BACON'S REBELLION
The Op/Ed Page for Virginia's New Economy

Does Not Compute

VDOT's forecasting model is the best yet devised, but it's still grievously flawed. Virginia does *not* face $108 billion in unmet transportation needs over the next 20 years.

By James A. Bacon

If there's one number that stands out in Virginia's transportation debate, it's this one: $108 billion.

That's how much money the VTrans2025 report, the keystone transportation policy document of the Warner administration, says Virginia needs to raise over the next 20 years to meet the shortfall in funding for roads, rail and aviation.

Over the past year, a parade of politicians and pundits has chanted the figure as they make their case that Virginia needs to raise taxes in 2006. After months of repetition, the number "$108 billion" has achieved the status of holy writ. Not one person, to my knowledge, has stepped forward publicly to question it. Out of Virginia's seven million citizens, not a single one has thought to inquire, where did that number come from? Who came up with it, and how?

Think about it. If we're to take the VTrans2025 scenario seriously, Virginia will need to raise taxes by $5 billion per year – that's *over and above* the current budget of roughly $3 billion per year -- to keep traffic congestion from slipping into a nightmare of curb-to-curb gridlock. You'd think that someone would give the $108-billion number a second look. You'd think that someone, somewhere, would say "Holy cow, can Virginia's funding level, which to this point has created an imperfect but functional transportation system, be that far out of whack?"

You'd think that, given the Warner administration's track record in projecting tax revenues two years ahead – oops, we were off by $2 billion a year, but trust us, we really did need that tax increase back in 2004 – that someone, a journalist, perhaps, would evince a tad of skepticism about a forecast that peers 20 years into the future. But, no, this is Virginia, a state where the Fourth Estate has abdicated its role of watch dog over those in power and has assumed the role of cheerleader for an ever-expanding state government.

Once again, it falls to *Bacon's Rebellion* to ask the questions that no one else thinks to ask.

Before I launch into a dissection of the $108 billion, however, let me be clear about one thing: I'm not criticizing members of the Virginia Department of Transportation staff who undertook a good-faith effort to develop the best estimate they could of Virginia's future funding needs. The exercise of projecting long-term forecasts is a necessary one. The state can't fly blind. If there is a risk of a long-term funding gap, lawmakers need to know about it. Virginia needs to make long-range forecasts, and VDOT staffers have used the best analytical tools available to them.

I reserve my ire for those who misuse the $108 billion figure: charging ahead recklessly, formulating policy unimpeded by the caveats, qualifications and limitations that are inherent in any such forecast. My quarrel is with the Political Establishment that would, upon the basis of a fragile methodology, lead the citizens of Virginia into the second major tax increase in two years, imposing a huge and unnecessary tax burden upon the citizens of the Old Dominion.

If you want to know who came up with the $108 million figure for VTrans2025, here's the name: Mary Lynn Tischer. Now serving as director of the Commonwealth's Multimodal Transportation Planning Office, Tischer had the job of compiling and reconciling the forecasts provided by Virginia's four transportation agencies: VDOT, the Department of Rail and Public Transportation, the Department of Aviation and the Virginia Port Authority.

Tischer expresses confidence in the VTrans2025 numbers. They're not pin-point accurate, of course. No one would expect them to be. "We're looking for a *sense* of what the [financial] needs will be. We're looking for a range," she says. The forecasting model is a "continual work in progress," she adds, but "if you look back over time, our

forecasts have done fairly well."

Let's take a look under the hood of the VTrans2025 projections. Each of the four transportation departments submitted its own forecast. Tischer made some adjustments to put them all on the same footing, and then created a composite. Of the four, the budgets for roads and rail dominated. Aviation accounted for only $3 billion in "unmet needs", and ports less than $1 billion. Roads and rail accounted for the other $105 billion.

Of the two big spenders, VDOT ($74.2 billion in unmet needs) and Rail ($30.7 billion), VDOT was the driver. The reason Rail was forecast to require such expansive funding was that VDOT showed such an extraordinary growth in the need for new road capacity that there was, quite literally, no physical way to provide it all. If VDOT's model forecast that the Interstate 495 Beltway around Washington, D.C., will require an additional 22 lanes to accommodate traffic growth, for instance, there would be no way to add those lanes; the only alternative was to shift to rail and mass transit.

Ultimately, then, the validity of the VTrans2025 forecasts rests upon a VDOT foundation, for VDOT is the department that forecasts travel demand.

VDOT is rightfully proud of its forecasting model, which is significantly more advanced than the forecasting tools used as recently as five years ago.

In the waning days of the Gilmore administration, the Joint Legislative Audit and Review Commission and the Auditor of Public accounts both issued reports criticizing VDOT for the inadequacy of its traditional approach to forecasting. The department has since put into place a model, The Statewide Planning System, of considerable sophistication.

The Statewide Planning System encompasses Virginia's Interstates and the state road system, dividing them into 19,000 segments. Drawing upon some 40 years of traffic counts, VDOT forecasts traffic levels for each segment, explains Chad Tucker, a manager in the Transportation Planning Division. The model then compares those counts to the design capacity of the segment, based on the number of lanes and other characteristics. When traffic counts exceed the capacity, the model then projects a "need" for additional capacity, selects the optimum improvement -- a lane widening, a new lane, whatever -- and assigns a rule-of-thumb cost per mile to that improvement.

The model does not recommend specific projects – it just generates rough estimates based on traffic demand. The methodology is not perfect, VDOT planners acknowledge. The model can under-estimate traffic counts on the urban fringe where development and population growth accelerates over the trend line, notes Tucker. But the model compensates for those weaknesses by overlaying metropolitan traffic forecasts developed by Metropolitan Planning Organizations (MPO) whose regional planners have detailed knowledge of what's happening locally. The model looks to planner-derived projections whenever possible, and defaults to the extrapolation of trend data only when MPO data is not available.

The beauty of the statewide model, says Tucker, is that there's no manipulation of the numbers. "It's hands off. It's objective." And it's good for a "reasonable" estimate of what to expect.

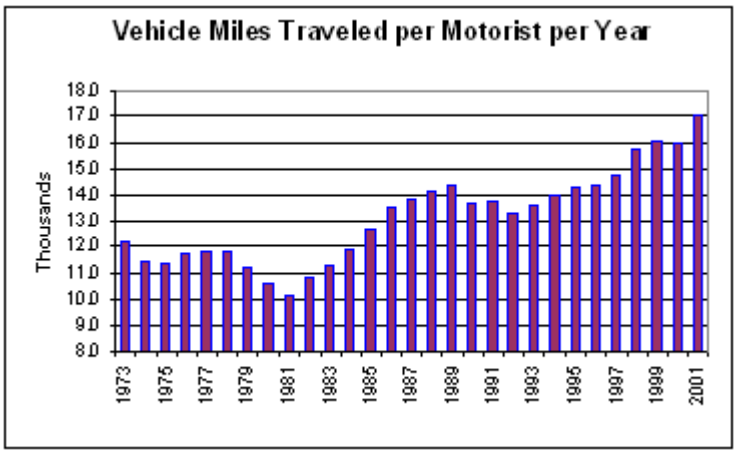
The Statewide Planning System undoubtedly represents a huge improvement over the methods were practiced before. But I would hesitate to claim that the System will provide a "reasonable" forecast of transportation needs 20 years from now. There are huge dangers extrapolating the trends of the past 30 to 40 years into the future. *VDOT's methodology assumes that the key factors driving traffic growth – development patterns, gasoline prices, commuting patterns, household lifestyles -- will continue as they have for the past 40 years.*

Let's look closer and see how reasonable that assumption is.

Gasoline prices. Neither the VDOT model nor the MPO models adjust for the rising price of gasoline. Although gasoline is only one component of the total cost of driving, which includes the cost of buying a car, maintenance, insurance, license fees, etc., it is a highly visible one. According to basic economic theory, if the price rises high enough, people will curtail their driving. The question is, by how much?

Tucker acknowledges the possibility that higher gasoline prices could modify driving behavior, but he minimizes the likely impact. "Higher gas prices make people buy more efficient cars – not drive fewer miles," he says. "People are buying hybrids and fuel-efficient diesels. Actual VMTs (Vehicle Miles Traveled) haven't changed any."

I offer two responses to Tucker's argument. First, history shows that higher gasoline prices, along with highly publicized exhortations to conserve gasoline, *did* dampen peoples' driving in the 1970s.



This table, republished from "The Tip of the Dipstick," Aug. 9, 2004, shows the average Vehicle Miles Driven per Virginia motorist between 1973 and 2001. During the "energy crisis" era of 1973 to 1981, driving declined from 12,000 miles on average to 10,000 miles. When oil and gasoline prices began their two-decade decline in the early 1980s, motorists began driving more. True, the price of gasoline is not the only factor at work. A sharp recession helped reduce Vehicle Miles Driven in 1979-1981, as it did a decade later in 1990-1991. Any reasonable person would conclude that there are two key factors at work: The rate of economic growth *and* the inflation-adjusted cost of gasoline. Neither factor can be ignored.

This much is clear to me, if not to VDOT: If rising gasoline prices conform to the energy-crisis era of high gasoline prices (1973 to 1981), the future will look very different than if it tracks a 40-year period in which high gas prices were only a blip.

My second response is this: The cheap-energy era is over. In a "strong China" economic scenario, in which continued economic growth feeds the Chinese appetite for automobiles and gasoline to fuel them, Chinese demand for petroleum will drive global oil prices even higher than they are today. In inflation-adjusted terms, gasoline prices are still significantly lower than they were in the mid-1970s. It would not be surprising to see gasoline exceed $4 at the pump within a few years.

Even if higher gas prices don't prod Virginians into driving less, they certainly would put the brakes on driving more. And that's a problem for VDOT's forecast. Remember: VDOT is projecting continued traffic growth based on past trends. Not only will there be more cars on the road, but the extrapolation of past traffic trends into the future implies that individual motorists will be driving more. Projecting the experience of the past 20 years into the next 20 years, Virginians will be driving 25,000 miles on average, up from 17,000 miles in 2001. How likely is that in the face of $3- and $4-per-gallon gasoline prices? That's the billion-dollar question.

Demographics, lifestyles and development patterns. Neither the VDOT nor the MPO models adjust for the aging of the population, the movement of the Baby Boom generation into retirement age, and the changing lifestyles of empty nesters.

News flash: Retired people don't work. And because they don't work, they don't commute. Their children are grown up, which means they don't spend as much time running errands and chauffeuring their children. While retired people may hit the highway in their RVs, racking up miles on rural byways, they aren't contributing to local traffic congestion.

Take a look at what's happening.

Virginia Age Cohorts (2000 Census)

Under 5.....461,982
5 to 14.....991,064
14 to 24.....964,889
25 to 34.....1,036,965
35 to 44.....1,200,690
45 to 54.....999,256
55 to 64.....631,611

Today, in the year 2005, we're mid-way through a decade in which the 15-to-24 year olds of the 2000 census are entering the workforce, while the 55-to-64 year olds are leaving it. Thus, even excluding the influx of newcomers to Virginia, a changing demographic mix means that the working-age population can be expected to grow by about 334,000 over the course of the decade. VDOT's traffic counts over the past 40 years reflect that steady growth in the workforce, dominated by the maturing of the Baby Boom generation and the 70s-era influx of women into the workforce. Extrapolations based on that experience are valid as long as the working age population and labor force participation continue to grow.

But look what happens a decade from now. Children who were 5-to-14 back in the 2000 Census will be entering the working age

population, replacing the 45-to-54 cohort. By then, there will be no growth in the working age population whatsoever. In fact, the working-age numbers will shrink by 8,000 -- a tiny number, to be sure, but a marked reversal from the growth of the current decade.

We don't know exactly how many people will be entering the workforce by 2025 -- many of them hadn't been born by the 2000 census -- but the number almost certainly will be smaller than the number of retiring Baby Boomers. A good guess is roughly 930,000 Virginians entering the working age population in place of 1.2 million leaving -- a potential loss of 270,000. Far from growing, the working age population will be shrinking!

Bottom line: While Virginia's population will continue to grow due to immigration and increasing longevity, the size of the working-age population will level off -- in marked contrast to VDOT's traffic projections, which are based on the traffic count generated during a period of steady growth in the working age population.

Compounding the problem, there is evidence to suggest that segments of the working-age population are changing their lifestyles in significant ways. Once their children grow up, many of the so-called "empty nesters" aren't maintaining their suburban lifestyle -- they're moving back into the city where they can enjoy a more urban lifestyle. Empty nesters crave shorter commutes, pedestrian-friendly neighborhoods and low-maintenance housing. Sensing a major shift in demand, developers are responding by building an unprecedented number of high-rise condominiums in Virginia downtowns, or creating New Urbanism-inspired neighborhoods that mimic the urban look and feel. So, even within the working-age population -- the empty nest segment -- we can anticipate a leveling off, or even a decline, in the number of Vehicle Miles Driven.

Mobile Workforce. The story doesn't end with the empty nesters. Driving patterns are changing for younger workers, too, a phenomenon I described in detail in "Rush Hour Will Never Be the Same," (July 25, 2005). In a nutshell, cell phones, wireless laptops, broadband connections and collaborative software are changing the relationship between workers and the workplace. An increasing number of people are finding that they can work more productively away from the office. As a consequence, an increasing number of people find that they can avoid the stress of fighting the rush-hour crunch, and companies are finding they can improve morale by allowing employees to work one or more days from home, or on the road. The result: a scrambling of traditional commuting patterns and, if not an outright decline in driving, at least a leveling off in Vehicle Miles Traveled.

Congestion. The VDOT model does not take into account the possibility that people might change their driving patterns as the cost of congestion arises. This is a critical flaw, and it is inherent in the methodology. The VDOT model *presupposes* that an increase in Vehicle Miles Driven gets translated into additional transportation capacity. But that's not how the world works.

In the real world, in the absence of massive tax increases and road construction projects, congestion *will* increase. Assuming that the population continues to grow, total Vehicle Miles Driven will rise -- even if not nearly as much as DOT anticipates -- and roads will get more congested. As the cost of congestion mounts, drivers, being rational creatures, will change their behavior. There won't be a stampede; people won't be abandoning their cars on the highway. But individuals will adapt by finding alternatives that suit their unique circumstances.

There are many alternatives. Availing themselves of mobile technology and an increasingly flexible attitude by employers, some people may decide to work at home one or two days a week. Some may work at home for an hour or two, then drive into the office when rush hour subsides. Some people may carpool, or start riding buses again. Others may move closer to work, trading off bigger houses in on the metropolitan periphery for somewhat smaller houses closer to the center of things. Yet others may avail themselves of new alternatives that entrepreneurs bring into the marketplace, such as NuRide's Internet-based scheduling system to coordinate ride sharing in Northern Virginia.

In time, developers even may begin changing their product mix. Indeed, there is every sign that they are doing so already. Central cities like Richmond are seeing more residential investment than any time in decades; even in the suburbs, developers are building mixed-use, pedestrian-friendly projects that evoke the urban experience. These New Urbanism projects may not always be ideally placed from a regional transportation perspective, but they still represent an advance in transportation efficiency. In projects designed with a balance of jobs, houses and amenities, people can go about much of their daily

routine within the development, without hopping onto the regional transportation grid at all. (For real-world examples, see Bob Burke's articles about Albemarle Place, a New Urbanism project in Charlottesville, and the redevelopment of the Columbia Pike corridor in Arlington.)

Ultimately, even local governments may alter their behavior in response to the demands of the public and developers. A number of counties are modifying their zoning codes to encourage mixed-use, pedestrian friendly development; others are reconciling themselves to the idea that they should encourage the redevelopment of their aging suburbs at higher densities as an alternative to letting them spiral into decay. Mixed uses, higher densities, pedestrian-friendly streetscapes, these all make it possible for people to resort to fewer, shorter trips.

The immediate impact of these changes will be modest. But over the 20 years contemplated by the VTrans2025 forecast, a shift from scattered, disconnected low-density development to compact, mixed-use, pedestrian-friendly development could make a tremendous difference. The VDOT methodology, based as it is upon traffic counts generated over 40 years of rampant suburban sprawl, cannot anticipate such a sea-change.

The VTrans2025 forecast does do one thing very well: It shows the utter futility of basing Virginia's transportation policy on the Business As Usual principle of building our way out of traffic congestion. It is madness to think that Virginians would accept an increase in $5 billion a year in higher taxes and tolls. A billion dollars a year, maybe. But $5 billion? Impossible. The logical conclusion from such a number is that our transportation system is hopelessly broken and in desperate need of fixing.

But it's not. The VDOT forecast is flawed because it extrapolates from 40 years of traffic counts generated by cheap gas, an expanding working-age population and suburban sprawl. The real future will bring us expensive gasoline, a leveling off of the working-age population, the rise of the mobile workforce, and a reaction to suburban sprawl.

Like the proverbial generals who fight the last war, Virginia's politicians are basing transportation policy on the continuation of social and economic trends that have played themselves out. They want to raise our taxes based upon forecasts that , by their very nature, cannot take into account critical social and economic changes. It is up to us, an informed citizenry, to stop them before they tax again.

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Read more columns by Jim Bacon at
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