

TxDOT Must Embrace New Technologies

I will be speaking for myself today. My first comment is that I am generally supportive of the Advisory Board's work and recommendations. I do have a strong disagreement however, with Appendix C on page 137 of the Full Staff Report. It has a table displaying the 12 funding categories for the 2017-2026 Unified Transportation (spending) Program.

Category 5 allocates \$2.2 billion of for Congestion Mitigation and Air Quality, aka CMAQ. We all support these goals but it is my belief that if these funds are disbursed as proposed in the various MPO long term plans, air quality will decline and congestion will get worse.

If this funding formula had been proposed in 1967 it would have resulted in positive outcomes but the world has changed. Back then public transit was much cleaner than personal vehicles. But in 2017, travel by car is significantly kinder to the environment than public transit.

This information is found in Edition 35 of the DOE Transportation Energy Data Book. For instance, see Table 2.15 (on page 70). It states that average per-passenger-mile fuel consumption in 2014 for travel by car is 3122 Btu versus 3,829 Btu for travel by transit bus.

On page 72 please see Figure 2.7 which states that travel by light rail consumes 3,844 Btu per passenger mile. (Measurements in Btu's can easily be converted to mpg with equivalent results.) Travel by heavy rail does achieve better numbers than cars but this is irrelevant because because no heavy rail lines are likely to be built in Texas. (<http://cta.ornl.gov/data/download35.shtml>)

Important qualifiers should be understood. DOE is presenting national averages. While the national average fuel consumption of transit buses is 3,829, it varies widely from city to city. In New York it might be 2,000 Btu per passenger mile but in Sun Belt cities like Dallas or Austin it could exceed 4,000 Btu. Public transit makes sense in New York but is idiotic in Texas.

Secondly, DOE presents the trend since 1970, when buses were much cleaner and cars were much dirtier. EPA has already projected the trends from 2014 to 2040 and they are confident that the historic trends will continue. For instance a new American start-up car company expects to begin selling a new 84 mpg car next year, for a base price of \$7,300. They are in crash testing now and have reservation deposits from 63k customers. (ElioMotors.com)

Many transit users ride buses because they can't afford cars or the fuel or insurance. Millions of these poor people will abandon public transit when they can buy affordable cars.

Another important point is that public transit is heavily dependent on diesel engines that are inherently dirty. (Volkswagen didn't have to cheat with their gasoline cars but they, and other diesel car companies had to lie to sell their diesel cars.) Heavy diesel engines found in buses and trains are even harder to clean up. Some improvements have been made but there is little prospect for significant future gains. And since transit has lower fuel economy, and getting worse, the future is dim for government run public transit.

This brings me to new technologies. In 1991 President Kennedy made 2 promises to the nation; he would put a man on the moon in 10 years and he would solve urban congestion too. (Urban congestion has always been a problem, especially for bigger cities. Over the years since 1961, the national average travel time from home to work has remained the same, ~25 minutes.)

Kennedy's urban congestion report was delivered in 1968. The HUD Reports concluded that no combination of roadways and / or conventional mass transit systems would ever solve the urban congestion problem. (https://en.wikipedia.org/wiki/HUD_reports) A subcommittee stated:

"The GRC study examined **four cities**; Boston as an example of a large transit-oriented city, Houston as a large auto-oriented city, Hartford as a small transit-oriented city, and Tucson as a small auto-oriented city. They showed that, with the projected population growth and growth of the use of automobiles, *using conventional transit systems would continue to worsen the problems in cities*. Only by deploying *personal transit systems* would it be possible to reverse the direction."

But the best engineers on Earth could not build a PRT system in 1968. For Instance, each vehicle would need a computer the size of a small refrigerator and costing \$100,000. The technology has now matured and PRT vehicles operate at around 1,000 Btu per passenger mile. And the total cost

per passenger mile is a small fraction of conventional transit. No government subsidies are needed!

Cities in the US have been pitched PRT systems by entrepreneurs who offer to finance, build and run the systems if they can keep the profits. Cities like Austin, have dismissed the offers without discussion! However, Greenville, South Carolina issued an RFP for a system and has 6 offers. And India signed a \$35 billion contract with an infrastructure provider in August.

So, I would recommend that some of the CMAQ funds be used to hire a few PRT engineers for TxDOT, have TxDOT underwrite an international PRT symposium (in Dallas?), fund a PRT study program at A&M etc. TxDOT might also put up some ancillary funding for a demonstration project, like paying for utility relocation (but none of the system construction or operation costs!)

Another possibility would be car-only lanes. TxDOT currently build all roads as dual mode for cars and trucks. This doubles or triples the cost. In some cases where a new facility is not absolutely needed by truckers this could provide great benefit at very low cost. I would suggest some direct connectors from Mopac to IH -35. These could be elevated or tunneled. They would remove thousands of cars per day from downtown Austin. There are a lot of applications in Texas. TxDOT and the lege could also cooperate in drafting a statewide regulatory framework for deployment of PRT systems.

Finally, although I support tolling in specific locations, like if a bridge is to be built across Lake Travis from Lakeway to Lago Vista. Or, I would support tolling I-35 through Austin if, and only if, it is purely a congestion management tool, and not a back door revenue generation plan.

But, as practiced by TxDOT, tolling is being used for empire building. We could build new capacity free roads for much less and have greater congestion reduction and lower environmental impact. And all new monies appropriated by the lege should **only** be used for free facilities!

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