Review of the Draft Red Line Business/Finance Plan

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Introduction

The Charlotte Area Transit System (CATS) and Mecklenburg-Union Metropolitan Planning Organization (MUMPO) have proposed to rebuild an existing rail line between Charlotte and Mount Mourne for use as a passenger transit route. A draft business/finance plan proposes that CATS and the state of North Carolina each pay 25 percent of the estimated $452 million capital cost, leaving the remaining 50 percent to seven local municipalities including the cities and towns of Charlotte, Cornelius, Davidson, Huntersville, and Mooresville, and Iredell and Mecklenburg counties.[1]

The plan further proposes that these municipalities pay their share of the costs using so-called "value-capture" taxes that supposedly would tax the increased value of properties that result from being located in proximity to a rail transit line. These taxes would include tax-increment financing and special assessment districts.[2] The town of Cornelius has asked me to evaluate this financial plan.

Review of Lynx

Since the proposal for the Red Line builds on the supposed success of the Lynx light-rail line that goes south from Charlotte to Pineville, it is worthwhile to briefly review that line. Although CATS is doing its best to persuade people that the line is a great success, it is in most ways a dismal failure.

First, the cost proved to be far greater than anticipated. When MUMPO's 2025 Long-Range Regional Transportation Plan was written in 1998, the South line was expected to cost $227 million (about $302 million in today's dollars). Projected costs steadily rose to $399 million "year-of-expenditure" (YOE, meaning not adjusted for inflation) dollars in 2004.[3] By the end of 2008, the line had opened after CATS spent $444 million YOE, which is more than $510 million in today's dollars.[4]

But spending did not stop when the line opened. In 2009 and 2010, CATS spent an additional $54 million (about $56 million in today's dollars) on light-rail capital improvements.[5] While some of this may have been spent planning extensions to the line, to the extent that this was spent on the existing line the total capital cost of the Lynx line, through the end of 2010, is as high as $561 million. That is about 130 percent greater than the original estimated cost.

CATS spends $16 million a year operating the line, and in 2009 and 2010 it also spent an average of $8 million a year on maintenance. Yet the line generates only about $3.2 million in revenues, so annual operations & maintenance losses in 2009 and 2010 averaged more than $20 million per year.[6]

A second problem is that Lynx ridership is anemic. The Lynx line is one of the poorest performers among the two dozen modern light-rail systems in America. According to data published by the Federal Transit Administration (FTA), when just operating costs are counted, each trip on the Lynx line cost taxpayers $3.95 in 2010, compared with an average of $2.37 for all light-rail lines (again, excluding streetcars).[7]

Evaluating the line's ridership is complicated by the fact that CATS keeps two sets of books: one that it gives the public in North Carolina and a second that it gives to the FTA.[8] While few people have questioned the public data, the FTA has rigorous standards and will often label data submitted to it by transit agencies as "questionable" in its reports. Submitting questionable data risks losing future federal transit grants, so agencies have an incentive to give reliable data to the FTA.

Table One
Annual Lynx Ridership According to CATS Reports
(millions of trips per year)

	FTA	Public	Percent Difference
F.Y. 2008	2.26	2.85	26%
F.Y. 2009	3.55	5.02	41%
F.Y. 2010	3.25	4.81	48%

Public and FTA reports of bus ridership are nearly identical, but the Lynx ridership reports greatly differ. Table one shows that CATS publicly reported annual Lynx ridership numbers that were about 42 to 48 percent higher than it reported to the FTA in fiscal years 2009 and 2010 (CATS' fiscal year ends on June 30). Table two shows similar differences in the reports of average weekday ridership, with public numbers in fiscal years 2009 and 2010 being around 42 to 44 percent greater than FTA numbers.

Table Two
Average Weekday Lynx Ridership According to CATS Reports

	FTA	Public	Percent Difference
F.Y. 2008	11,678	13,714	18%
F.Y. 2009	10,753	15,492	44%
F.Y. 2010	10,444	14,815	42%
F.Y. 2011		14,684	

Some indication of the veracity of these two sets of numbers can be gained by comparing ridership with fares. The nominal fare to ride Lynx is $1.75, but there are various discounts. At the FTA's ridership numbers, average fares in 2009 were 90 cents, increasing to 99 cents in 2010. This compares with average light-rail fares nationwide of 84 cents in 2009 and 91 cents of 2010. If the public ridership numbers are correct, however, then fares in 2009 averaged just 63 cents, rising to 67 cents in 2010. Of some two-dozen true light-rail systems in the country (that is, not including streetcars), only Houston's earns less money per rider than this.

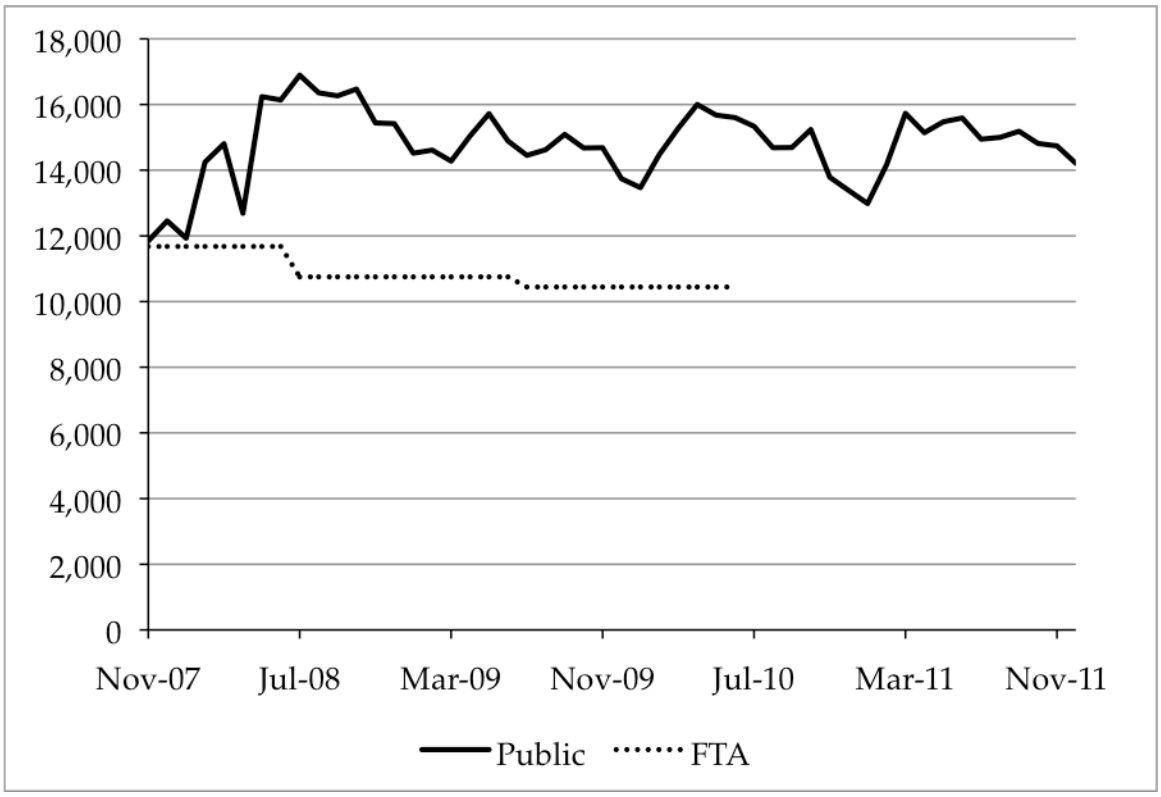
The existence of two sets of books on Lynx ridership puts CATS in a difficult position. If the FTA numbers are correct, then CATS must explain why it has been deceiving the public with higher ridership claims. If the public numbers are correct, then CATS must explain why average fares are so low—as if a million-and-a-half riders per year are getting free rides.

Using either public or FTA numbers, Lynx ridership pales in comparison to ridership on other light-rail lines. According to CATS' latest numbers, average weekday ridership on the 9.5-mile Lynx line averaged 14,800 in calendar year 2011, while FTA's F.Y. 2010 average was less than 11,000. By comparison, 2010 average weekday ridership on the 7.4-mile Houston light-rail line

is 35,000, while weekday ridership on Buffalo's 6.2-mile line—which even most rail advocates admit was a failure—was 21,500. Most other light-rail systems are significantly longer than Charlotte's, but even using CATS' public numbers, Charlotte's line carries less than 1,600 weekday riders per route mile, compared with a national average of 2,000 for true light-rail lines (again, excluding streetcars).[9]

Figure one shows that the public numbers were virtually identical to the FTA numbers for the first three months of Lynx operations. After that, the public numbers jumped to about 40 percent greater than the FTA numbers. Both sets of numbers show that ridership peaked in 2008 and has been slowly declining since. This suggests that early ridership was boosted mainly by high gasoline prices (which also peaked in mid 2008), and lower prices since that time has drained riders away from the light rail.

Figure One
Average Weekday Ridership as Reported by CATS to FTA and to the Public



In December 2011, CATS received an $18 million federal grant for increasing the capacity of the Lynx line.[10] Considering that the line was designed to handle more than 18,000 riders per day in 2025, and that ridership has been declining since 2008, this capacity increase is either unnecessary or is necessary only because the line was not built to the original design standards. In the latter case, this $18 million should be added to the line's cost overrun.

Due to low ridership, the environmental benefits of the Lynx line are nil or negative. Operating the line in 2010 required more than 4,000 British thermal units (BTUs) of energy per passenger mile, compared with about 3,500 for the average passenger automobile. Carbon dioxide emissions from the electrical generation plants that supply power to North Carolina average slightly more a half a pound per passenger mile on Lynx, which is almost exactly the same as

that emitted by gasoline-powered autos.[11] When the high energy costs and carbon emissions during construction are counted, the light-rail line is far "browner" than autos and highways.

A third problem with the Lynx line relates to overblown claims of economic development resulting from the line. The city of Charlotte has estimated that new development planned around the rail line will be worth nearly $2 billion.[12] The Center for Transit Oriented Development says that nearly 10 million square feet of new development opened along the line between 2005 and 2009.[13] Two problems with these estimates are that they both count all new development near the rail line whether or not that development would have taken place without the rail line; and they ignore or downplay the fact that much of the new development received taxpayer subsidies on top of the subsidies to the rail line.

In reviewing the city of Charlotte's estimates, University of North Carolina–Charlotte transportation professor David Hartgen found that most of the development along the rail line was simply a reflection of the rapid growth of the Charlotte metropolitan area. Considering the rate of the growth of the rest of the region, Hartgen concludes that rail corridor is likely to grow by less than $250 million worth of development more than the rest of the region.[14] This represents barely 13 percent of the amount claimed by the city.

Nor can the rail line even be credited with that $250 million worth of development. Taxpayers subsidized much of the new development near the rail line, including a $50 million infrastructure subsidy as well as "synthetic TIFS" that effectively rebate developers their property taxes. In addition, the city provided developers with special assistance in planning the projects, including two full-time staff members to expedite project approval.[15] Without these subsidies, corridor development would have looked very different and much of might not have taken place at all.

Regionally, studies have found that new rail transit lines do not stimulate urban development. Instead, at best, they shuffle it around, so that landowners along the rail line whose property values increase are balanced by landowners elsewhere whose property values do not increase as fast. A comprehensive study commissioned by the Federal Transit Administration and written by University of California (Berkeley) planning professor Robert Cervero (who is personally a strong advocate of rail transit and transit-oriented developments) and Parsons Brinckerhoff consultant Samuel Seskin found that "urban rail transit investments rarely 'create' new growth." Instead, they merely "redistribute growth that would have taken place without the investment." Further, they concluded, most of the redistribution is from suburbs to downtowns, which means downtown Charlotte would benefit at the expense of the city's suburbs.[16] All of these points apply as well to the Red line corridor as to the Lynx corridor.

The Red Line Proposal

Although the cost of the proposed Red line is expected to be roughly comparable to that of the actual cost of the Lynx line, projected ridership is far lower. The Lynx line was projected to carry 18,100 riders a day in 2025, but by that year the Red line is projected to carry only 5,600 riders a day. Considering both the high capital cost and the projected annual operating losses, it would be far less expensive (and better for the environment) to give every daily round-trip rider a new Toyota Prius every third year for the life of the project than it would to build and operate the Red line.[17]

Curiously, many photos accompanying Red line documents, such as the one on the cover of the appendices to the draft business plan, show multiple-car trains of high-capacity passenger cars. Given the low ridership projections, the proposal itself calls for operating so-called Diesel

multiple units (DMU), which would be individual powered cars, something like buses on rails, operating singly or, occasionally, in pairs. The DMU vehicles used for Portland, Oregon's commuter rail line have 70 to 76 seats, about equal to one-and-a-third commuter buses (which typically have 55 seats).

The environmental assessment (EA) for the North Corridor commuter-rail line projects that so few people will ride the train that the increased congestion caused by more trains at grade crossings will be greater than the reduction in congestion that results from attracting people out of their automobiles and onto transit. The EA predicts that average southbound speeds during the morning rush hour on corridor arterials will be 21.3 miles per hour in 2030 if the project is not built, but will fall to 17.9 mph if the project is built. Northbound afternoon rush hour speeds will decline from 20.9 in 2030 without the project to 18.0 with the project.[18]

The Federal Transit Administration has notoriously loose criteria for what rail projects it will fund. But in 2005 it set one quantitative limit that projects must cost no more than, initially, $24 for every "hour of transportation system user benefit," that is, hour of travel time saved (indexed to inflation after 2005).[19] In 2004, the South line was projected to cost $22.73 per hour saved, which barely met the limit (and would have been more than the limit had the true capital cost of the line been known).[20] At less than one-third of the ridership, the Red line cannot come close to meeting this limit, so CATS has given up seeking federal funds that might otherwise pay for half the project.

Instead of federal funds, CATS has proposed that five cities and two counties along the route use tax-increment financing and special assessment districts to raise the funds needed to start Red line operations. CATS has also proposed to build the line using a public-private partnership, which it implies will save money and reduce the likelihood of cost overruns.

Value-Capture Funding

The theory behind value capture is that new transportation projects such as a commuter-rail line increase the value of properties near those projects. By collecting taxes from those increased property values, transit districts can effectively have the transit projects pay for themselves.

There is a distinct flaw in this reasoning, however. In order to truly create new value, a transportation project must produce more mobility than existed before that project. That new mobility generally results from lower travel costs, increased speeds, and/or increased convenience. Increased mobility at lower cost gives people more money to spend on other things, thus increasing the property values of places where they might spend that money. Increased mobility at higher speeds or greater convenience gives people more time to earn money or do other activities, which also increases property values. A transportation project that does not increase mobility but instead merely substitutes one mode for another does not increase property values, and thus there is no value to capture.

The environmental assessment for the North Corridor commuter-rail line projects that, in 2030, there will be nearly 700,000 daily trips within the corridor, plus another 500,000 trips originating in the corridor and leaving it and 520,000 trips originating outside the corridor and ending in it.[21] The 5,600 or so daily Red line riders represent only about a third of a percent of all this travel, which is hardly enough to significantly affect property values.

No one, however, claims that the 5,600 daily trips will be new travel. Instead, some will be former bus trips and most of the rest will be former automobile trips. Although the major investment study and environmental assessment both estimate "new transit trips," nearly all of

these new transit trips will previously have been automobile trips. Nothing in the environmental assessment suggests that any of the new transit trips represent actual new travel.

If there is no new travel, the Red line will result in *no new value to capture*. Instead, the value that would be "captured" through tax-increment financing and special assessment districts is value that would be there in any case due to population and economic growth. Some rail transit lines may attract some new development near a transit station that would otherwise have taken place somewhere else in the same city or urban area, but this is still not new growth, it is merely a reshuffling of where that growth takes place. But the Red line will carry so few riders that it is not likely to even produce that kind of redevelopment.

Not only would the Red line merely substitute one mode of travel for another, it would substitute a high-cost form of travel for a relatively low-cost form. In 2009, Americans spend an average of 33 cents a vehicle mile driving their cars.[22] The Federal Highway Administration also reports that the average vehicle held about 1.6 people, so the cost per passenger mile is about 21 cents.[23] Taxpayers subsidize some roads, mainly local ones, but these subsidies amount to only about a penny per passenger mile.[24]

By comparison, even using the projected 2025 ridership of 18,100 trips per day, the Lynx line costs nearly $1.50 per passenger mile, all but 18 cents of which is subsidized.[25] Red line passengers will more miles on average than Lynx riders, but given much lower ridership the Red line will cost closer to $1.80 per passenger mile.[26] Counting subsidies, then, the Red line will cost about eight times as much as driving.

Substituting a high-cost form of travel for a low-cost form means that there will be *value lost*, not value created, by the Red line. Given the huge subsidies, some people will still ride the Red line, but the convenience they gain from using it will be more than offset by the congestion the Red line will impose on the corridor.

Tax-Increment Financing

Tax-increment financing (TIF) is often presented as "free money" that would not have been available without the development supported by the TIF. As the Red line draft business plan says, TIF "does not add any new taxes to an area, nor does it require a tax rate change or deprive governments of existing property tax revenues."[27] This is highly misleading, as TIF does deprive governments of *future* property tax revenues, which forces government agencies that rely on property taxes to choose between reducing the level of urban services or increasing their tax rates.

As shown in figure 2 on page 13 of the draft business plan, at the time a TIF district is created, the existing level of property taxes is set as the "base," and schools and other agencies funded by property taxes continue to receive that base for the life of the TIF. Yet those agencies end up being short-changed by the TIF district in at least four ways.

First, when property values rise due to inflation, the TIF district enjoys the increased revenues even if there are no new developments in the district. Since inflation also increases the costs of providing urban services, property-tax-funded agencies end up with higher costs without a source of higher revenues to cover those costs.

Second, when development does take place within the district, that development consumes the same urban services as any other development. Residences send children to schools and use libraries. All developments require fire and police protection. Since taxes on the new

development go to the TIF district, any agencies funded out of property taxes will see their costs rise with no increase in revenues.

Third, some development that takes place within the district would have happened even without the TIF (although it might have been in a somewhat different form if TIF planners favor some types of projects over others). Without the TIF, the tax revenues from that development would have gone to schools and other districts; but with the TIF, the TIF district claims the revenues even though it did not really generate the development.

Fourth, on a broader scale, most researchers agree that TIF is, at best, a zero-sum game.[28] Like the developments that took place around the Lynx light-rail line, the development would have happened somewhere in the urban area with or without the TIF. At most, all the TIF does is move some developments to properties inside the district instead of outside. Since school and other districts are typically much larger than TIF districts, they would have collected property tax revenues on developments outside the district, but do not inside the district.

At least one Illinois study has concluded that TIF is a negative-sum game; that is, that the extra tax burden imposed by TIF causes cities to grow slower than cities that do not use TIF, particularly if the TIF is used to support retail and other commercial uses.[29] While the urban-renewal district itself may grow, "commercial TIF districts reduce commercial property value growth in the non-TIF part of the same municipality."[30]

For all these reasons, TIF often forces other agencies to increase their tax rates to compensate for the revenues lost to TIF. When a fire district in Colorado sought a $2 million per year tax increase from local voters in 2006, for example, a representative of the district explained that TIF had taken $1.4 million away from the district.[31]

The draft Red line business plan is especially deceptive because its time horizon ends when the TIF bonds are paid off, which is slightly less than 30 years after the rail project opens. Figure 2 clearly states that, when the bonds are paid off, "post-project" tax revenues then will go to the other agencies that depend on property taxes.

That might be the case if TIF is used to support a private development. In this case, however, CATS proposes to use TIF to directly fund about one-quarter of the rail line. What the 30-year time horizon fails to disclose is that rail transit lines must be almost completely rebuilt every 30 years at a cost that is nearly as great as the original construction cost.

The San Francisco BART system, for example, cost about $13 billion (in today's dollars) and first opened in the early 1970s.[32] In 2007, BART planners reported that they needed $11 billion over the next decade to rehabilitate the system.[33] Similarly, the Washington Metro system cost about $18 billion to build and first opened in 1976.[34] In 2002, just 26 years later, the Washington Metropolitan Area Transportation Authority estimated that it needed $12.2 billion over the next decade to rehabilitate the system, funds that, for the most part, have not been found.[35]

The DC subway collision that killed 9 people in 2009 was directly attributable to that system's maintenance shortfall.[36] Significant portions of both the BART and Washington Metro systems are much younger than 30 years, so it would be ill-advised to expect that rehabilitation costs will be less than the original construction costs even after adjusting for inflation.

Few rail transit agencies budget for the rehabilitation costs that arise about every 30 years. This has led to a near-crisis situation in many cities. The Chicago Transit Authority is "on the verge of collapse" as it needs $16 billion it doesn't have to rehabilitate its tracks and trains.[37] New York's Metropolitan Transportation Authority says it needs $30 billion for rehabilitation over

the next 10 years, of which it only has $13 billion.[38] It is already spending $1.5 billion per year repaying debts incurred by past rehabilitation efforts.[39] As a result, it may need to cut subway, commuter rail, and bus service.[40] Boston's Massachusetts Bay Transportation Authority [MBTA] "is in danger of collapsing under its own operating expenses and debt obligations," says the *Boston Globe*, "to the point that it can't even pay for repairs that are vital to basic safety."[41]

A 2010 report from the Federal Transit Administration concluded that America's transit systems suffered from a $78 billion maintenance backlog, the vast majority of which was attributable to rail transit. The report also found that current spending on maintenance is inadequate to keep rail lines in their current state of poor repair, so the systems are continuing to deteriorate.[42]

In sum, municipalities served by the Red line can expect that, shortly after the bonds are paid off, CATS will require a further infusion of $400 million or more dollars to reconstruct and rehabilitate the tracks, stations, maintenance facilities, and other infrastructure needed to support the commuter train. If this is not paid for out of TIF funds, the region will have to find some other source of money to keep the trains safely operating past that time.

The business plan projects that only 75 percent of TIF revenues will be needed to pay for the rail line and magnanimously each city, town, and county "retain 25 percent of the property tax increment in its general fund."[43] Note that this 25 percent will not go to schools or other property tax-dependent entities but will be kept by the municipalities for their own economic development projects. Since transit-oriented development is an important part of the rail concept, no doubt the municipalities will be encouraged to spend that 25 percent on such developments, as has happened in Portland, Denver, and many other cities. If so, the economic development that will supposedly be generated by the rail line will in fact require its own subsidies.

Special Assessment Districts

Unlike TIF, no one claims that funds collected through special assessment districts (SADs) are "free" money or are otherwise not a tax. But they do attempt to suggest that SAD charges are a voluntary fee paid by businesses that enjoy the benefits of proximity to the rail line. The rail line will lead to "increased business through a greater number of customers" for businesses along the route, says the Red Line Task Force.[44] This should make those businesses willing to pay "an added tax that is *self-imposed by the relevant property owners*," says the draft business plan (emphasis in original).[45]

In fact, the planned commuter train will have a nearly inconsequential effect on businesses in the special assessment districts, mainly because ridership will be so low. Nearly all travelers will ride round trip, so the projected 4,200 trips per weekday the first year, rising to 5,600 trips in 2025, really represents just 2,100 to 2,800 people. Given the planned ten suburban stations, each station will have an average of just 210 to 280 people getting on the train in the morning and returning in the afternoon. Many of those people will be too eager to catch the train in the morning or get home from work in the evening to bother to shop, so few will add much to local businesses. Those businesses will hardly be eager to pay an additional 0.75 percent of the total value of their property in annual taxes because of a handful of new customers.

In any case, like TIF money, retail sales and other business generated by commuter-rail patrons are a zero-sum game: without the train, they would still be living in the region, buying food and other products from a variety of retailers and using other services. Businesses that would have to pay an additional 0.75 percent of the value of their property would be at a disadvantage to other businesses, so SADs, like some TIF, may actually be a negative sum game. The cost to

local communities of using a special assessment to help pay for the rail line is that it will limit their ability to increase taxes for other, more necessary programs.

Several other cities have used special assessment districts to help pay for transit lines, but it is doubtful whether businesses paying the assessments are getting their money's worth. Portland and Seattle used SADs to help pay for streetcar lines; the Seattle streetcar carried just 1,700 riders per weekday in 2010, which is hardly enough to support a grocery store much less an entire neighborhood of businesses. It may be that businesses believe that having a Disneyland-type ride promotes an attractive neighborhood even if few people use it.

Virginia is using an SAD to help pay for a rail line from Washington DC to Dulles Airport. Many of the businesses in this corridor strongly resisted this funding mechanism, and Christopher Walker, the largest commercial property owner in the Dulles corridor, went so far as to challenge it in court.[46] SADs have also been used to help pay for a subway in Los Angeles, a bus tunnel in Seattle, and a transit center in San Francisco.[47] These are all expensive and controversial projects with questionable benefits, and it is likely that transit agencies turned to SADs not because businesses wanted the projects but because the agencies were desperate for money to complete them.

Public-Private Partnerships

Sensitive to concerns about cost overruns, CATS proposes to build the Red line with a public-private partnership, which it suggests will help contain costs and prevent overruns. Public-private partnerships are a popular method for building highways in Europe. Typically, a European government will offer a private company a franchise to build a bridge or road and toll that route for several decades, after which the road reverts to public ownership.

The private company has an incentive to contain costs because it must recover those costs out of tolls. It also has an incentive to provide and maintain a quality road because it has to attract people willing to pay the tolls. Many if not most recent highways built in Europe use such public-private partnerships.

Public-private partnerships for transit are very different and offer the private partner a different set of incentives. Unlike a road, where the private partner expects to recover costs directly from the users, the fares collected from most transit projects cannot cover the operating costs, much less some or all of the capital costs. As such, the private partner is counting on taxpayers to provide sustained subsidies to build the project and keep it going.

This greatly reduces the incentive to contain costs. If a project that is projected to cost $450 million ends up costing $500 million, the private partner can simply threaten to walk away from the project. This can give public agencies a choice between taking over the project, and absorbing the cost overruns, or explaining to voters why they spent hundreds of millions of taxpayer dollars and have nothing to show for it.

Simply making something a public-private partnership offers no guarantee that there will be no cost overruns. The draft business plan offers the New Jersey's Hudson-Bergen light-rail line as an example of a successful public-private partnership.[48] Construction of the first phase of this line had a 78 percent cost overrun. Minneapolis' Hiawatha light-rail line was built with a design-build public-private partnership, yet it had a 49 percent cost overrun, most of which took place after the partnership contracts were signed.[49]

Another public-private partnership cited in the draft business plan, the Oakland airport connector, is hardly a good example of cost containment. Originally projected to cost $130

million, this 3.1-mile line is now expected to cost $484 million, or more than $150 million per mile.[50] It will replace a bus service that covered most of its costs out of $3 fares with a rail line that will lose money on $6 fares.

The business plan cites two American examples of "design-finance-build-operate-maintain" (DFBOM) partnerships, in which the private partner not only builds and operates the project but provides some of the financing. The implication provided by figure 3 of the business plan is that this will reduce the costs to local communities.[51] In fact, all it might do is spread the costs over a longer period of time, increasing the total interest and finance charges.

For example, the Denver Eagle partnership cited in the plan resulted from a 2004 measure approved by Denver-area voters that increased sales taxes to pay for rail construction but limited the total indebtedness that Denver's transit agency could undertake at any given time. By letting the private partners sell bonds, the partnership effectively circumvented this limit, even though Denver-area taxpayers will still be responsible for repaying those bonds plus interest.

The Las Vegas Monorail project, also cited as a DFBOM partnership, is an unusual case of a transit project that was funded similarly to a highway public-private partnership. The company building the monorail expected to repay all capital and operating costs out of fare revenues. However, it turned out to be a disastrous failure.

After opening in July, 2004, the monorail company defaulted on its bonds in just two years. A judge recently rejected the company's bankruptcy plan, noting that it had no chance to earn the revenues needed to maintain the line, which will either be forced to shut down or be taken over by the government by 2019.[52] Meanwhile, investors have sued the company's bond dealer, Citibank, for fraud, saying that when it offered the bonds it failed to disclose a report by Wendell Cox that "seriously undermined the reliability of" ridership projections that Citigroup and monorail backers were using and "which Citigroup knew had proven itself much more reliable."[53]

In contrast to highway projects, transit public-private partnerships fail to significantly alter the incentives facing private contractors and thus offer little or no guarantee that there will be no cost overruns. While transit public-private partnerships are not necessary bad, neither are they a panacea.

Like the Lynx line, which was originally projected to cost about $227 million, the Red line was projected to cost just $230 million (2002 dollars, about $280 million in today's dollars), based on the "11-station option" of the North corridor major investment study.[54] After adjusting for inflation, that estimate has already increased by more than 40 percent.

The Red line project is approximately at the stage the Lynx project was in 2000, when the cost of that project was projected to be $330 million. Considering that construction costs and materials are low today due to the recession, it is safe to say that if the nation experiences an economic recovery between now and 2018, when the Red line is scheduled for completion, those costs will significantly increase.

Alternatives

Railroads can be both cost-effective and energy-efficient in moving freight, but for passengers they are largely obsolete. As one of the Red line presentations says, CATS' rail transit plan is "based on centers and corridors land-use vision."[55] But this is an obsolete model for American

cities. Economist William Bogart points out that less than 30 to 40 percent of jobs in a typical American urban area are located in downtown or suburban centers.[56] The Charlotte urban area, where less than 14 percent of jobs are located in the region's central business district, is likely to be on the lower end of this scale.[57] This means that the vast majority of both jobs and residences will be inaccessible to rail transit no matter how many rail lines CATS builds.

The fact that even the Federal Transit Administration thinks that the project is not worth funding should offer the region's residents a clue that they should look at alternatives. Those alternatives include improved bus service, expanded highways, and new technologies that make better use of existing infrastructure.

Bus

Spurred largely by the desire to get federal funds, America's government-owned transit agencies spend inordinate amounts of money on new infrastructure. Small cities build downtown bus centers. Medium-sized cities build bus-rapid transit with exclusive bus lanes. Large cities build rail lines. The main beneficiaries of these forms of infrastructure are not transit users but the contractors that build them and manufacturers that supply them.

Significantly, the nation's private intercity bus industry is moving in the opposite direction. What the American Bus Association calls the "New Model" of bus service relies on minimal infrastructure while providing maximum service to customers. The New Model consists of:

- Picking up and dropping off passengers at curbside, rather than expensive bus stations;
- Providing frequent, non-stop service between major city pairs rather than service that stops in intermediate cities;
- Selling tickets over the Internet;
- Offering luxurious accommodations such as leather seats, free WiFi, and sometimes even movies and on-board food service;
- Fares that are approximately half the old model of bus service and often less than a third of Amtrak fares.

In the Boston-to-Washington corridor, where Amtrak runs trains as fast as 150 miles per hour, more than dozen different bus companies offer nearly 600 departures per day on such routes as Newark to Baltimore, Philadelphia to Boston, and of course New York to every major city in and near the corridor. Collectively, these buses carry far more passengers than Amtrak with practically no subsidy and they do so at fares of $15 to $20 compared with Amtrak fares of $50 to $140. In other parts of the nation, led by Megabus, a variety of New-Model bus companies are outperforming Amtrak in numerous corridors, offering faster, more frequent service at lower fares.[58]

Public transit agencies can learn from this model. In the North corridor, CATS could offer non-stop commuter bus service between each suburban community and Charlotte, using comfortable buses featuring free WiFi and other amenities. The result would be schedules that are just as frequent and at least as fast if not faster than commuter rail, with its frequent stops, and at a tiny fraction of the cost.

As Megabus and its competitors know, the key to successful bus service is filling seats. Commuter buses, which operate only or mainly during rush hours, are most successful at this. While American transit buses average less than 11 passengers on board over the course of a day, many commuter buses average more than 20 passengers and a few average more than 30. While the average bus fare covers little more than a quarter of operating costs, many commuter bus lines cover 70 percent or more of their operating costs, and a few actually earn an operating

profit. By comparison, Red line commuter-rail fares are expected to cover less than 25 percent of operating costs.

Several commuter bus lines in the New York urban area, including Trans-Bridge Lines, Trans-Hudson Express, Olympia Transit, Orange-Newark-Elizabeth Lines, and Community Transit all earned an operating profit in 2010. These buses nearly all connect New Jersey suburbs with Manhattan. In the Washington, DC area, Martz Group out of Fredericksburg, VA and Loudoun County (VA) Commuter Bus Service each earn about 90 percent of operating costs. By comparison, commuter-rail lines in Minneapolis, Nashville, Portland, Salt Lake City, Seattle, and South Florida earned just 5 to 22 percent of their operating costs, while only a few lines, mainly in the New York urban area, earned more than 50 percent of their operating costs in 2010.[59]

The Red line commuter-rail proposal is actually a hybrid between commuter-rail service (which tends to operate mainly during rush hours) and light rail (which operates all day long). CATS could emulate this hybrid with buses by running express buses during rush hours and bus-rapid transit, which would stop at each major town en route to and from Charlotte, during the rest of the day. One major advantage of buses over rails is that buses can serve more origins and destinations. An express bus from Cornelius to Charlotte, for example, might circulate to a few neighborhoods in Cornelius before taking I-77 to Charlotte.

The Red line business plan calls for spending $58.3 million on Diesel multiple unit vehicles.[60] These vehicles are currently estimated to cost about $3.5 million to $3.7 million each, so this budget is enough for 16 railcars.[61] Since each vehicle holds about as many passengers as one-and-a-third commuter buses, just 22 buses costing about $400,000 each could replace these vehicles. Even if twice this number were needed, the capital cost would be less than 4 percent of the capital cost of the proposed Red line. Rather than require six years for planning and construction, this alternative can be implemented almost immediately, as curbside service would not require construction of expensive stations and Interstate 77 HOV lanes would allow express buses to avoid congestion without constructing special bus lanes.

Curiously, one of the strongest endorsements for this alternative came from the current administrator of the Federal Transit Administration. In a speech given at the Federal Reserve Bank of Boston in May, 2010, Rogoff noted the contradiction that America's transit agencies were unable to maintain rail lines in a state of good repair and yet were intent on building more.

"Supporters of public transit must be willing to share some simple truths that folks don't want to hear," said Rogoff. "One is this—Paint is cheap, rails systems are extremely expensive. . . . You can entice even diehard rail riders onto a bus, if you call it a "special" bus and just paint it a different color than the rest of the fleet."[62]

Highway

In presentations about the Red line, CATS and its consultants often point to traffic congestion as a reason to build rail transit. One presentation, for example, notes that traffic on I-77 is expected to nearly double from 87,000 vehicles per day in 2007 to 170,000 vehicles per day in 2030.[63] Yet no one can seriously imagine that a commuter train carrying a mere 5,600 people a day—many of whom would otherwise ride a bus or carpool—will produce a significant reduction in congestion.

This means the choice is not between expanding I-77 or building a commuter-rail line, but between expanding I-77 or building a rail line *and* expanding I-77. The real difference between

building a commuter-rail line and expanding a highway is that transit lines require 100 percent capital subsidies and continuing operating subsidies while highways can be funded largely out of user fees.

Highway user fees, mainly gasoline taxes and tolls, have funded nearly all state highways for the last eight decades, and all federal highways for the last 55 years.[64] While general taxes have paid for many local roads, this is more due to a failure of state legislatures to provide for user-fee driven funding mechanisms for local roads than to the unwillingness of auto drivers to pay their own way.

If I-77 needs expansion, one way to do it would be to add new lanes funded by tolls that vary by time of day. These lanes would give travelers a choice of using the existing free lanes that may be congested or using the toll lanes that will be guaranteed to be free of congestion. The lanes would pay for themselves and, as a bonus, would offer CATS a congestion-free corridor for its commuter buses. An interim measure would convert existing HOV lanes on I-77 to HOT lanes, which high-occupancy vehicles can use for free and other vehicles can use by paying a toll. Such HOT lanes have proven very successful in San Diego, Denver, Minneapolis, and elsewhere.

New Technologies

Even as cities across the country are planning and building expensive rail systems whose technologies are derived from the nineteenth and early twentieth centuries, the automobile industry is adding features to new cars that will revolutionize travel. One of these features is adaptive cruise control, which allows cars to maintain a fixed distance behind the car in front of them. Since about half of all congestion is due to slow human reflexes, and congestion typically takes places in "pulses" on a highway lane, traffic experts estimate that when as few as 20 percent of cars on the road are using adaptive cruise control, a lot of roadway congestion will disappear. Adaptive cruise control is available on high-end cars and, starting in 2013, will be available on several moderately priced cars as well.

Another new technology is collision avoidance, in which sensors all around the car detect whether other cars are getting too close. The car responds to such situations by braking or taking other actions needed to avoid collisions. Some cars on the market today are even able to detect the stripes on the highway and steer themselves within these stripes.

Several manufacturers are combining these technologies to help drivers minimize the effects of congestion. Audi will soon offer "traffic jam assistance" that will control the speed and steering of cars in traffic.[65] Volkswagen has a "temporary auto pilot" that allows a car to drive semi-autonomously at speeds of up to 80 mph.[66] Honda is already selling cars in other countries that can steer, keep pace with other cars, and avoid collisions, a combination it calls the "advanced driver assistance system."[67]

All of these things are leading up to the next real transportation revolution: self-driving cars. With funding from Volkswagen and Google, researchers at Stanford University have developed self-driving cars that have successfully operated hundreds of thousands of miles on California streets and highways. Google has persuaded the Nevada legislature to legalize self-driving cars, and industry leaders predict that self-driving cars will be on the market at about the time the Red line is schedule to begin operations.[68]

Self-driving cars will solve numerous transportation problems. First, they will relieve congestion, as the faster reflexes of a computer will allow highways of self-driving cars to move three to four times as many vehicles per hour as highways of human-operated cars. Second,

they will increase safety, as self-driving cars will greatly reduce highway accident rates. Third, they will increase energy efficiency, as safer roads mean cars can be lighter in weight and on-board computers can be programmed to operate with maximum efficiency. Fourth, self-driving cars will dramatically increase mobility, as anyone will be able to operate such car regardless of age or physical condition. Finally, self-driving cars will use existing infrastructure, so neither state nor local governments will have to invest in expensive new roads, rail lines, or other facilities.[69]

Conclusions

The Red line is an expensive, risky project that is likely to produce few benefits for anyone other than the contractors who build it. Tax-increment financing proposed by the business/finance plan for the project would divert funds from existing agencies that depend on property taxes, forcing them to choose between cutting services or raising tax rates. By significantly raising tax rates, special assessment districts would politically limit the ability of other agencies to raise taxes.

Bus transit can produce the same benefits as the Red line at a far lower cost. Highway expansions can do far more to relieve congestion than rail transit and can be largely self-funding. In the long run, rail transit will be seen as an obsolete technology for moving passengers, and cities that build it will regret it, especially as the cost of maintaining the lines proves to be never ending.

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