly when the product has a well-established record for failing to deliver on promises. When governments make purchases, their responsibility to spend wisely is heightened by the fact that the purchase will be made with other people's money.

When determining whether the North Carolina urban rail proposals will deliver cost-effective mobility improvement, it's important to examine how well rail has delivered on past promises. Unfortunately, past experience reveals a sizable gap between what voters and policymakers think they're purchasing, and what they actually receive. North Carolinians must determine the degree to which past experience is likely to repeat itself in their state, and how this might affect rail's ability to deliver cost-effective mobility improvement.

1. Has urban rail delivered on past promises?

In the early 1970s the Urban Mass Transportation Administration (UMTA) began substantial funding for urban rail projects. Construction intensified after 1980 and for about a decade there was little information available that could assess rail's performance on ridership and cost. The information deficit began to close in 1990 when the U.S. Department of Transportation released a report entitled, *Urban Rail Transit Projects: Forecasts vs. Actual Ridership and Costs*. The report analyzed $12 billion worth of federal money spent on new rail projects, and found that only in Washington D.C. was rail ridership "more than half of that forecast, and even there ridership remains 28 percent below that originally anticipated ... The consistent overestimation of future ridership on recent rail transit projects suggests that, with few exceptions, the levels of travel and related benefits they currently provide are far below those originally anticipated by the local decision-makers who selected these projects. "[82]

In addition to ridership overestimates, the DOT report found that costs were commonly underestimated. Capital cost overruns ranged from 13 percent in Sacramento to 106 percent in Miami. And while operating costs in Sacramento were 10 percent lower than projections for the year 2000, in the other cities actual operating costs exceeded projections by a range of 12 percent to over 200 percent. Moreover, the report found that, with but two exceptions, "actual vehicle-miles of service were only one-third to one half of those originally planned."[83]

The DOT report provoked strong criticism from the transit industry, especially because it used projection data from the beginning stages of projects, not from later, revised projections. Specifically, the DOT report emphasized the importance of using such data since those were the projections "available to local decision-makers *at the time the choice among alternative transit projects was actually made*."[84] Certainly, we understand this rationale in other purchases. For example, we would demand a refund if we ordered a sweater online and it was delivered in a different color and size and for a higher price than advertised.

Other researchers have defended the practice of using initial forecasts.[85] In *A whole-system approach to evaluating urban transit investments* in 2001, Jonathan Richmond, then of Harvard University, notes that policymakers make major decisions based on initial estimates, and even if the estimates prove to be fanciful, the damage has already been done. Often, policymakers have already passed up better alternatives and momentum has swung toward rail. [86]

Richmond sought to update and expand upon the DOT report, and learn whether the practice of overly optimistic projections had changed. Richmond analyzed all wholly new U.S. light rail projects in operation as of April 1997, as well as the reconstruction to modern light rail of a streetcar system in Pittsburgh. Overall, Richmond studied 21 urban rail projects from 11 cities, and found that—even after the DOT report—the promises-made-versus-promises-delivered gap persisted. Again, forecasts overestimated ridership:

> *In few cases has ridership reached initially forecast levels. St. Louis light rail and the San Diego Blue (South) Line have exceeded forecasts by a healthy margin, while the Los Angeles Blue Line is on track to meeting the ridership projected for the year 2000. The San Diego Orange (East) Line has experienced significantly lower ridership than initially forecast, even if its ridership is currently approaching the 2000 forecast made in a subsequent study. In Buffalo, Miami (heavy rail and people mover), Pittsburgh, Portland, Sacramento and San Jose, rail ridership is strikingly less than originally forecast.*[87]

And again, forecasts underestimated costs: "In most cases capital costs have been higher than forecast, in some cases by a large margin."[88] It is often argued that lower operational costs will make up for rail's relatively high capital costs. However, Richmond regards this argument as too narrow. While it is generally true that, compared to buses, rail can carry more customers per driver, maintenance costs for rail tend to be "substantially greater."[89] Richmond finds rail's financial performance "disappointing in most cases."[90]

Table 14: Forecast and Actual Boardings, Buffalo Light Rail

	Average weekday boardings
Forecast for 1995	
1971	160,000
1976	92,000
1978	88,000
1981	45,500
Actual	
1986	17,872
1990	30,010
1995	26,115

Source: Jonathan Richmond, "A whole-system approach to evaluating urban transit investments," Transport Reviews, Vol.21, No. 2, 2001.

Table 15: Forecast and Actual Boardings, Portland Light Rail

	Average Weekday Boardings
Forecast	
1978 for 1990	42,500
1985 for 1987	19,270
Actual	
1987	19,500
1990	20,500
1993	23,700
1996	27,000

Source: Richmond, "A whole-system approach to evaluating urban transit investments."

Table 16: History of Capital Costs, Los Angeles Blue Line Light Rail	
	$ million
Estimate year	
1981	146.6
1982	254-280
1983	350-400
1984	393-561
1985	595
1990	887
Actual	
1996	890

Source: Richmond, "A whole-system approach to evaluating urban transit investments."

Table 17: History of Capital Costs, Portland Light Rail	
	$ million
Estimate year	
1978-I	161.0
1978-II	191.2
1978 in 1986 $	259.2
1980	188.0
1982	328.5
Actual	
1986	321.0

Source: Richmond, "A whole-system approach to evaluating urban transit investments."

Writing in the *Journal of the American Planning Association* in 2002, Bent Flyvbjerg, et al, considered cost projections more broadly in *Underestimating Costs in Public Works Projects: Error or Lie?*. The authors analyzed 258 infrastructure projects worldwide worth $90 billion and asked: "How common and how large are differences between actual and estimated costs in transportation infrastructure projects?"[91] The answer: cost underestimation is very common, but the magnitude depends on the category of project. Of the North American transportation infrastructure projects considered, road projects (24 total) had the smallest cost escalation (8.4 percent) while rail projects (19 total) had the largest (40.8 percent).[92]

Table 18: Inaccuracy of Project Cost Estimates (North America)			
Project Type	**Number of Projects (N)**	**Average Cost Escalation (%)**	**Standard Deviation**
Rail	19	40.8	36.8
Road	24	8.4	49.4
All projects	61	23.6	54.2

Source: Bent Flvybjerg, Mette Skamris Holm and Søren Buhl, "Underestimating Costs in Public Works Projects: Error or Lie?" Journal of the American Planning Association, Vol 68, No. 3, Summer 2002.

When all projects were considered, rail still experienced the highest cost escalation. The authors found that "rail promoters appear to be particularly prone to cost underestimation."[93] Moreover, their findings suggest that cost underestimation has not improved over time: "No learning seems to have taken place in this important and highly costly sector of public and private decision making."[94] For the authors, the key policy

implication of the research is that "legislators, administrators, bankers, media representatives, and members of the public who value honest numbers should not trust the cost estimates presented by infrastructure promoters and forecasters."[95]

2. Beyond Ridership Forecasts

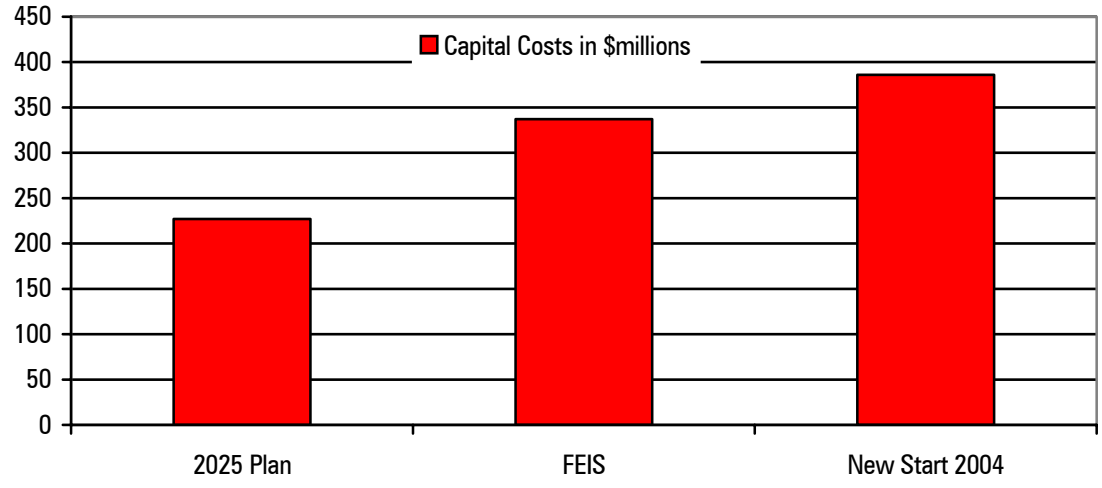
Although there have been some exceptions, the past decades of urban rail projects have taught observers to expect ridership to fall below forecasts and for costs to rise above. While it's important to consider both ridership and cost projections, one should avoid getting lost in ridership forecasts, revised forecasts, and actual ridership figures. Another common practice is to ratchet down ridership projections, thus making projections easier to achieve. For example, in just one year Charlotte's opening year ridership forecast dropped from 12,880 average weekday boardings to 9,100.[96] Still, focusing too much on ridership projections may narrow one's view about a region's transportation needs.

Even in the cases where actual ridership meets or exceeds forecasts, urban rail's effect on a region's overall mobility is still slight. Richmond found that "in no case" had new rail service achieved a noticeable impact on highway congestion.[97]

C. Will the North Carolina Proposals Continue Rail's Pattern of Cost Overruns?

North Carolina's rail projects have already shown themselves to be more expensive than originally planned. Charlotte voters approved that city's urban rail project in 1998, as a part of a larger transit plan. The original $1 billion capital cost has since tripled. Figure 9 shows the inflated cost of the light rail separated from the rest of the transit plan.

Figure 9: Charlotte Light Rail Costs



In the Triangle, a project that was long thought to cost $250 million now stands at over $840 million. Of course, inflation can be a significant factor in cost escalation, but the duration of development for urban rail projects makes it all the more important for policymakers to factor in inflation from the beginning. Additional retaining walls along the rail line increased cost by $13 million, while additional station amenities cost an extra $18 million. Additional construction management, administration and insurance costs totaled $25 million. Insurance costs were not even included in the original estimate.[98]

The Triangle's Final Environmental Impact Statement (FEIS) concedes that the project may require additional funding sources:

> *[T]he Regional Rail project could require additional tax revenues …, delays in construction, some combination of the two, and/or other actions to increase debt service coverage ratios …*[99]

Residents of Charlotte and the Triangle should not be surprised if costs rise even further, and those in the Triad should be prepared for future cost escalation.

1. Additional Costs

Often officials present urban rail as a way for local agencies to grab their share of "free" money. Indeed, non-local revenues generally pay the majority of capital costs, and the possibility of outside funding can prompt agencies to massage ridership and cost projections in order to make their projects more attractive to the Federal Transit Administration and other agencies. However, while the initial capital costs fall mostly to non-local sources, long-term costs—such as operating expenses—typically fall to local funders. Since the federal government generally does not fund cost overruns, local governments must absorb additional costs.

What can further exacerbate problems associated with cost escalation is the uncertainty of urban rail financing. Such additional costs tend to complicate the financing scheme that initially appeals to local policymakers. Again, while the initial cost burden is shouldered by non-local funding, if and when cities face new expenses, the financial burden shifts to local taxpayers.

In both Charlotte and the Triangle new taxes designed to fund urban rail have brought in less revenue than projected. As of October 2003, the Charlotte Area Transit System had collected $15 million below the roughly $200 million projected revenue for that point. Without an up-tick in revenue, CATS would lose more than $100 million over the life of the project. Local funding uncertainties can cause federal officials to waver in their support. Receiving such substantial support from Washington also means dealing with the federal government's persistent delays. Delays in federal funds cost Charlotte taxpayers $1 million per month in higher land, equipment and construction costs.[100] In February, both Charlotte and the Triangle received far less federal funding than they expected.[101]

The combination of cost overruns and revenue shortfalls often prompts local leaders to propose new taxes. The mayors of the Triangle's four largest cities have already considered new taxes and fees, while TTA General Manager John D. Clafin takes an approach familiar in rail cities. He notes that it's easier to raise taxes for expanding rail service after the first segment opens.[102]

Because it is difficult for rail to coordinate with road-based transit, policymakers often hope that more rail lines will improve transit coordination. In other words, the completion of one project often means that local policymakers will pursue new rail projects, regardless of how badly the first project performed. Even chronic

financial problems rarely dissuade policymakers from pushing for new rail lines. After years of cost overruns, delays and funding uncertainties, officials in Seattle recently used the occasion of their urban rail groundbreaking ceremony to call for additional lines.[103]

Seattle's experience follows a larger trend. The GAO weighed the positive and negative effects of rail. One negative effect listed was that "building a Light Rail system can have a tendency to provide a bias toward building additional rail lines in the future."[104] Of the 13 cities that built light rail lines between 1980 and 2000, only one has not expanded its initial system. Expanded rail service may yield certain economies of scale (efficiency) improvements in areas such as maintenance and labor force training. However, any such gains must be weighed against the total resources devoted to rail rather than other transportation improvements. Of the nine cities that had Full Funding Grant Agreements at the time of the GAO report, the cost estimates for the new projects were considerably higher than the completed projects. For the completed projects, capital costs averaged about $34.8 million per mile, with a per mile range from $12.4 to 118.8 million.[105] For the new projects, costs averaged $54 million with a range from $19.5 million to $238.3 million.[106] Of course, it remains to be seen if these new projects will experience further cost escalation.

If the North Carolina rail projects are built, there is good reason to believe that local policymakers will pursue additional projects. Even if the first line fails to deliver on promises, policymakers can assure residents that success is just around the corner, that one more line will help the system operate more efficiently. Indeed, whatever the outcome, the response is almost always the same—more rail.

D. How Much Mobility Have Other Rail Areas Purchased?

As with considerations of cost escalations, it is helpful to establish the framework within which any discussion of mobility improvement must operate. Again, we begin with past evidence and then determine to what extent the North Carolina proposals will follow their predecessors. After all, during the last 20 years North Carolina's predecessors have spent well over $30 billion on urban rail.[107] It's worth noting how much mobility improvement they received for their money.

1. Has Transit Improved Mobility in the Past?

Even if the urban areas considering rail had demographic features similar to older 20th century cities, rail's inherent limitations would still make achieving cost-effective mobility improvement a difficult task. With the exception of New York, in recent decades no American city has shown that transit can capture a significant share of travel, and rail transit fares even worse than transit in general.

However, ever-worsening traffic is not inevitable. Some cities have resisted quite well, but they haven't done it with rail. Table 19 shows work-trip data for urban areas with rail systems built after 1970. In each case, overall roadway traffic increased.

According to the Texas Transportation Institute, the more a city's highway capacity kept pace with traffic growth, the more congestion was kept in check (Figure 10). Cities like New Orleans, Pittsburgh and Tampa fell in the "narrow gap" category—where road growth nearly kept pace (within 10 percent) with traffic growth. Narrow gap cities enjoyed small increases in congestion, while those cities where traffic growth was at least 30 percent greater than the growth in road capacity (categorized as "significant mismatch") suffered

the steepest increase in congestion. Notably, "significant mismatch" cities outnumbered "narrow gap" cities 45 to 5.[108] Certainly, political climate may affect a city's ability to add capacity, and cities should not rely solely on adding capacity, but adding capacity clearly does help reduce congestion. Creative solutions, such as privately financed toll lanes and toll roads, can help cities overcome the severe budget constraints that plague many governments in today's budget deficit climate.[109]

Table 19: Estimated Roadway and Transit Market Share: Pre-Rail to 2000[110]
(Share of passenger miles for new urban rail systems since 1970)

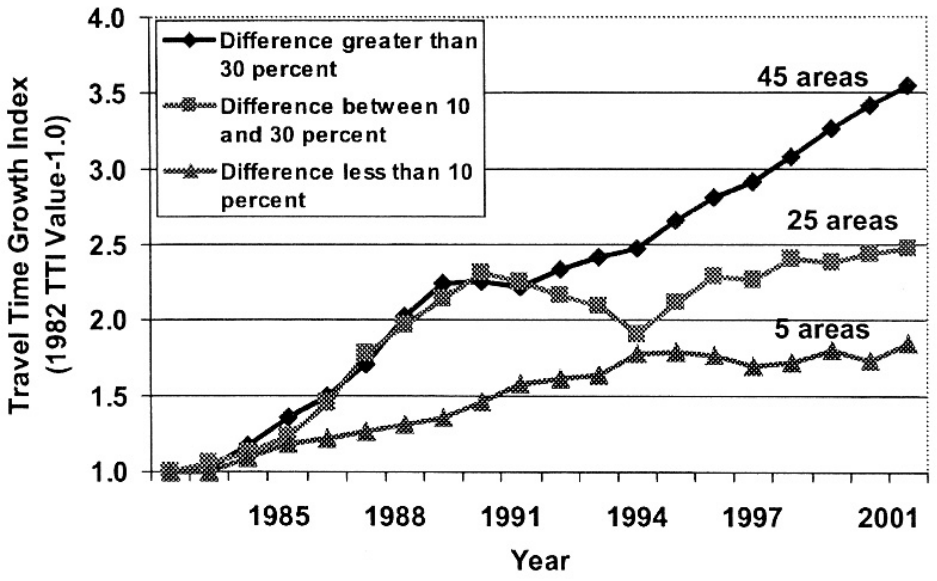
Urban Area	Years since opening	Change in Roadway Traffic	Roadway Market Share: Pre-Rail	Roadway Market Share: 2000	Change in Roadway Market Share
Atlanta	Note	218%	97.5%	98.7%	1.2%
Buffalo	16	67%	97.6%	97.7%	0.1%
Baltimore	14	49%	98.7%	99.3%	0.6%
Dallas-Fort Worth	4	13%	99.5%	99.5%	-0.1%
Denver	6	25%	98.9%	98.7%	-0.2%
Los Angeles	9	11%	99.0%	98.6%	-0.4%
Miami	16	68%	98.8%	98.7%	-0.1%
Portland	13	94%	98.1%	97.9%	-0.2%
Sacramento	13	50%	99.2%	99.1%	-0.1%
Salt Lake City	1	1%	99.1%	99.0%	-0.2%
San Diego	18	88%	99.1%	98.5%	-0.6%
San Jose	12	25%	99.2%	99.0%	-0.2%
St. Louis	7	23%	99.3%	99.2%	-0.1%
Washington	Note	85%	95.9%	96.3%	0.5%
Average		58%	98.6%	98.6%	0.0%

NOTE: Earliest roadway traffic data is for 1982. The Atlanta and Washington metro systems opened in 1983, but expanded significantly after that date (150 percent in Washington and nearly 200 percent in Atlanta). Change is measured from 1982.
Source: Demographia, "New Urban Rail and Traffic Congestion."

For the first time the TTI report estimated the degree to which transit systems reduce congestion. TTI measured the extent of actual congestion and then estimated a larger "base" level that would occur if the transit system ceased to exist. TTI concluded, "Overall, if these [transit] riders were not handled on public transportation systems, they would contribute an additional roadway delay of approximately one billion hours [per year] or 30 percent of total delay."

While these findings seem to prove transit's congestion-relieving effect, they are actually quite exaggerated. TTI's methodological assumption is that if the transit system were suddenly shut down, all transit users would head to the roads with their cars, thus adding to congestion. However many transit users do not own cars—for example, the 2000 National Household Travel Survey found that 44.6 percent of transit trips were taken by individuals who do not own cars. Therefore, those without cars could not add to roadway congestion. It is true, however, that over time some of those without cars may very well find ways to buy them, and this could eventually contribute to more congestion.

Figure 10: Road Growth and Mobility Level



Source: Schrank and Lomax, "2003 Urban Mobility Report."

Of course, TTI considers total transit, whereas this study is concerned more specifically with urban rail. When more popular forms of transit (particularly bus) are excluded, urban rail's effect on congestion is slight. Moreover, TTI calculations don't account for cost-effectiveness, which this study argues is essential for choosing among various transportation options. If funding goes toward policies that offer less mobility improvement per dollar than other options, then it becomes difficult to argue that policy has achieved meaningful congestion relief.

a. Can transit compete with the car?

Since the trend toward private auto ownership is so pronounced, it's unlikely that any form of public transit will prompt a significant amount of motorists to leave their cars. As a society grows wealthier, private auto use tends to become more popular, and public transit tends to lose ground. Journey-to-work figures reveal the strength of this trend. In 1960 the percentage of work trips by auto was 66.9, while 40 years later the figure stood at 87.9 percent. Meanwhile, public transit's share of work trips continues to fall, from 12.6 percent in 1960 to 4.7 percent in 2000. In 2000, the number of people who walked to work and worked from home exceeded the number who used public transit. Urban areas are generally considered to be more conducive to public transportation, but when examining all urban travel, public transit's share falls even lower (2 percent).

Certainly, it is difficult to see the large and growing trend of private auto ownership next to the small and shrinking trend of public transit use, and conclude that public transit has much of a chance of gaining ground. And since the bus is generally the workhorse of public transit, it's even less likely that urban rail will be able to capture a sizable market share. Because of Manhattan's atypically high density, New York City towers above all other cities with a transit share of over 10 percent, and a rail share of just over 8 percent.

Because of that density New York can sustain a heavy rail system that runs (mostly) underground and—unlike other forms of urban rail—has the advantage of avoiding other traffic. In most major urban areas with rail systems, where densities are much lower than New York, rail's share of motorized passenger miles is less than 1 percent. And, in New York (particularly Manhattan), the density of population and jobs, and particularly of trips, means that the roads are extremely congested. Rail does well in New York not so much because it is convenient in and of itself, but because the relative ratio of people who want to, and do, use roads for their trips is so high it makes the private auto a very slow and expensive way to travel. In other words, it is not so much that rail requires density to succeed, but that density destroys much of auto's advantages, thereby making transit more attractive.

Table 20: Census Journey-to-Work Modal Trends (1960-2000)
(percentage of work trips by means of transportation)

	1960	1970	1980	1990	2000
Total Auto	66.9	77.7	84.1	86.5	87.9
Single Occupancy Vehicle (SOV)	Not Available (NA)	NA	64.4	73.2	75.7
High Occupancy Vehicle (HOV)	NA	NA	19.7	13.4	12.2
Public Transit	12.6	8.9	6.4	5.3	4.7
Walk	10.3	7.4	5.6	3.9	2.9
Bicycle	NA	NA	0.5	0.4	0.4
Work at Home	7.5	3.5	2.3	3.0	3.3
Other	2.6	2.5	1.1	0.9	0.8
All	100	100	100	100	100

Source: U.S. Decennial Census, "Supplementary Survey: Journey-to-Work."

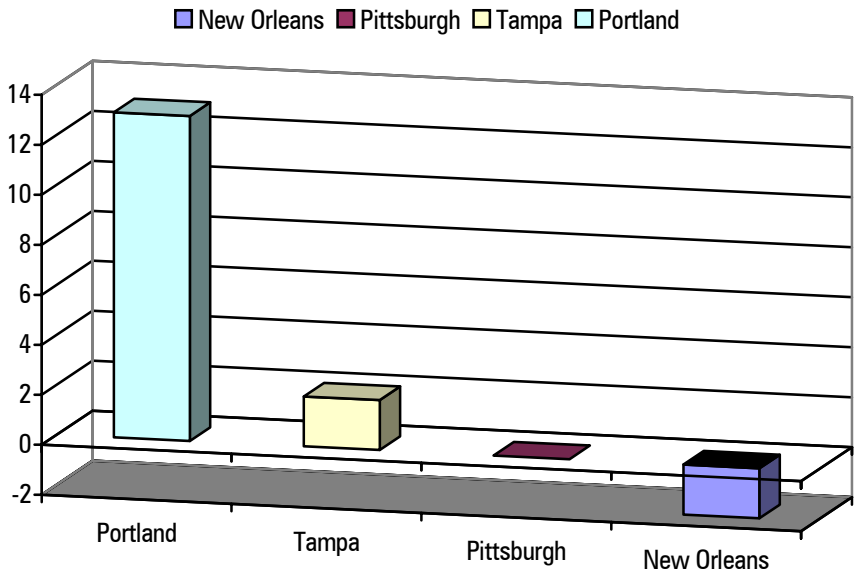
In 2000, 23 of our nation's 50 largest urban areas had rail transit of some kind (light rail, heavy rail, commuter rail). Using Texas Transportation Institute data, a recent Reason Foundation report employed two measures to compare traffic growth in these areas to non-rail urban areas: the travel time index and vehicle miles traveled per person. Among the report's findings:

- [R]ail regions form 16 of the 20 with the fastest-growing travel time indexes and 12 of 20 with the fastest-growing hours of delay per commuter.
- Only three rail regions are among the 20 with the slowest-growing travel time indexes and only four are among the 20 with the slowest-growing hours of delay per commuter. Slow population growth, not rail transit, helped those rail regions escape congestion.
- Some of the largest increases are in regions where rail is supposedly successful. St. Louis and Portland, Oregon for example, both had huge increases in per capita driving.[111]

Transportation planners from across the nation frequently visit Portland, Oregon's light rail system, which is often regarded as the "best case scenario." Even so, Oregon's commitment to light rail has not yielded congestion relief. In fact, congestion is mounting. From 1996 to 2001, Portland was among the nation's leaders in the rate of congestion increase. During that period, Portland's travel time index increased by 13 points. Meanwhile, the three large urban areas in which freeway capacity did the best job of keeping pace with traffic resisted increased congestion very well. Tampa's travel time index increased by a singe point. Pittsburgh's did not increase at all, while New Orleans' actually fell by two points.[112]

It is easy to see why even Portland's light rail system has not brought congestion relief. A very important figure for North Carolinians to consider is 0.9. That represents the percentage of travel urban rail carries in Portland—the highest light rail share in the nation.[113] In other words, the best case scenario for North Carolinians is that rail will account for less than 1 percent of travel. Stakeholders must consider whether a 0.9 percent share would be an adequate return on their investment.

Figure 11: Change in Congestion
(Point change in travel time index 1996-2001)



b. Practical Problems with Transit and Rail

It's easy to see how commuters—particularly those unfamiliar with transit—might get excited about the prospect of urban rail. Perhaps they envision others using rail, thus freeing up the highways for them. Perhaps they envision themselves using it, quietly gliding past congested freeways. But in regions like the Triangle, the Triad and Charlotte where auto use is particularly strong and transit use particularly low, first-time transit users often overlook critical shortcomings. For example, motorists often take the trunk capacity of their cars for granted. Taking transit back from the park may be quite efficient, but taking it back from the grocery store is quite taxing. One need only carry heavy groceries a few blocks to understand why so often the poor buy cars as soon as they're able. Transfers further complicate a simple task like buying groceries.

The general inconvenience of transit is compounded with rail. Since few people live and work within walking distance of fixed corridors, rail transit generally requires more transfers than bus transit. A typical trip may require walking to a bus stop, taking the bus to a rail station, transferring to rail, then walking or taking yet another bus to your destination. Rail passengers often find much of their commute time consumed not by riding the train, but by walking to it, waiting for it and transferring to it, all of which are made especially burdensome during inclement weather.

One must also consider the added inconvenience of waiting at the various stations. Moreover, the driving habits of North Carolinians have evolved the same way as most Americans. Trips often follow elaborate paths as various errands are completed in one trip, a practice called "trip-chaining." Such elaborate maneuvering can never be duplicated with a fixed rail system.

Another factor that is commonly misunderstood is speed. It is often assumed that—since it does not travel on roads—urban rail generally travels at rapid speeds. The proposals tout "maximum" rail speeds of approximately 55-60 mph. For example, Charlotte's rail would be "limited" to 25 mph in certain areas but would be allowed to go "up to 55 mph" in others.[114] Given light rail's national average speed of 15 mph, Charlotte rail patrons should consider themselves fortunate if their line averages speeds of 25 mph.[115] Indeed such a speed would place Charlotte with L.A.'s Green Line as the nation's only light rail lines that meet or exceed a 25 mph average speed.

E. How Much Mobility Improvement Are North Carolinians Purchasing?

1. Triangle Regional Rail

As mentioned above, the true measure of a transportation project should be its effect on overall mobility. Higher transit ridership may be a means to improving overall mobility, but it is not an end in itself. Still, it is worth noting how the Triangle's Regional Rail proposal compares to the two alternatives the federal government mandates transit agencies to analyze: No-Build (where no new projects are undertaken) and Transportation Systems Management ("TSM," where the current transportation system is enhanced).

Although rail is projected to cost nearly 14 times as much as the No-Build alternative, it will provide only 32 percent more transit trips.[116] Rail costs nearly nine times as much as TSM, yet it will yield only 12 percent more trips. Compared to these alternatives, rail's total cost rises even more once operating costs and the costs associated with proposed extensions are considered.

When examined against its effect on congestion relief, the Triangle proposal reveals an even larger disconnect between cost and mobility improvement. FEIS figures reveal that urban rail will have an almost imperceptible impact on congestion. Compared to the No-Build alternative, rail will reduce regional daily vehicle hours traveled by just over 1 percent, and vehicle miles traveled by just under 1 percent. Compared to TSM, rail will decrease vehicle hours traveled and vehicle miles traveled by considerably less than 1 percent (see Table 21).

Table 21: Daily Vehicle-Hours and Vehicle Miles of Travel in 2025[117] (for the 8 county region covered by the regional travel forecasting model)

Alternative	Vehicle-Hours Traveled	Change from No-Build Alternative	Vehicle-Miles Traveled	Change from No-Build Alternative
No Build	2,078,400	--	66,465,800	--
TSM	2,063,700	-0.71%	66,234,400	-0.35%
Regional Rail (LPA)	2,053,300	-1.21%	65,837,100	-0.95%

Source: U.S. Department of Transportation, Federal Transit Administration and Triangle Transit Authority, "Phase I Regional Rail System Durham and Wake Counties, North Carolina: Final Environmental Impact Study and Section 4(F) Evaluation," Research Triangle Park, North Carolina: November 2002.

On the 45th day after Triangle's rail line is opened, congestion will be back to its pre-rail levels. If opened on January 1st, by mid-February the Triangle will have spent $844 million and be at pre-rail congestion levels.[118]

Even after the modest congestion relief disappears, the striking annual cost per new rail passenger ($10,358) will remain.[119]

Figure 12: Capital Cost: TSM vs. Regional Rail

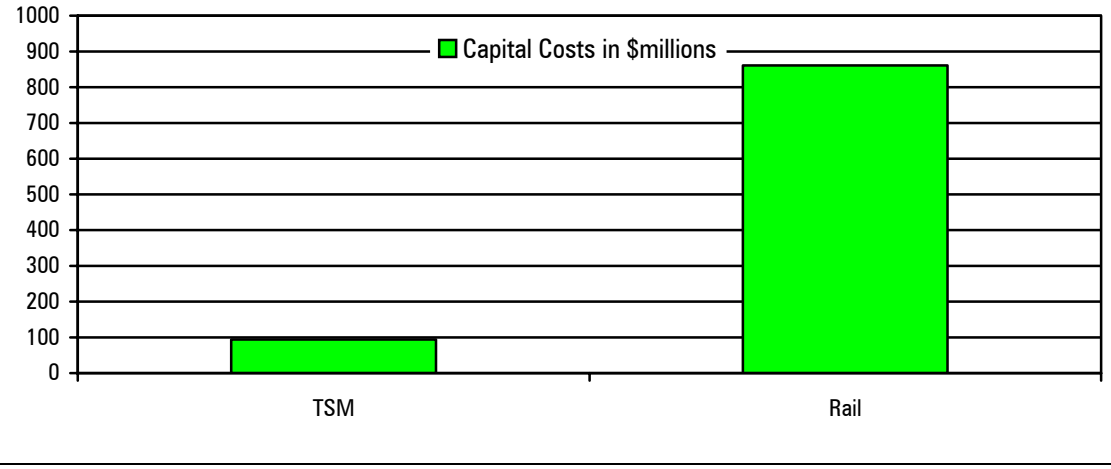
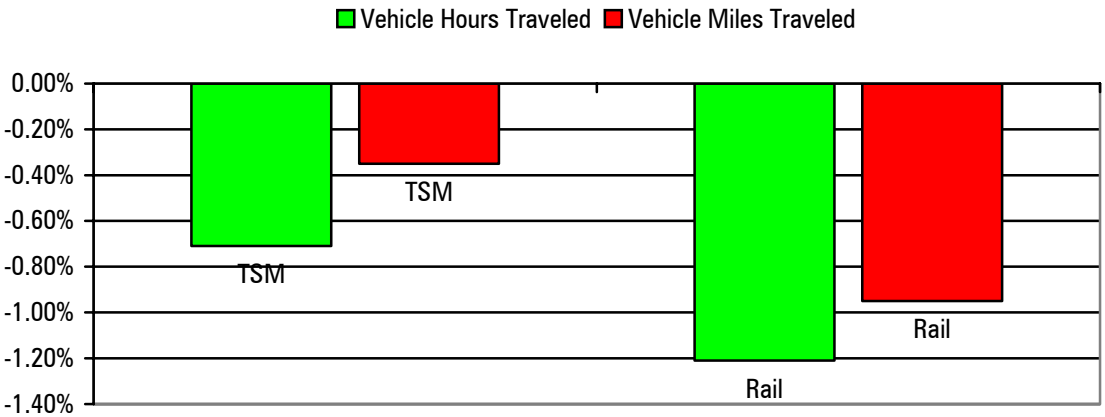


Figure 13: Congestion Relief: TSM vs. Regional Rail



Clearly the Triangle's urban rail proposal was not designed to reduce congestion. Still those Triangle residents who believe transportation policy should help relieve congestion, will want to consider whether it is worth spending over $800 million for 45 days of slight congestion relief. Is it worth it to spend nine times more than the next most expensive alternative, to decrease congestion by less than 1 percent?[120]

2. Charlotte Light Rail

On the first page, Charlotte's FEIS summary laments increased road congestion and a transit system limited by the failing road and highway system. The solution offered in the paragraph that follows isn't reducing congestion or improving roads, but using "transit investment as a tool to focus growth and encourage mixed-use development patterns." Focusing growth is then listed as goal number 1, while "improve mobility" is listed as goal number 3. Moreover, this goal is concerned only with improving *transit* mobility.

According to forecasts, any congestion relief will be barely perceptible (as measured by reductions in vehicle miles traveled and vehicle hours traveled):

> *On a regional basis, the reduction would be relatively small, amounting to approximately 0.1 percent reduction in auto travel with the implementation of the Preferred Alternative.*[121]

It's not even clear if the light rail line would have any noticeable impact on congestion on South Boulevard, the thoroughfare that runs parallel to the proposed rail line. Ridership is expected to be 9100, and even if that projection were achieved it would account for about one-fifth of South Boulevard's traffic. However, residents should not expect traffic to quell by one-fifth. Since typically two-thirds of light rail passengers are commonly former bus patrons who have lost their bus line, only time will tell how many rail patrons actually replace auto trips with rail.

Moreover, any possible congestion relief must be considered against the new traffic associated with rail. The FEIS recognizes that urban rail tends to "concentrate traffic around stations through increased automobile and feeder bus traffic, which may create additional, localized congestion." Indeed, projections expect nearly 40 percent of passengers to access rail by car. [122]

While light rail is projected to have such a slight impact on congestion, it costs $378 million more than the No-Build Alternative.[123] The huge disparity between project costs and returns is even more dramatic when examined on a per-unit-of-congestion-relief basis.

Table 22: Light Rail's Congestion Relief Cost (vs. No-Build)	
Cost per vehicle trip reduced	$43,725
Cost per vehicle mile reduced	$9,578
Cost per vehicle hour reduced	$384, 537

At $6,747, Charlotte's annual cost per new rail rider—although less than the Triangle—is still steep. [124]

a. Did Voters Expect Congestion Relief?

It's difficult to determine to what extent voters expected light rail to bring congestion relief when in 1998 they approved a sales tax increase to fund the transit project. In an editorial just prior to the vote, The *Charlotte Observer* seemed to suggest that it was common knowledge the transit project would not reduce congestion:

> *Will building a transit system reduce traffic congestion? No. The area's growth will produce more traffic, with or without a transit system. Transit will, instead, offer the option of a reliable, efficient trip, versus the unpredictability and annoyance of traffic congestion.*

Still, voters hoped that, although not the primary goal, improved transit would eventually relieve congestion. The same *Observer* editorial seems hopeful that the tax will at least restrain the increase in congestion:

> *Will a transit system erase air pollution problems, which are fed primarily by automobile use? No. Again, growth brings traffic, which brings air pollution. As with congestion, though, transit can make conditions better than they would be otherwise.* [125]

Mayor Pat McCrory seemed similarly hopeful: "Charlotte and Mecklenburg County have sent a strong signal to the rest of the nation—and especially to the rest of the state—that there is a serious concern about transportation, congestion and the environment."[126] Even today residents seem to have different expectations about how much congestion relief light rail will provide.[127]

Since voters had to decide on a package of transportation options that included money for bus, urban rail and roads, they were unable to vote on the relative worth of each investment. Perhaps more importantly, we will never know how or if the vote would have been different if voters knew that the proposal would spend hundreds of millions on light rail, but have no or virtually no impact on congestion.

3. Triad Fixed Guideway Transit

The Major Investment Study pays special attention to comparing two transit alternatives: Rail Diesel Multiple Units (DMU) and Bus Rapid Transit (BRT). Under each alternative, the project length is significantly larger than either the Triangle or Charlotte proposals (22 stations and 110 miles of track for DMU rail vs. 23 stations, 90 miles of guideway for BRT). The Triad proposal offers a convenient opportunity to compare urban rail against a transit alternative that, although frequently dismissed by transit agencies, generally offers more cost-effective mobility improvement.

For each proposed corridor, BRT is much less expensive when considering either capital or operating costs.

Table 23: Cost (in millions): Rail vs. BRT

	Rail DMU Costs		BRT Costs	
Proposed corridor	**Capital**	**Operating**	**Capital**	**Operating**
Burlington to Clemmons	$716	$32	$389	$12
High Point to Greensboro	$382	$12	$104	$3
High Point to PTI Airport	$443	$12	$106	$3
High Point to Winston-Salem	$545	$17	$58	$3

If the Triad were to adopt rail for each corridor the total capital cost would be $2.1 billion and provide 16,730 daily passenger trips. If BRT were adopted for each corridor the total capital cost would be $657 million, and provide 15,858 daily passenger trips.[128]

In other words, under the all-rail plan, the Triad would spend over three times as much to purchase 872 more daily passenger trips. The taxpayer cost of each of those additional trips would be an astounding $1.7 million per trip.

Figure 14A: Capital Costs: All Rail vs. All BRT

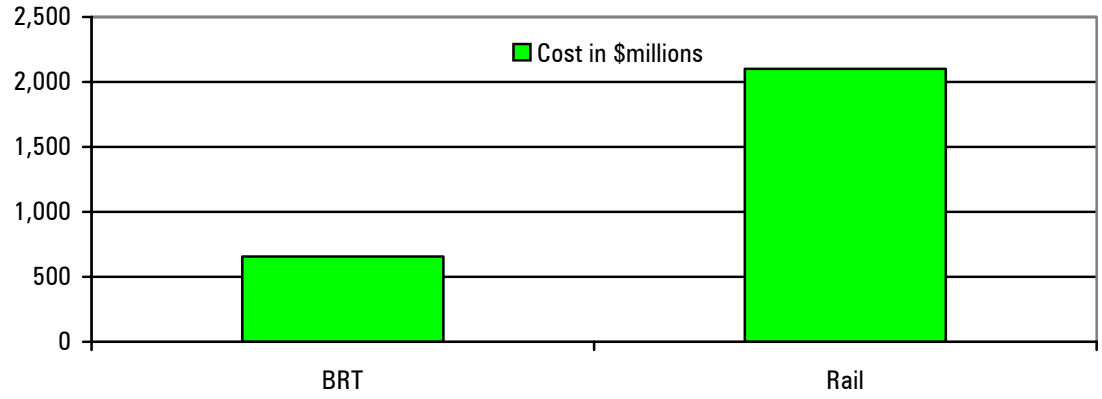
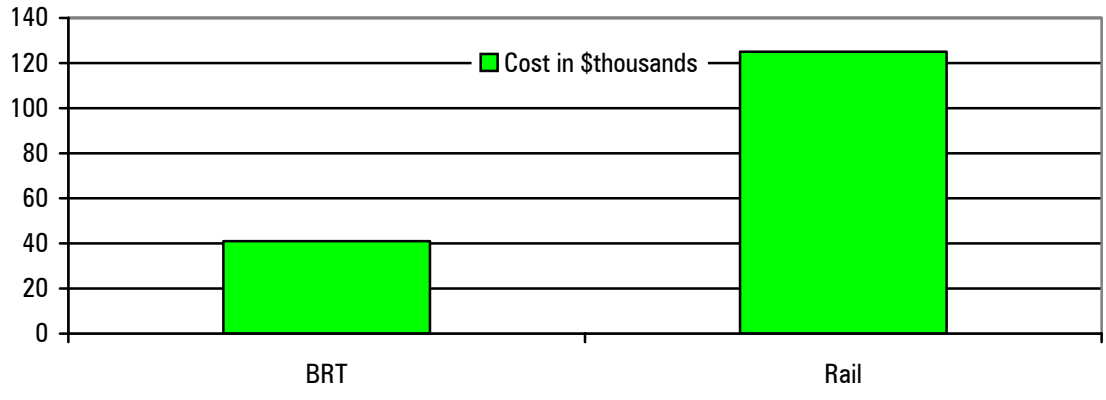


Figure 14B: Capital Cost Per Trip: All Rail vs. All BRT



4. Urban Rail vs. Local Characteristics

Past evidence shows that the billions spent on urban rail have yielded virtually no mobility improvement, and analysis of the specific North Carolina proposals reveals that any mobility improvement will be extremely slight. Any analysis of the North Carolina proposals must occur within the context of local demographic and travel characteristics.

Certain demographic features make it more likely that rail will be able to capture a sizable amount of market share. However, North Carolina's demographics make rail's success particularly difficult to achieve.

a. Low Population Densities

If rail is to truly help improve overall mobility it must be facilitated by high population densities. Rail works best when high densities are combined with commuting patterns that move back and forth from a dominant

central business district. Such commuting patterns were common in the hub-and-spoke cities of the first half of the 20th century. During the latter parts of the century, cities began to change from hub-and-spoke to networks of subcenters. More people began to live, work and commute outside the central city.

This trend toward suburbanization is particularly pronounced in North Carolina, where there is hardly a trace of the old-style hub-and-spoke city layout. University of North Carolina at Charlotte's David T. Hartgen uses the term "rurban" to describe a state that has developed demographic patterns distinct from traditional urban areas, where population densities are low and dispersed commuting patterns have replaced the traditional commute to and from the central city.

Hartgen notes a trend in which North Carolina's smaller urbanized areas have experienced recent increases in densities, while the larger urban areas—because they have grown more in geography than in population—have decentralized. Of the urban areas considering rail, only High Point has experienced an increase in density from 1990 to 2000. Even so, at just over 1400 people per square mile, High Point's density remains very low. The other urbanized areas have experienced declines in population densities ranging from Raleigh's 2.5 percent to Winston-Salem's 22.4 percent.[129] The North Carolina urban areas considering rail have low densities and are becoming increasingly suburban, meaning that both absolute terms and observed trends work against rail's success.

b. High Auto Use, Low Transit Use

Another factor that aids in rail's success is a population that has shown a willingness to use transit in relatively large numbers. Certainly, a "chicken or the egg" kind of dynamic may be at work in North Carolina, where it's difficult to determine if the state's strong preference for auto use is a cause or effect of its "rurban" demographics. Still, the fact remains that North Carolinians overwhelmingly find private auto travel to be more conducive to their transportation habits than transit. Table 24 shows that in those areas considering urban rail, work-trip auto use is well above the national average and transit use is well below. Such commuting patterns will make it particularly difficult for rail to capture a significant share of work trips.

Still, the general manager of the Charlotte Area Transit System (CATS) reportedly hopes to increase transit's transportation market share to between 15 and 20 percent.[130] To put such optimism in perspective, achieving a 20 percent share would mean roughly doubling the transit use of New York, our nation's transit leader. Achieving such transit ridership with Charlotte's unfavorable features would certainly be a historic achievement.

Table 24: Journey to Work Census Data

	Auto's Share 2000	Transit's Share 2000
National	88 %	5%
Charlotte	94 %	1%
Triangle	91%	2%
Triad	94%	1%

In short, North Carolina's specific features coupled with past evidence make it extremely unlikely that urban rail will bring cost-effective mobility improvement to North Carolina.

Part 4

Be Realistic.

If the current course of investing heavily in urban rail is unlikely to bring cost-effective mobility improvement, what will?

First, policymakers must adopt a realistic approach to transportation policy, an approach that analyzes society with sober eyes, and recognizes the world as it is and as it is likely to be in the future. Moreover, a realistic approach appreciates the limits of public policy's ability to shape a specific future.

Second, policymakers must be realistic about what transit can and cannot accomplish. Instead of focusing on those who already have many transportation options, policymakers should serve those most in need of mobility improvement—the transit-dependent poor.

Finally, policymakers can move from considering goals and frameworks to choosing specific transportation policy options that have yielded success elsewhere.

A. Prepare for the Future

An unknowable future leaves transportation planners with two options:

1. Use policy to attempt to forge a specific future and tailor the transportation system to that vision; or
2. Embrace flexibility and create a transportation system that can adjust to a changing future.

Predicting the future is tricky business. Even if we accept the forecasts for continued population growth for Charlotte, the Triangle and the Triad, many questions still remain about the decades to come: What will the magnitude of the population increase be? Where will population increase and where might it decrease? What will housing patterns look like? How might commuting patterns change? How might improved technology change transportation policy?

Policymakers who refuse to surrender to an unknowable future seek to use urban rail and other policy tools to try to forge a specific vision. Instead of choosing a flexible transportation system that would evolve as demographic patterns evolve, policymakers regard rail's rigidity as an asset. For example, the Triangle's FEIS warns that without a fixed guideway system, a transit system "could be subject to route modifications as the economy of the area thrives or deteriorates, and as ridership on the system changes."

It may seem odd that transportation planners would so flatly decry the sort of flexibility that would allow the system to adjust to an unpredictable future. But the planning documents for all three of North Carolina's urban rail proposals make it clear that officials don't want to build the transit system around society, they want to build society around the transit system. Public officials often speak of the need to mix transportation policy with land use planning. However, allowing policymakers to mix transportation with land use invites local governments to focus more on buying, selling and shaping property and less on improving mobility within the society that already exists.

And, if predicting the future is tricky, using public policy to forge a specific future may be even trickier. The GAO notes that fixed lines "cannot easily change to adjust to new patterns of housing and development," and—as noted earlier—Los Angeles's experience with the Green Line illustrates that point.[131] Even with generous funding and careful planning, it is difficult to use public policy to forge a specific future.

Since rail project costs are typically high and since funds are focused on a very specific geographic area, rail advocates risk a "too many eggs in one basket" problem. Devoting so much money to one mode of transportation in one area means putting enormous faith into policymakers' ability to either predict the future or forge one that will conform with their plans.

A flexible transportation system recognizes that predicting the future is tricky business, and shaping policy around a fixed vision of the future risks squandering tax money on a gamble. Flexibility leaves policy best prepared for an unknowable future. Only a flexible transportation policy can improve mobility by working with demographic trends. Only a flexible transportation policy is a realistic one by serving the trips that exist today as well as trip needs that emerge over time. Flexibility means investing in infrastructure that can serve multiple modes, for example roads that serve motorists, shared rides and BRT.

B. Work with Demographic Trends

As noted above, certain powerful demographic trends have transformed American society from what it was a century ago. Urban rail could only succeed if these trends reversed, but the strength of these trends suggests that embarking on a battle against them would be unrealistic, hugely expensive and probably futile. These trends are particularly strong in North Carolina, making any campaign against them in this state especially futile.

Unfortunately, much of the debate surrounding sprawl is cast in emotional terms, for example, those who love cars versus those who hate them. Decision-makers should separate the following observations regarding auto use and suburbanization from such a dichotomy. These observations merely describe past trends and suggest that it's realistic to assume that these trends will continue. If we are to address society's transportation needs effectively, we must recognize society for what it actually is, not for what we wish it might be.

1. Suburbanization

As people once left their farms in hopes of finding better lives in the city, they now leave the city in hopes of finding better lives in the suburbs. Suburbanization is most commonly thought of as people choosing to live outside the city, but employment has also decentralized. Over the last few decades, as jobs have moved

outside the city, suburb-to-suburb and rural-to-suburban commuting have become increasingly common. People head for the suburbs for reasons important to them—including better schools, safer neighborhoods, more property, and a larger home to raise children. Since it's unlikely people will suddenly regard such motivators as unimportant, it's likely that suburbanization will continue.

Indeed, even groups critical of suburbanization are beginning to concede that it's difficult to sell homebuyers on high-density, mixed-use living. The National Center for Smart Growth Research and Education recently analyzed over 48,000 real estate transactions near Portland, Oregon, and found that "consistent with previous market surveys, people prefer neighborhoods with low population density and low dwelling-unit density."[132]

North Carolina's history and demographics make rail-supportive, high-density development particularly unlikely. Even the state's more developed regions are better described as "rurban" rather than urban. Charlotte's central business district provides only a tiny share of the area's total employment, and embedded within the names "Triangle" and "Triad" is a recognition that these regions have no one, dominant, central business district. Urban rail's primary function is bringing people to the central city, but where there is no central city, rail has much less chance of attracting widespread patronage.

2. Auto vs. Transit

Nationwide, transit's share of transportation is tiny and shrinking, while the private auto's share of transportation is large and growing. Even mounting congestion and huge investments in transit have failed to reverse this trend. For over 30 years, transit subsidies have greatly surpassed highway subsidies. Transit subsidies now average 50 cents per passenger mile, while subsidies for highways and surface streets average 0.4 cents.[133] The transportation investment priorities of many cities reveal huge disparities between transit and highways. For example, Portland, Oregon plans to spend 61 percent of its transportation capital funds on transit even though it accounts for only 2.1 percent of passenger miles. Minneapolis-St. Paul plans to spend 70 percent on transit even though it carries only 1 percent of travel. In San José the disparity is even steeper. The county is spending 80 percent of its transportation capital funds on transit, even though it carries just 1 percent of regional travel.[134]

Large investments in urban rail do little to change transit's market share. As noted above, Portland, Oregon is urban rail's "best case scenario" in terms of transportation market share. However, for those who hope rail will lead to greater transit use, San Diego is the "best case scenario." While the percent increase in transit's market share since rail appears quite substantial (62.1 percent), transit's total market share is still very small (1.5 percent). The average change in transit market share was –1.2 percent.[135] North Carolinians should consider the kind of returns on investments other rail cities have realized.

As with suburbanization, Table 25 shows the dominance of the private auto is a trend that is very strong nationwide, and even more pronounced in North Carolina.

Since auto ownership so greatly expands economic opportunity, North Carolina policymakers should not consider it a defeat when someone of modest means leaves the transit system and purchases an automobile. Bus service should be improved for those who have no other transportation alternative, but policymakers should consider it a victory when the poor are able to improve their lives even more with auto ownership.

Table 25: Journey-to-work Census Data								
	% drove 1990	% carpool 1990	% combined auto 1990	% transit 1990	% drove 2000	% carpool 2000	% combined auto 2000	% transit 2000
National	73.2	13.4	86.6	5.3	75.7	12.2	87.9	4.7
Charlotte	78.8	14.5	93.3	1.8	80.9	12.9	93.8	1.4
Triangle	77.4	14.2	91.6	1.8	78.5	12.9	91.4	1.7
Triad	79.3	14.5	93.8	1.1	81.2	13.1	94.3	0.9

And like the recognition of homebuyers' preference for low-density living, recognition of the auto's central role in American transportation is beginning to come from unlikely sources. As noted earlier, planner Rich Carson promotes "urban realism," which takes a realistic view of the auto's place in society:

> *There will be more cars in the future, not less. Until someone invents the Star Trek teleporter and gets to 'beam me up Scotty' there will be more automobiles.*[136]

Americans are often said to be "in love" with their cars, sometimes even "addicted" to them. However, high auto use has little to do with an irrational attachment. In most cases, cars simply offer the fastest way to get somewhere.

3. Serve the Poor First

Those most likely to use public transit are those who are poor and have no other transportation options. Few things improve a poor person's chance for upward economic mobility more than improved transportation mobility. Greater mobility means greater access to employment and educational opportunities. Since transit funds are limited, they should be directed to first serve the transit-dependent poor in order to help them on their way to economic advancement. And since it is unrealistic to assume that transit—particularly rail transit—will ever account for a sizable share of transportation, agencies have even more reason to first serve those who need transit most.

It is also far more cost-effective to serve the transit-dependent poor than to try to attract "choice" riders to public transit. For example, attracting a new rider to Houston's Main Street line costs nearly 10 times as much as attracting a new rider to bus. In Los Angeles it costs over 12 times as much to attract a new rail patron.[137] By way of comparison, prior to embarking on urban rail, Los Angeles increased transit ridership by 40 percent in the 1980s, simply by cutting bus fares from $0.85 to $0.50.[138]

Rider surveys reveal straightforward approaches to improving public transit. Bus patrons are rarely concerned with the ambitious goals often used to justify urban rail projects—they simply want more routes, and faster, more frequent, more reliable service. Perhaps the most troubling effect of urban rail projects is that they divert money from bus service, the transit mode that offers the poor the greatest amount of mobility improvement.

Unfortunately, policymakers have often spent scarce funds trying to entice middle-class motorists to transit instead of improving mobility for the transit-dependent.

> *With the emphasis on attracting "choice" riders to rail, the lot of those without a choice has frequently worsened as alternative through bus services have been discontinued to encourage rail ridership.*

> *Journey times compared with those by direct bus have often increased for passengers who must now make a transfer from bus to rail.*[139]

a. Rail's Historical Impact on the Poor

The present North Carolina urban rail proposals risk continuing the trend toward devoting scarce transit resources toward the comparatively wealthy, at the expense of the poor.

Policymakers tend to agree that the only mode of transit that wealthier motorists would consider is rail. Since mobility increases with income, middle- and upper-class commuters already have more transportation options. They are, therefore, less likely to choose transit on their own, and future ambitious attempts to change their minds are likely to be as expensive and unsuccessful as they have been elsewhere. Since policy decisions are always bound by economic constraints and competing interests, policymakers must prioritize transit funds so they are put to the best use possible. Even if it means reducing attempts to attract wealthier motorists to transit, public transportation should first serve the transit-dependent poor. The more policymakers devote resources toward rail the less they can expand bus service—the mode of transit that the transit-dependent poor use, and the kind that offers them the greatest mobility.

North Carolina should avoid the common practice of placing urban rail before bus:

> *As documented extensively in the literature, most transit systems have tended to take minority and low-income "captive riders" for granted and focused their fare and service policies on attracting middle-class and affluent riders out of their automobiles. In many cases, the result has been lower-quality service for the poor and minorities and superior service, at high public subsidy cost, for the affluent. New and extended rail transit systems, in particular, have been aimed at luring affluent suburban motorists out of their cars to reduce congestion, air pollution and energy use in American cities.*[140]

Urban rail patrons are often mostly displaced former bus patrons who have lost their bus service. For example, a Baltimore survey found that half of light rail patrons were former bus riders, while surveys in Los Angeles and Denver found that 63 and 73 percent of rail passengers had previously taken the bus.[141] Replacing bus service with rail can also mean transit patrons must endure more transfers, and giving highly trafficked areas to rail lines can boost rail ridership at the expense of bus service. Higher operational costs for buses may actually stem from new rail service:

> *When Light Rail lines are introduced, transit agencies commonly reroute their bus systems to feed the rail line. This can have the effect of making overall bus operations less efficient when the highest-ridership bus routes have been replaced by Light Rail; the short feeder bus routes can be relatively costly.* [142]

When transit agencies tilt resources to boost rail ridership, bus service often deteriorates. During the past decades, civil rights organizations have filed many complaints and lawsuits against transit systems whose fare and service policies were regarded as discriminating against minority patrons. Bus riders in Los Angeles are especially familiar with the tradeoff between urban rail and bus service. Beginning in 1986, local policymakers began to divert funds from a successful bus ridership program toward rail construction. Four years later, bus ridership fell by over 96 million passenger boardings per year (19.3 percent). By 1995, lost bus ridership was 10 times that gained by the new rail line. The issue drew intense political scrutiny, culminating in a legal victory for the Bus Riders Union, a grassroots organization that represents the MTA's

largest client group. A U.S. District Judge signed a consent decree designed to mitigate the negative impact the MTA's rail plan had on bus service. [143] One study summarized the situation this way: "While the residents of Los Angeles County have agreed to tax themselves ever more intensively to pay for rail-transit systems, the County's least fortunate residents have been squeezed into the most crowded buses in the United States."[144]

b. Rail's Impact on North Carolina's Poor

North Carolina has already experienced some similar, but less severe, tensions.

As President of the Derita-Stateville Road Community Organization, Bernie Samonds serves as a Charlotte area advocate for the transit-dependent poor. He has found the bus system to be non-responsive to the needs of the transit-dependent poor. For over a year he has lobbied for modest improvements—such as extending peak hour bus service by a mile and a half on one route—that would greatly improve the mobility of patrons who have no alternative to public transit. He has even taken to submitting petitions to the city council. Said Samonds, "What the mass transit people promoted is not what we're getting. Originally this was an alternative to driving, something to provide transportation for people who don't have cars."[145]

An interesting wrinkle in this controversy is that sometimes poorer sections of town prefer rail to bus because of the image conferred by rail. Some may worry that a local government's decision to not bring rail to one part of town signals that officials regard residents there as second-class citizens. In this case urban rail becomes something like the pair of shoes with the fancy brand name—expensive and ill-fitting, but desired for reasons far removed from functionality.

During his tenure as mayor of Durham, Nick Tennyson advocated improving bus service. He helped organize a trip in which local leaders visited the Bus Rapid Transit systems in Pittsburgh and Ottawa. While visiting a highly-regarded BRT system like Ottawa's helped allay local leaders' concerns that bus could not realize high ridership, Tennyson notes that Ottawa's relatively homogenous demographics also had the effect of further souring officials on expanded bus service. "There's a long term bias about who rides buses," said Tennyson, "and it's poor people and unemployed people."[146] Again, the needs of the transit-dependent poor are compromised by desires to get wealthier motorists out of their cars. Since bus riders in North Carolina are not as organized as in Los Angeles, it's unlikely they could exert a similar amount of political pressure. Still, for North Carolina policymakers interested in shaping policy to assist those who need it most, improving bus service offers a promising opportunity.

In the Triangle Region, total bus route miles are actually planned to decline under the Locally Preferred Alternative (LPA) as compared to the TSM. Several regional and express bus routes will be replaced with rail service.[147] The Charlotte proposal assumes that, during peak hours, nearly 52 percent of patrons will access light rail via the bus.[148] Here, rail's pattern of imposing another transfer upon bus riders seems to continue.

Under Charlotte's rail plan, four new bus routes would be added. But since all of the new routes are feeder routes, bus patrons can expect more transfers, not necessarily improved mobility. One local route would experience less frequent service.[149]

Of course, as other cities have learned, bus service can deteriorate more dramatically than originally planned. More fundamentally, the cost advantages of bus service would allow much more service expansion than offered by rail.

c. The Poor and Auto Ownership

While expanded bus service is the transit option most likely to offer the poor the greatest mobility improvement, there is another transportation option that offers the poor even greater access to opportunity—private auto ownership.

Although the poor use public transit more than any other group, even the poor are 17 times more likely to use cars for their urban trips than transit (75.9 percent vs. 4.6 percent). Of American's poorest households, three-quarters own at least one car. This is a very American phenomenon, and should be considered good news even when considered against the potential negative effects of auto ownership. [150] After all, autos grant the poor better access to jobs that will support their families and lead to greater personal fulfillment.

Most welfare advocates see auto ownership as an essential precursor to upward mobility. Pres. Bill Clinton proposed relaxing auto ownership restrictions for food stamp eligibility requirements "so that people can access reliable transportation to get to work without sacrificing their food stamp benefits." Auto ownership gives the poor access to a large area of opportunity. At average transit operating speeds of 15 miles per hour, a transit patron can access a "job shed" of 175 square miles in 30 minutes. Driving in an auto, that same person can expect to average 30 mph and access a job shed of 700 square miles in 30 minutes.[151]

As a study from the Progressive Policy Institute put it:

> *In most cases, the shortest distance between a poor person and a job is along a line driven in a car. Prosperity in America has always been strongly related to mobility and poor people work hard for access to opportunities. For both the rural and inner-city poor, access means being able to reach the prosperous suburbs of our booming metropolitan economies, and mobility means having the private automobile necessary for the trip.*[152]

A highly publicized report recently claimed that our nation's reliance on private auto ownership put unfair transportation cost burdens on the poor, and that the poor spent a much higher share of their income on transportation costs.[153] However, expenditure data from the Bureau of Labor Statistic's Consumer Expenditure Survey reveal that low-income households spend less on transportation than any other income group, including slightly less than the highest earning quintile. From 1984 to 2001 auto ownership among the poor has risen, while transportation costs are actually below 1984 levels.[154]

Since auto ownership so greatly expands economic opportunity, North Carolina policymakers should not consider it a defeat when someone of modest means leaves the transit system and purchases an automobile. Bus service should be improved for those who have no other transportation alternative, but policymakers should consider it a victory when the poor are able to improve their lives even more with auto ownership.

Figure 15: Square Miles Accessible in 30 min.

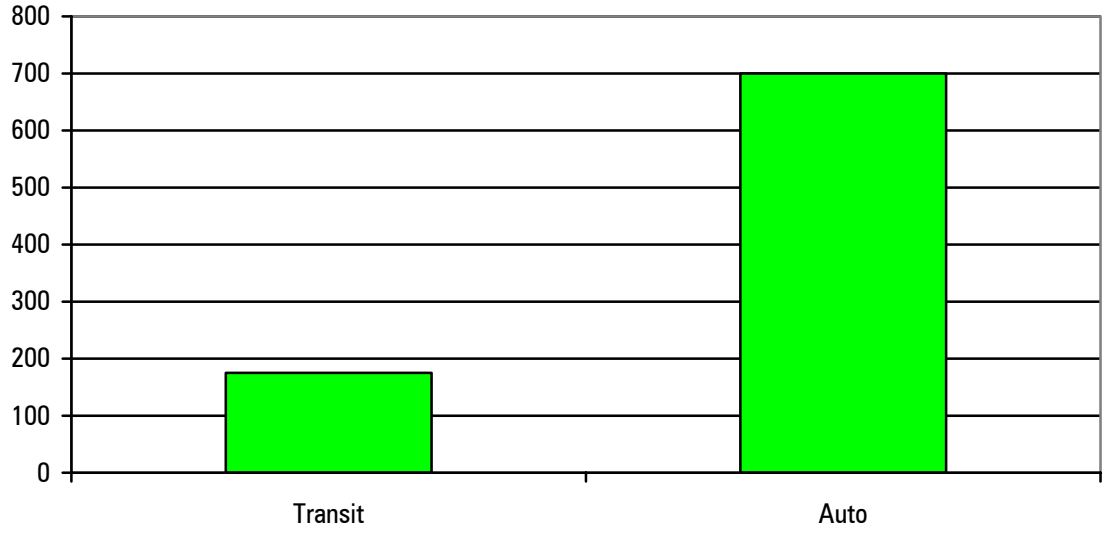
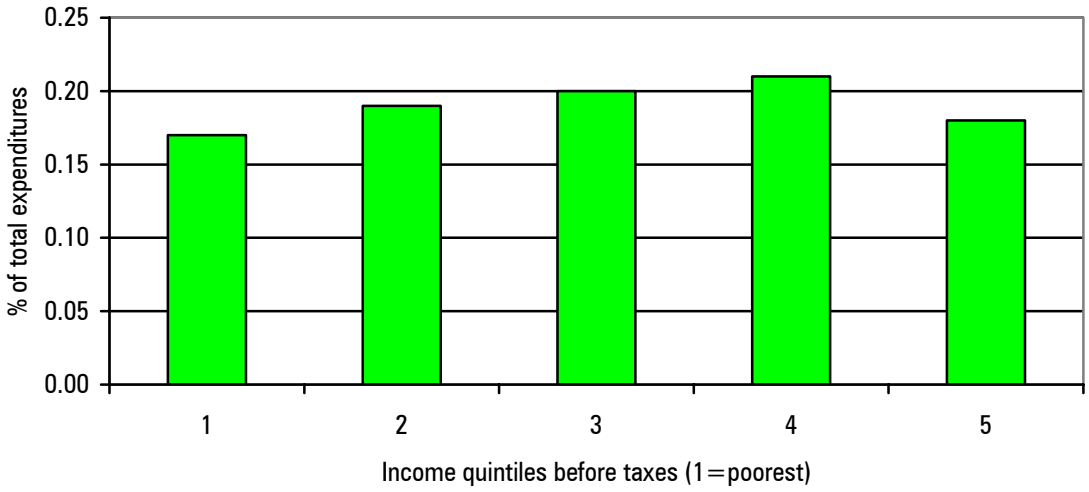


Figure 16: Transportation as Percentage of Total Expenditures



Part 5

From Framework to Concrete Solutions: What Will Provide Cost-effective Mobility Improvement?

Adopting a realistic approach to the role urban rail can play in North Carolina's search for cost-effective mobility improvement means adopting a new decision-making framework. Realism recognizes that it's more constructive to improve mobility by working with demographic and travel trends—such as suburbanization and widespread auto use—rather than battling against them. Realism recognizes which goals transit is equipped to achieve, and which goals are fanciful.

However, a realistic approach to cost-effective mobility improvement needs more than a clear framework—it needs concrete policy tools. Ever-worsening traffic is not inevitable. Across the nation and across the world, cities are peppered with transportation policies that really do improve mobility, and do so at comparably low costs. It's rare to find a city that makes use of more than a couple of the following policies at any one time; therefore, those areas that choose to incorporate more of them into their transportation systems can realize even greater mobility improvement.

Again, policymakers should not grow attached to any particular policy solution. Often the right tool is highly situational. If and when conditions arise where urban rail can provide the best mobility improvement at the best price, it too should be incorporated into a realistic transportation system.

A. Competitive Contracting

Competitive contracting can help those transit systems that struggle with high costs, poor service and low ridership. Nationwide, about 40 percent of transit systems contract for at least some service.[155] In the United States and Europe, major transit systems have used competitive contracting and realized reductions in operating costs ranging from 20 to 51 percent, with savings around 25 percent being the norm.

San Diego has the nation's highest percentage of contracted service. Contracting reduced bus transit costs by 33 percent, and San Diego's costs are 42 percent lower than neighboring North County Transit, which does not contract out. As of 2000, Los Angeles contracted nearly 500 buses in peak service—the largest number in the country. Contracting by Foothill Transit has led to bus service costs 46 percent below the LA County MTA's service.[156]

Since competition prods contractors to offer an appealing product, and city oversight ensures the fulfillment of performance measures, contracted bus service often leads to such improvements. According to Charlotte bus rider advocate Bernie Samonds, as the city moved away from relying on fares for revenue and toward sales taxes, responsiveness to customer concerns has declined.[157] By treating bus riders as customers whose business must be earned, competitive contracting can help invigorate customer service.[158]

Whether it's transit systems, intercity bus service like Greyhound, or other kinds of transportation like air travel, competition continues to cut costs. Meanwhile, systems that avoid competition grow ever more expensive. Since 1970, nationwide inflation-adjusted transit spending has increased 15 times faster than the increase in ridership.[159] Without competition, transit agencies have little incentive to search for ways to innovate. Instead of listening carefully to their customers, they grow complacent. Costs rise and service falters.

Although competition has a record of driving down costs and improving service, it is a force that flourishes only within the proper framework. Service providers must guarantee quality, and contracts must emphasize accountability and performance. As is so often the case, proper preparation can allow officials to sidestep potential pitfalls.

Contracting done right yields impressive satisfaction rates. In fact, a recent Transportation Research Board survey notes that—when asked if they had to do it over again—roughly 80 percent of transit managers who chose contracting say they would stick with it a second time.[160] These transit managers speak with the benefit of experience, and they offer some important advice for those who consider following their lead:

- Anticipate the advantages and disadvantages of contracting, and set realistic expectations.
- Establish a competitive procurement process that invites high-quality proposals and screens out unrealistic proposals and unqualified contractors.
- Prepare an internal analysis of the cost of service contracting as a baseline for examining bids.
- Spell out all contractor responsibilities clearly, monitor performance closely, and communicate with the contractor frequently and openly.
- Set up a separate team, divorced from and separate from the procurement/evaluation team, to prepare the transit agency's bid on the service, working with the labor unions to achieve reduced costs.

1. A Potential Obstacle

A provision within the Federal Transit Act may complicate a transit agency's attempt to introduce competition into its bus system. Section 13(c) requires that, before any transit agency can receive federal transit grants, the labor rights, privileges and benefits under existing contracts have to be preserved and continued. Moreover, the provision guarantees employees protection against any worsening of their positions. For example, employees who experience a drop in pay are entitled to the difference between their prior and current pay for up to six years.

Although it may make competitive contracting more difficult to attain, 13(c) restrictions can be overcome. For example Denver, Houston, Los Angeles and San Diego were able to adopt competitive contracting

without running afoul of 13(c). In each case, the transit agencies avoided layoffs or anything that could be construed as a "worsening" of conditions for their unionized employees. By factoring in the normal rate of attrition and the fact that 13(c) benefits expire after six years, transit agencies can face these restrictions and still reap the benefits of competition.[161]

B. Bus Rapid Transit

No doubt the lowly bus suffers from an image problem. Transit officials frequently regard the bus as a lost cause, and those keen on attracting middle-class motorists to transit are particularly dismissive of the bus.

Decades of slow, spotty, unpleasant and unpredictable service have earned the bus the reputation as the transportation option of last resort. As fewer people ride the bus, transit agencies anxious to control costs may reduce service even more. Ridership continues to fall, while a service that wasn't great in the first place degrades even further.

But there's nothing inherently lowly about the bus. Bus service already enjoys the kind of flexibility that cannot be replicated with rail. Add to that the proper attention to service and aesthetic improvements, and the bus can enjoy increased ridership. Bus Rapid Transit (which exists in small scale in Charlotte) is an innovation well suited to helping the bus with its image problems. A GAO study notes that riders have no preference for rail over bus when the service characteristics are equal.

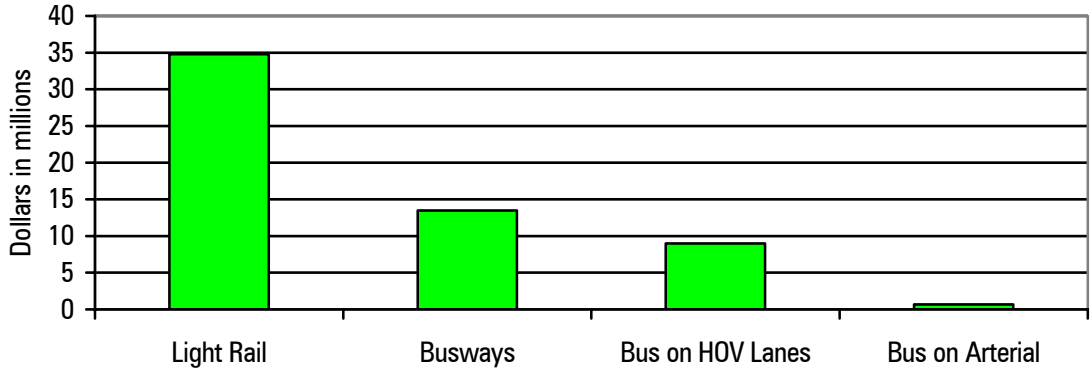
Former Durham mayor Nick Tennyson claims that discussions of bus versus rail are "completely divorced from reality." If the debate focused on facts, and not on perceptions, Tennyson asserts: "I don't see any way that the bus doesn't win."[162]

BRT may include some or all of the following features:

- Traffic signal preference
- Exclusive lanes
- Limited stops
- Rapid boarding
- Improved stations and shelters
- Cleaner and quieter vehicles
- Excellence in customer service

That buses have much lower capital costs than urban rail is a well-established and uncontroversial fact. Even when comparing per mile capital cost of light rail to the most expensive BRT option (exclusive busways), bus is still only 39 percent of the cost of light rail (see Figure 17[163]). Bus rapid transit on arterial streets (with signal priority) can be particularly cost-effective, as evidence by two Los Angeles lines completed at about $200,000 per mile.

Figure 17: Capital Cost per Mile: LR and BRT



Source: "Bus Rapid Transit Shows Promise," General Accounting Office.

Many factors contribute to light rail's higher capital costs. Unlike buses light rail generally requires a train signal, communications, and electrical power systems with overhead wires to deliver power to trains. Light rail also requires rail, ties and track ballast, and usually the construction of a separate maintenance facility. There is also a great disparity in vehicle cost. While a typical bus costs about $283,000 and higher capacity bus cost about $420,000, light rail cars cost about $2.5 million each.

Bus transit's ability to operate with shorter headways than rail contributes to its higher capacities. At 40 to 120 passenger spaces per bus, busway capacity is between 46,000 to 138,000 passengers/lane/hour—about six times the capacity of light rail and twice that of heavy rail.[164]

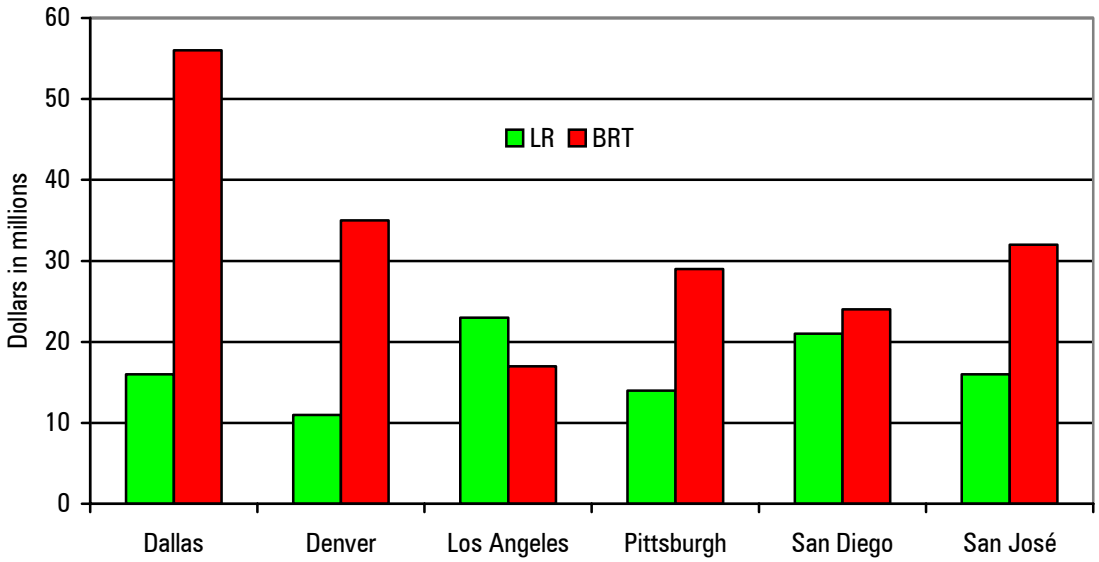
Since separate busways do not require vehicle lane changes, some cities realize further capital cost savings by not paving the center of the lane. This approach has the added benefit of reducing engine noise. The presence of grass or earth under the bus has reduced noise by as much as 40 percent.[165]

Traditionally, operating costs have been a more controversial matter than capital costs. Light rail has certain operational advantages over BRT, perhaps the most significant being that rail cars' greater capacity allow more passengers per car. On the other hand, unlike buses, light rail requires a separate repair facility and specialized staff. Even when considering operating costs, BRT cost-effectiveness is better than commonly acknowledged. The GAO examined six cities that operate both light rail and BRT, and then measured operating costs in three different ways: operating cost per vehicle hour, per revenue mile, and per passenger trip. For each category, most cities saw greater cost-effectiveness with BRT.[166]

Ironically, rail's high capital costs actually help understate its operating costs. Because rail is so expensive it is only built in heavily used corridors, but because buses are comparatively cheap they are used under almost any kind of condition. While rail serves only highly trafficked areas, many bus routes have feeble ridership. The result is an unequal comparison, where ridership figures drive operating costs down for rail and up for bus.

Of the cities that operate both systems, BRT average speed topped the average speed of light rail in every city but one (Los Angeles).

Figure 18: Average Speed of BRT and LR, 1999[167]



Source: "Bus Rapid Transit Shows Promise," General Accounting Office.

BRT's ability to reduce travel time is encouraging. For example, Pittsburgh realized a travel time reduction of 50 percent, and BRT also generally realizes ridership gains.[168]

Table 26: BRT Impact[169]

City	Travel Time Reduction	Ridership Increase
Pittsburgh	50%	80-100%
Los Angeles	25%	27-41%
Miami	NA	70%
Honolulu	25-45%	NA
Chicago	24%	70%

Source: Lloyd Wright and Karl Fjellstrom, "Sustainable Transport: Mass Transit Options," (New York: Institute for Transportation and Development Policy) March, 2003.

While cities often favor light rail on environmental grounds, buses have grown cleaner and cleaner. Bus emissions have fallen substantially, and newer buses can run on cleaner-burning alternative fuels, such as liquefied natural gas. Still, it's important to remember that the best way to reduce the most pollution is to target gross polluters.

1. Rapid Bus

Even without the investment in bus surface guideways required by "full" BRT, bus speed improvements such as limited stop route design; restructuring of traffic signal cycles to favor transit, including minor lengthenings and early "greens" for buses; and other low-cost, low-risk changes can produce major

improvements in transit service that attracts new riders while improving the travel for existing riders. On its Wilshire and Ventura Boulevard bus routes, the Los Angeles County MTA was able to increase average bus speed by 25 percent at a cost of less than $200,000 per guideway mile—well under 1 percent of the guideway costs for almost all light rail systems. Ridership increased 25 percent and 40 percent on these two lines, with approximately one-third of the added riders on these lines new to transit.

C. Adding Capacity

The saying "We can't build our way out of congestion" is popular among urban planners, but it's not entirely accurate. Certainly, no city should pursue adding capacity as its only defense against mounting congestion. Still, adding capacity does help improve mobility.

Roads are often accused of creating their own demand. However, cities with higher per capita lane miles actually have lower traffic densities, and in a study of highways and sprawl in North Carolina, David T. Hartgen notes that this "induced demand" effect is small. Some object to investing in roads on grounds that it will increase sprawl. As noted above, suburbanization is associated with positive effects such as reduced commute distances much more often than is generally appreciated. Even so, growth does not simply follow road investment. Rather it's influenced by a collection of highly localized factors, including schools and taxes. Hartgen concludes that "road projects are blunt and inefficient instruments for either spurring or slowing growth."[170]

Perhaps the most persuasive evidence of the effectiveness of added capacity comes from the 2003 Urban Mobility Report. The report organized America's 75 largest urban areas according to how well roadway capacity kept pace with increased traffic, and it makes the benefits of added capacity plain: "It is clear that adding roadway at about the same rate as traffic grows will slow the growth of congestion. It is equally, clear, however, that only five of the 75 areas studied were able to accomplish that rate."[171] In other words, adding capacity is an effective congestion-relieving strategy. The problem is not functional—it is political and financial.

Part of the political challenge lies in prioritizing projects so limited funding is spent as rationally as possible. Of course spending more on projects that offer little or no congestion relief means that less can be spent on solutions that do improve mobility. Another part of the political challenge is finding new revenue without placing undue burden on taxpayers. Considering innovative financing options like private toll roads and express lanes allows the private sector to bear much of the risk and cost of adding capacity. About 10 percent of major U.S. highways operate as toll roads, and toll roads are particularly popular in certain high-growth areas, such as Dallas, Denver, Houston and Orlando. Thanks to new technology that has made tollbooths obsolete, motorists can pay tolls electronically, without even slowing down.[172]

1. Road Needs in North Carolina

A 2000 analysis of North Carolina's highway system by David T. Hartgen revealed that much work needs to be done in order to reduce congestion and improve safety.[173] In 1990, the state's highway system ranked 8th in the nation, but ten years later it had fallen to 35th , including 35th in fatal accident rate. (New data suggest that after a brief improvement when the state rose to as high as 20th, its rank has again begun to slip.[174]) Of the state's major urban roads, over 10 percent (1,025 miles) are congested.

According to the 2000 analysis, the highway system has nearly $28 billion in needs (from 2000 to 2008), yet the gap between needs and likely revenue stands at an imposing $3.8 billion. Even worse, areas that currently consider spending billions on urban rail have the highest needs per county: Mecklenburg County ($1.5 billion), Wake County ($1.3 billion) and Guilford County ($1.2 billion). While it's true that the Triad is in the process of building highway loops and other improvements, such construction will have little impact on congestion within urban centers.

A 2003 report by the American Society of Civil Engineers listed roads as North Carolina's most pressing infrastructure concern. The report categorizes one-third of the state's roads as being in poor or mediocre condition, and notes that nearly a third of the state's bridges are structurally deficient or functionally obsolete. Indeed, poorly maintained roads cost each North Carolina motorist $259 per year ($1.4 billion total) in extra vehicle repairs and operating costs.[175]

Failure to meet highway needs doesn't just make travel unnecessarily slow—it makes it more dangerous. Paying attention to seemingly bland details, such as narrow shoulders, can result in substantial safety improvement. Adequate shoulders allow vehicles the space they need to safely pull over to the roadside. Extra shoulder area also helps reduce the chance and severity of accidents. Statewide, about 17 percent (11,000 miles) of highways have shoulders that are too narrow. A Transportation Research Board study found that adding standard-width shoulders reduced accident rates by 29 percent.[176] Such results seem to make spending money on shoulder-widening a worthy investment. Increasing capacity often has nothing to do with adding lanes, for example: improving traffic signaling on surface streets, improving bottlenecks and installing high-occupancy toll (HOT) Lanes.

D. HOT Lanes

High-occupancy Toll (HOT) lanes are limited-access lanes reserved for buses and other high-occupancy vehicles, but open to single occupant vehicles upon payment of a toll.[177] A variable toll that rises during peak hours and drops during off-peak times keeps traffic moving briskly even during rush hour, by limiting demand to the number of vehicles consistent with high throughput. Since it eliminates the need for tollbooths, electronic toll collection allows for payment at full speed. California's two HOT lanes (SR-91 and I-15) offer convincing proof that electronic toll collection and variable pricing can indeed maintain congestion-free conditions even during peak hours. Surveys have revealed widespread public acceptance of the HOT lane concept. People from all income levels use the HOT lanes when they can't afford to be held up in traffic. An ever-present, congestion-free alternative allows the electrician to make another appointment, the accountant to meet another client and the parent to make it to soccer practice on time. During their busiest hours, traffic in Orange County's 91 Express Lanes travels at 65 mph, while the regular lanes average 10-20 mph. And during those same hours, the Express Lanes handle 40 to 45 percent of the freeway's peak-direction travel, despite having only 33 percent of the lanes. This occurs because throughput in the regular lanes is greatly reduced by stop-and-go congestion.

HOT lanes may be constructed in highway medians (e.g. 91 Express Lanes), converted from inefficient HOV lanes or added to BRT busways. The more HOT lanes can link with other HOT lanes, the greater their congestion-relieving potential becomes.

In recent years, the HOT concept has grown rapidly in popularity. The Southern California Association of Governments has proposed a HOT lane project for highway 101, and the concept has spread beyond

California to states like Texas, Minnesota and Washington State. Perhaps the highest profile HOT project would be the one considered for the Washington Beltway (I-495) in the nation's capital.

E. HOT Networks: Something For Everyone

Combining HOT lanes with BRT offers something for everyone. With an entire network of uncongested, premium-service lanes bus patrons can avoid general-purpose traffic, private motorists can purchase a way out of congestion, and the transportation system gets a much-needed new source of revenue. Even motorists who don't use the HOT lanes benefit because more cars on the HOT Networks means fewer cars in the regular lanes.[178]

HOT Networks could enjoy application in the three areas considering urban rail. For example, in Charlotte alone there are various possibilities. If private motorists were allowed on Charlotte's BRT guideways, variable pricing could ensure that traffic would move briskly and that bus service would not be harmed by the presence of automobiles. A similar arrangement could work in Independence Boulevard's wide middle lane. While motorists hope the 28-foot wide strip of asphalt will be converted into an HOV lane, CATS would prefer to use it only for city buses and vanpools. A HOT Network arrangement could again satisfy transit patrons and private motorists. Since the region is considering constructing as much as 90 miles of BRT guideway, HOT bus lanes could prompt even greater mobility improvement in the Triad.

With the right legal framework, HOT Networks could be financed and operated largely by private firms. Under a public-private partnership, a competitive bidding process would yield a long-term private franchise holder. The firm or consortium would design, finance, build and operate the new road project. If the project makes economic sense, the private capital markets will provide the construction funds up-front, in exchange for long-term revenue bonds and in some cases equity in the company. Tolls would provide cash flow to pay off the bonds, provide for maintenance, operating costs, and profit. HOT Networks are the only urban transportation improvement that can be largely self-supporting. Although the degree of self-support would vary from project to project, a Reason Foundation analysis of eight metro areas estimates that toll revenue bonds could pay for about 67 percent of the cost of creating the networks:

> *At a time when every reputable study suggests that the need for transportation capital investment greatly exceeds existing, traditional sources of funding, this is certainly good news. It means that America's largest and most congested metro areas have a new option available that offers both meaningful congestion relief and significantly improved transit service—and without the need for major new tax revenues. The funding will be largely volunteered by a subset of auto users, willing to pay for a higher quality of transportation than is now available to them.* [179]

F. Telecommuting

Many hope that transit will bring congestion relief by luring motorists out of their cars. However, telecommuting offers a cost-effective way to decrease the number of cars on the road simply by allowing workers to stay home. During recent decades transit's share of work trips has fallen to about 4.7 percent while telecommuting has risen to 3.3 percent. If current trends continue, soon more Americans will be telecommuters than transit commuters. Since North Carolina's transit work trip share is typically less than

half the national average, telecommuting's comparative advantage could be even greater. Indeed in Charlotte, Greensboro and Raleigh, telecommuters outnumber transit commuters by more than 2 to 1.

There is good reason to believe that telecommuting's congestion relief potential could expand exponentially. While public transit struggles to adapt to an evolving society, telecommuting benefits from the momentum of technology. Advancements in broadband and other technologies will continue to make telecommuting more feasible for more people.

Transit's fall has occurred despite heavy subsidies, and the emphasis on urban rail projects—often justified as the only way to lure middle-class motorists to transit—makes transit all the more costly. However, since these motorists are more likely to have high speed Internet access, it would be easier to sell this demographic on telecommuting. After all, a Progressive Policy Institute report notes that " a part time teleworker that eliminates a commute of 30 minutes each way adds 10 full days of free time every year."[180] Dismantling regulations that hamper telecommuting would also be more cost-effective than building expensive new rail lines.

As transit continues to fall despite large subsidies, telecommuting continues to rise despite often-unfriendly public policy. By placing restrictions on home offices, zoning codes often make telecommuting more difficult than it could be. Additional hassles often arise when an employee lives in one state and his or her company is located in another state. Interstate telecommuters may find that both states will try to tax their income. Addressing such potential barriers to telecommuting would be particularly important for areas like Charlotte, where interstate commuting is common.

The Progressive Policy Institute report outlines many regulatory obstacles to telecommuting, for example:

> *Under current tax law … employees who are given home computers by their employers as an incentive to telecommute must pay income taxes on the value of the gifted machines that are classified as taxable fringe benefits.*[181]

By ending local, state and federal barriers to telecommuting, policymakers could allow technology to ease congestion.

Part 6

Conclusion

It's often said that it's best to prepare for a problem before the problem arises. In general, the three North Carolina areas considering urban rail still enjoy relatively good mobility. Future growth stands as one challenge to the preservation and improvement of mobility. However, more than future growth, policy decisions will determine the state of North Carolina's mobility.

The decision before North Carolinians begins with three particular urban rail proposals, but then expands well beyond. The decision expands with the extensions and new lines already under consideration. In Charlotte, the fate of four additional corridors is still to be determined. In the Triangle, local officials hope to extend the "Phase I" line and add a "Phase II" which includes connections to the Raleigh-Durham (RDU) airport and Chapel Hill. In the Triad, the four corridors may be serviced by rail, bus or a combination of the two. If past experience is any indicator, the decision will expand beyond the specific proposals that are currently known. In the hopes that the next line will make good on rail's ambitious goals, one line often begets many more lines.

Some may see the push for additional lines as proof of rail's success. Indeed, dozens of American cities have preceded North Carolina, and local leaders have toured some of those cities' rail lines. Often, they return with great hope that rail will do for North Carolina what it has done for other areas.

Unfortunately, such tours neglect crucial information about the performance of urban rail. Any area considering rail should set aside hopes and promises, and look deeply into rail's past performance. After the promises have been made, and the ribbons have been cut, urban rail has proven that it is not well suited to relieve congestion, improve air quality, spur economic activity or aid the transit-dependent poor.

The public should insist that anyone who advocates rail does it on the basis of fact, not hope. If the goal is improved mobility, in which city has rail captured any significant portion of travel? If the goal is improved air quality, where has rail had a measurable impact? Where has rail spurred more economic activity than it cost?

Even in areas with rail-friendly characteristics—such as relatively high densities, strong traditions of transit use—urban rail's performance has been disappointing. The demographics of Charlotte, the Triangle and the Triad are especially unfriendly to rail, making rail's success especially unlikely.

Clearly, North Carolinians must decide on more than rail. They must decide how to cope with expected increases in travel. They must decide the future direction of their region's transportation policy, and if it will be based in hope or realism.

Under a realistic policy, all stakeholders would know the goals up front, how the goals will be measured, and what would constitute success or failure. Without clear and objective performance measures, nearly any result can allow nearly anyone to claim he was right all along.

Unfortunately, transportation debates can grow contentious, and are often cast in terms of one mode versus another. Like football fans backing their teams, fans of cars root for cars and fans of rail root for rail. In this myopic view, people are either anti-rail or anti-car. However, a realistic transportation policy eschews such a dichotomy, and, instead maintains modal neutrality. Decisions should not made on the basis of a fondness for one particular mode, but on what would be the best tool to meet a specific goal. If your waiter places a bowl of soup before you and you ask for a spoon, this does not make you anti-fork. You simply recognize that, in this case, a spoon works better. Likewise, if someone asks you the best way to get to London, you are likely to suggest flying. This does not make you anti-rail or anti-car. Different transportation tasks call for different tools, and it is the duty of policymakers to be realistic and match the task with the proper tool.

All stakeholders must recognize that—when it comes to goals—there is much common ground. It's likely that if a survey were taken of residents in Charlotte, the Triangle and the Triad, the vast majority would favor quicker travel times over slower ones, cleaner air over dirtier air, and economic growth over stagnation.

Achieving those common goals will be easier if stakeholders appreciate the variety of routes that lead to the same goal. Success will also be easier to achieve when those who favor different means recognize that their opponents are, like them, motivated by good intentions. Here North Carolinians can draw upon their admirable tradition of crossing political divides to cobble together solutions that achieve those common goals.

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Prior to joining Reason, Balaker spent five years with ABC Network News where he produced pieces on a wide range of issues, including high-occupancy toll (HOT) lanes and corporatized air traffic control. Balaker graduated Phi Beta Kappa from the University of California, Irvine with bachelor degrees in political science and English. For the past seven years Balaker has commuted to work on foot or via public transit.

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