

Why are we still building highways?



A Public Response to TxDOT's Unified Transportation Plan

Everyone **has a right to breathe clean air.**

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Introduction

In the year 2022, why are we still building highways? We've structured our research around this specific question for a number of purposes. We ask this broad question in earnest and we invite dialogue on the topic. In asking it, though, we are encouraging readers to try to answer it themselves. Whether you are familiar with the world of transportation planning or not, what is *your* understanding of the highway and its role in modern society? What are highways' primary functions and how do they impact our daily lives? And, what is the utility of *new* highways or expansion of existing ones?

Our second purpose for starting with the question *Why are we still building highways?* is that it serves as a useful framework for analyzing the Texas Department of Transportation (TxDOT) and its planning apparatus. TxDOT is arguably one of the biggest (both in terms of size and fervor) proponents of highway building and expansions in the United States. Few other states - or other countries, for that matter - expend as much time and money planning and executing highway expansions as does the state of Texas. TxDOT often states plainly that highway construction and maintenance is its primary function. *Why are we still building highways?* is therefore an appropriate question in examining the planning structure that has created one of the largest networks of highways in the world.

Finally, the specific phrasing of the question *Why are we **still** building highways?* suggests that highways are an aging tool whose utility should be questioned. Reevaluating the usefulness of an instrument or process is a regular practice undertaken in every variety of job across the world. Highway building has been the primary tool for transportation and mobility in the United States for decades. Yet, too few question the long accepted reasoning and 'utility' behind highways, despite an increasingly nuanced understanding of their socioeconomic impacts.

Unfortunately, transportation planning entities at every level do not encourage healthy interrogation of this accepted reasoning, either internally or with the wider public. As we analyze in this paper, TxDOT often obfuscates much of the data and planning elements that would allow for a thorough questioning of its planning philosophy. Instead of encouraging dialogue on the emerging needs of our dynamic transportation systems, TxDOT ignores or shuts down attempts at nudging its base philosophy in a new or alternative direction.

Pinning down the exact cause or source of this obstinacy would be difficult. In Texas, it's likely a confluence of bureaucratic stagnation, political dogma, and a vast array of monied interests heavily invested in the status quo of massive highway projects. This inertia has produced a *crisis of imagination* endemic in transportation planning entities and the general public alike. What we mean by this is that the highway's hegemonic reign as *the* preferred tool to solve transportation issues has been so consistently and thoroughly reinforced that people have difficulty imagining a world without them.

The ultimate purpose of this paper is not to convince the reader that highways are bad, but rather to remind the reader of the incredible value of questioning underlying assumptions that make up our shared reality. In the following pages, we will attempt to answer the question *Why are we still building highways?* from multiple perspectives. We start by analyzing aspects of the TxDOT planning apparatus that so prolifically produces highway expansion projects, breaking down agency arguments on congestion, safety, and system performance. We conclude by locating highway expansion projects in the context of the global climate crisis.

An Analysis of the DOT Perspective

The Texas Department of Transportation's website landing page defines their vision as thus: "A forward-thinking leader delivering mobility, enabling economic opportunity, and enhancing quality of life for all Texans."¹ As far as mission statements go, TxDOT's is mild and unremarkable; most readers will likely forget it by the end of this sentence. This mission statement however serves as a good entry point into analyzing how the department and its leadership defines 'transportation' and views its role in developing and maintaining Texas' transportation systems.

'Mobility,' 'economic opportunity,' and 'quality of life' are all very broad terms that can encompass a number of disparate goals and strategies in addressing transportation issues. TxDOT broadly translates these concepts into three planning goals: 'Promote Safety,' 'Preserve Our Assets,' and 'Optimize System Performance.'² These factors reflect priorities prescribed by the primary federal transportation funding legislation.³ These goals form the centerpiece of TxDOT's overall planning vision and serve as the basis for how the department interprets transportation challenges and defines solutions to address these challenges.

TxDOT uses these goals to develop project selection factors to determine which projects will improve the system. TxDOT literature indicates that these three planning goals are a result of a number of intertwining factors: federal requirements from transportation legislation and federal agency regulations; explicit directives from Texas elected officials, such as the Governor and Legislature; existing factors for evaluating system proficiency; and also, apparently, from public input.

TxDOT planning documents further define each of these three goals. 'Promote Safety' is fairly self-explanatory. Major state planning documents such as the Unified Transportation Plan (UTP, the 10 year plan) and Texas Transportation Plan (TTP, the 30 year plan) outline engineering and design, technological, and behavioral strategies to address safety challenges. TxDOT defines 'Preserve Our Assets' as a goal to ensure the maintenance of road and pavement quality, which




¹ <https://www.txdot.gov/inside-txdot/contact-us/mission.html>

² 2022 Unified Transportation Plan and the 2050 Texas Transportation Plan.

³ *Fixing America's Surface Transportation (FAST) Act, passed in 2015. This legislation will be succeeded by the Infrastructure Investment and Jobs Act (IIJA), which will be discussed later on.*

can contribute to both safety and mobility. Finally, the 'Optimize System Performance' goal focuses almost entirely on reducing automobile congestion on highways, suggesting strategies primarily aimed at improving mobility for passenger and freight vehicles.

PERFORMANCE MEASURES AND TARGETS FOR THE TRANSPORTATION SYSTEM

STRATEGIC PLAN GOAL	PERFORMANCE VISION	PERFORMANCE MEASURES	2032 TARGET
PROMOTE SAFETY 	Reduce crashes and fatalities through targeted infrastructure improvements, technology applications, and education	SAFETY: FATALITIES/YR	2,143
		SAFETY: FATALITY RATE	0.70
PRESERVE OUR ASSETS 	Maintain and preserve system/asset conditions through targeted infrastructure rehabilitation, restoration, and replacement	PRESERVATION: PAVEMENT CONDITION	90%
		PRESERVATION: STATEWIDE BRIDGE CONDITION SCORE	90%
OPTIMIZE SYSTEM PERFORMANCE 	Enhance mobility, connectivity, and mitigate congestion through targeted infrastructure and operational improvements	CONGESTION: URBAN CONGESTION	1.20
		INDEX CONNECTIVITY: RURAL RELIABILITY INDEX	1.12

These goals reflect a very narrow understanding of how transportation infrastructure affects everyone's daily lives, as well as a DOT's role in developing and maintaining this infrastructure. Considerations of social cohesion, accessibility, quality of life, public health, and environmental sustainability are all generally missing from the three goals around which TxDOT defines its mission. We will discuss these issues specifically later on. First, it's worth evaluating how TxDOT is addressing

the challenges they've outlined and how successful TxDOT has been within its defined scope. For the purposes of answering our primary question - *Why are we still building highways?* - we will focus on 'safety' and 'system performance.'

Congestion (System Performance)

Traffic congestion is an increasingly controversial topic within the transportation planning world. In decades past, alleviating traffic congestion was a nearly unanimous goal of planners in the US as economies and urban spaces increasingly became dependent on and intertwined with the automobile. Traffic congestion affects most everyone in some way and has often been identified as a primary concern by residents in urban communities. The primary strategy employed in the past to address traffic congestion follows fairly simple logic: if the amount of vehicles on the road is congesting lanes, building more lanes will allow that same amount of cars to travel freely. This argument has resulted in decades of state and local transportation planners relying on roadway capacity expansion to fix congestion - adding more lanes to roads and highways.

TxDOT (formerly the Texas Department of Highways) follows this logic faithfully and dutifully, even as the discourse and research on congestion and its solutions have grown more nuanced. Mitigating congestion has consistently been the department's understood directive, and highway capacity expansion has nearly always been its response. Concerningly, though, recent legislation has essentially codified capacity expansion via highway funding as the preferred solution. Proposition 1 (2014) and Proposition 7 (2015) directed billions of dollars into the State Highway Fund (SHF) and has resulted in state leadership discussing congestion in an oddly zealous manner.

One recent and representative example of this is an ongoing squabble over a voter-approved 'road diet' for San Antonio's Broadway Street. In the process of rehabilitating the aging road, city officials developed a road diet plan. A road diet strategy calls for a decrease in lane capacity in order to improve safety and create the opportunity for a more walkable/bikeable corridor with more amenities. Just before locals began executing the plan earlier this year, TxDOT leadership took the extraordinary step of seizing the road from the City based on an administrative technicality and abruptly halted the planned rehabilitation. Texas Transportation Commission Chair Bruce Bugg's explanation on the move:

"I feel strongly that if this commission does not take this action today and capacity is reduced from three lanes in each direction to two lanes in each direction, we would allow an action that would be in direct conflict with our clear stated policy to provide congestion relief in the state of Texas, specifically in San Antonio. What we're trying to do is stay consistent with our congestion relief initiative and not go backwards by reducing capacity."

TxDOT took these actions on a *voter-approved* project based purely on the idea that a single lane removed in either direction would be detrimental to TxDOT's goal of reducing congestion. Zealous may be an understatement.

This language is particularly perplexing given that expanding options for multimodal traffic is a proven method for reducing congestion. TxDOT nevertheless views capacity expansion as the most effective means of achieving its goals. Every major comprehensive planning document TxDOT produces - UTP, TTP, STIP - all identify congestion as a key issue and capacity expansion as the solution.

In 2016, the TTC created a congestion task force to "identify and address the state's most congested chokepoints and work with transportation planners to get new roads built swiftly and effectively." The task force's base analysis of the issue was wholly unoriginal: Texas' population is steadily growing, and a correlated increase in cars on the road can be expected.⁴ The increase of cars will naturally lead to congestion, which can only be solved by capacity expansion.

⁴ ["Texas Clear Lanes and Congestion Relief Task Force Committee Activity." 2018.](#)

The task force layered in the additional concern of congestion's impact on economic activity, translating congestion hours into loss of productivity. Conversely, the task force claimed that the preferred solution to address congestion - highway expansion - would actually *create* economic benefits. This included temporary construction jobs which in reality don't deliver long-term economic benefits.

This analysis laid the foundation for the Texas Clear Lanes initiative. Broadly, Texas Clear Lanes is the program under which TxDOT allocates billions of discretionary state transportation dollars to 'priority' capacity expansion projects, such as the I-45 expansion in Houston and the I-35 expansion in Austin. To clarify, TxDOT applies this thinking on congestion to all of its projects - TCL is merely the most prominent program espousing and implementing these strategies.

Texas Transportation Institute and the Urban Mobility Report

So, how can TxDOT and its leadership justify pursuing capacity expansion so doggedly, even as other planning entities broaden their vision to consider other solutions (and even ask if congestion is an appropriate priority in the first place)? The answer, in part, lies with the Texas Transportation Institute (TTI). TTI is a transportation research entity housed within Texas A&M University. While TTI produces a large body of research, they are most well known for their annual Urban Mobility Report (UMR) and the corollary Top 100 Most Congested Roadways. The UMR is a yearly analysis of congestion levels in urban areas across the country. It contains metrics used to depict a general state of mobility in urban areas and attempts to quantify the impacts of congestion on economic growth and quality of life.

The UMR's analytical framework and the metrics and congestion metrics form the philosophical basis for TxDOT's work on congestion. The project scoring methodology for TxDOT's short- and medium-term plans relies heavily on these metrics to identify congestion problem areas and estimate potential congestion relief benefits from future projects. TxDOT's Executive Director Marc Williams details exactly how central UMR findings are to TxDOT's work:

"As the 2021 Urban Mobility Report shows, congestion levels in Texas and much of the rest of the country have rebounded to near pre-pandemic levels. In Texas, we continue to see the *same underlying causes* – *a growing population and economy that is producing more passenger vehicle and truck traffic on roadways throughout the state*. That's why we're focused on important initiatives such as Texas Clear Lanes to address the top chokepoints in our state's largest metropolitan areas, as well as understanding the many facets of the traffic challenges we face. Studies such as the 2021 Urban Mobility Report are an important tool in this effort as we continually work to improve mobility and safety on our roadways."*(emphasis added)*⁵

⁵ ["2021 Urban Mobility Report" Texas Transportation Institute](#), 2021.

These methodologies have crept into many aspects of TxDOT planning, in everything from underpinning the aforementioned Texas Clear Lanes initiative to calculating emissions benefits for federally-required environmental impact analyses on major projects. Unfortunately for the people of Texas, the UMR is one of the most heavily criticized and oft ridiculed analyses of transportation planning in existence today.

A number of urban planners, transportation professionals, academics, and advocates have repeatedly identified problems with many aspects of the UMR. These include lack of peer review, faulty and misleading methodologies, misconceptions of major transportation challenges, and its failure to address the basic planning concept of induced demand. One aptly named response to the UMR succinctly sums the underlying issue of the TTI's foremost publication:

“Though it has been produced for decades, the Texas Transportation Institute’s Urban Mobility Report is essentially propaganda for road-building, not a critical analysis of transportation policy. It is designed to generate heat, not shed light. We and others have repeatedly refuted and debunked the methodology, metrics, and findings in this and prior TTI reports.”⁶

UMR Critique

The most detailed and thorough critique of the UMR is regularly produced by Todd Litman of the Victoria Transport Policy Institute. Entitled “Congestion Costing Critique: Critical Evaluation of the Urban Mobility Report,”⁷ Litman responds to TTI’s analyses point by point. Since it would be difficult to concisely summarize the UMR and its critique in its entirety, we will instead highlight a few key indicators that reveal some of the core issues with the analysis.

Travel Time Index is one of the key metrics TTI and TxDOT use to depict congestion. TTI defines it as ‘the ratio of travel time in the peak period to the travel time at free-flow conditions. A Travel Time Index of 1.30 indicates a 20-minute free-flow trip takes 26 minutes in the peak period.’ Litman contextualizes Travel Time Index in a planning paradigm: “Mobility-based analysis considers mobility (physical movement) an end in itself and so evaluates transport system performance using indicators of travel speed such as vehicle traffic speeds, roadway level-of-service and the travel time index.” This is contrasted with an ‘accessibility’ focused planning paradigm, which emphasizes moving people (instead of cars) as efficiently as possible and ensuring equitable access. While TTI can and should be faulted for continuing to operate within an outdated planning paradigm, the calculations employed within their own paradigm and planning context are flawed as well.

⁶“It’s back, and it’s even dumber than ever: the Urban Mobility Report.” Joe Cortright, City Observatory. 2021

⁷ “Congestion Costing Critique: Critical Evaluation of the Urban Mobility Report” Todd Litman, 2021

As Litman explains, TTI is unique in the way it calculates travel time index. While most traffic studies assume a relatively conservative baseline speed for cars in determining congestion levels, TTI uses *measured freeflow speeds* - the speed at which vehicles are moving when there is no congestion - to determine baseline speeds and calculates congestion from there. The issue with this is that measured freeflow speeds are (1) an unrealistic expectation for traffic flow and (2) are often higher than the legal speed limit in the given area.

Explained another way, the UMR only considers a road to be functioning efficiently if vehicles are traveling as fast as they would if there were no other vehicles on the road, *even if that speed exceeds the legal limit*. To use the UMR example quoted above, that '20-minute free-flow trip' could very well be a car going 70mph on a 60mph road. Observing the speed limit would be considered congesting the road in this example. Per Litman: "Freeflow speeds normally exceed speed limits since transportation agencies often set speed limits based on 85th percentile freeflow speeds. This suggests that *between a quarter and a half of the UMR's estimated congestion costs represent speed compliance*" (emphasis added). As one might imagine, building entire infrastructure programs around the idea that a car is only sufficiently mobile if it's going faster than the speed limit may be incongruent with other goals, such as safety.

Understanding this basic underlying assumption makes identifying other issues in the UMR much easier. If congestion is always calculated against observed freeflow speeds, then the resulting congestion costs will of course be exaggerated. As Litman points out, "Its \$166 billion annual congestion cost estimate is about twice the \$87 billion estimated by INRIX, the organization that provides the UMR's basic input data." How does TTI double INRIX's cost valuation? By combining the faulty travel time index and an exaggerated assumption of time valuation. Litman explains,

"Most studies conclude that motorists are willing to pay, on average, 25-50% of wages to reduce congestion delay; for example, a motorist who earns \$16 per hour is typically willing to pay \$4-8 per hour or 7-14¢ per minute for marginal travel time savings. Some travelers (commercial vehicles and people with urgent errands) are willing to pay significantly more, but most travelers are price sensitive and would rather save money than time. It is economically inefficient to spend more to reduce congestion than users are willing to pay."

For the purpose of mobility studies, USDOT recommends valuing personal travel times at 50% of prevailing incomes. The UMR uses a time valuation 33% higher than USDOT's recommended values, leading to results that suggest traffic congestion is much worse and more costly.

We encourage any and all readers interested in these issues to read the entirety of the annual UMR and Litman's ensuing critique. Litman addresses a number of additional issues in much greater detail than we can explain here. Our purpose for detailing some of these admittedly

wonky issues is to illustrate how the very basis of TxDOT's planning and policy apparatus is deeply flawed.

TxDOT planners actively avoid evaluating our state's transportation systems holistically. Highways, arterials, neighborhood streets, buses, trains, trolleys, bike lanes, and sidewalks all comprise an entire transportation ecosystem. When TxDOT planning documents claim certain projects will 'Optimize System Performance,' they're really only examining one small slice of the pie (roadway congestion intensity), and the solutions are narrowly tailored to try to address that specific issue (which it fails to do anyways - constant expansion has not resulted in sustained congestion decreases).

The UMR and its dogged focus on congestion is very representative of the thinking that dominates TxDOT policy, which has resulted in billions of dollars being poured into roadway expansion projects across the state. In sum, we believe the world would be better off if everyone understood the UMR for what it really is: not a comprehensive (or even fully accurate) accounting of transportation issues, but instead a very narrow data tool used for the express purpose of justifying large highway expansions. The fact that TxDOT's preferred solution has failed repeatedly reinforces this point.

Evaluating the Efficacy of Focusing on Congestion

As is the case with most debates within academia, squabbling over the accuracy of transportation metrics and planning paradigms is mostly inconsequential. If the Texas Transportation Institute was shuttered tomorrow and the UMR no longer produced annually, TxDOT would likely continue on with its highway building agenda without skipping a beat. So, it is worth asking: has the focus on congestion produced positive results? Has the vast amount of time and resources allocated to mitigate a single issue - congestion - actually done so?

No. TxDOT projects specifically designed to relieve congestion have not achieved sustained results. Evaluated on a system level, TTI's own UMR numbers suggest that congestion has steadily gotten worse over the past two decades in every Texas locality evaluated. Proponents of this focus may argue that population growth has simply outstripped all of our best efforts to prevent congestion, or that until recently TxDOT hasn't had adequate resources to address the problem. Those arguments might carry more weight if its proponents could point to *any* instance in which a city or state was able to build its way out of congestion. On the contrary, there is a growing body of research that details just how deeply congestion mitigation efforts have failed.

Transportation for America's recent report "Congestion Con" shows that the US has "added 30,511 new freeway lane-miles in the largest 100 urbanized areas between 1993 and 2017, an increase of 42 percent." This significantly outstripped 32 percent population growth over the

same time period. Despite outpacing population growth, the increase in lane miles did not reduce congestion; in fact, congestion grew 144 percent during that same time period.⁸

The fact that 'Congestion Con' actually uses TTI's UMR data to detail this congestion growth lines up a useful thought experiment. TxDOT's and TTI's primary reasoning for projecting increased traffic is population growth modeling. Tuning into any TxDOT-led presentation on congestion will invariably begin with a population growth graph. Well, the US actually executed TxDOT's strategy of increasing capacity to outpace population growth. Why then did it produce such staggering congestion levels?

One of the primary reasons is that TxDOT and TTI refuse to acknowledge induced demand as a proven phenomenon.

Put simply, induced demand is the concept that adding lane capacity to roads and highways encourages more road users, which in turn quickly negates any congestion mitigation benefits realized. This concept first originated as an economic principle over 100 years ago, and has been studied as a transportation phenomenon since the 1960s. Planners since the 1990s have made great strides in quantifying its impact. A recurring issue within the transportation planning world is planning entities' failure to adequately account for induced demand from projects. This has contributed to the undisputed failure of congestion relief projects "Congestion Con" describes.

To say that TxDOT's planners disregard potential induced demand would be an understatement/ TxDOT planning practices often fly in the face of rational traffic modeling by assuming static conditions and uninterrupted congestion relief far into the future. TxDOT continues to ignore the potential impacts of induced demand despite Texas (and more specifically, Houston) being the embarrassing poster child for transportation planning ignorance. *Congestion Con included a great summary of the failure of the Katy Freeway expansion project. We've included it on the following page:*

⁸ ["The Congestion Con." Transportation for America, 2020.](#)

Induced demand Exhibit A: the Katy Freeway in Houston, TX

The Katy Freeway, a segment of Interstate 10 running through the western suburbs of Houston, TX, is an iconic example of induced demand at work: a colossal investment to expand capacity that has failed to produce results. Back in the early 2000s, the Katy Freeway was carrying three times the traffic it was designed to carry and seeing congested conditions for up to 11 hours each day, according to FHWA.¹ Traffic was so bad that the American Highway Users Alliance gave it the title of “second worst bottleneck in the nation” in 2004.² Never one to do anything halfway, the State of Texas took drastic action: in 2008, Texas DOT completed construction of a massive widening project along a 12-mile stretch, increasing capacity to a whopping 23 lanes. The widening project cost the state and taxpayers a staggering \$2.8 billion.

At that scale of investment, you would expect to see improvements in traffic that last for decades, right? Wrong. Congestion on the Katy Freeway has grown worse since its expansion. While travel times at rush hour predictably declined right after the project opened in 2008, travel times began increasing steadily again starting in 2011. According to an analysis by Houston Tomorrow using Transtar data (Houston’s official traffic tracking data source), traveling from downtown outbound on the I-10 Katy Freeway to Pin Oak (~35 miles) took 51 percent more time in 2014 than in 2011. In 2011, this trip took about 47 minutes during peak rush hour; whereas by 2014 the same trip took approximately 70 minutes at the same time of day.³ A similar analysis of different segments of the Katy Freeway by Joe Cortright of City Observatory showed the same results: traffic began worsening again just three short years after the new lanes opened.⁴ Another 2014 analysis by a local television station looking at 200 commute combinations across Houston found 85 percent of those commutes are taking longer than they did in 2011.⁵

The Katy Freeway paints a stark picture: there is no amount of new lanes—and no amount of money poured into widening highways—that will solve our traffic problems. We need a different approach.



Future Katy Freeway plans, image from TXDOT

1 Federal Highway Administration. Project Profile: Katy Freeway Reconstruction. Available from: www.fhwa.dot.gov/ipd/project_profiles/tx_katy_freeway.aspx.

2 American Highway Users Alliance. (2004). Unclogging America's Arterials: Effective relief for highway bottlenecks. Available from: www.highways.org/wp-content/uploads/2004/04/bottleneck2004.pdf.

3 Crossley, Jay, Houston Tomorrow. (2015, May 26). It took 51% more time to drive out Katy Freeway in 2014 than in 2011. Available from: www.houstontomorrow.org/livability/story/it-took-51-more-time-to-drive-out-katy-freeway-in-2014-than-2011/

4 Cortright, Joe, City Observatory. (2015, Dec. 16). Reducing congestion: Katy didn't. Available from: <http://cityobservatory.org/reducing-congestion-katy-didnt/>

5 Reyna, Jennifer, Click2Houston. (2014, Feb. 4). Houston commute times quickly increasing. Available from: <https://www.click2houston.com/news/2014/02/04/houston-commute-times-quickly-increasing/>.

Despite these failures, TxDOT has done little to change its practices. A recent Environmental Analysis conducted for a 12-lane expansion of San Antonio's Loop 1604 (four lanes in each direction expanded to ten lanes in each direction) is a striking example of the agency's refusal or inability to properly model potential induced demand. TxDOT's analysis of the 1604 expansion projected the project would cut average commute times from the current 29 minutes to "around 20 minutes" by the time of project opening in 2025. Ignoring all past evidence of the effect of induced demand, TxDOT projects that by 2045, twenty years after completion of the project, this same trip *will still only take "24 minutes to 27 minutes."* TxDOT arrives at this conclusion based on their projection that adding 12 lanes of highway *will not result in an increase of average annual traffic on this road compared to a no-build alternative.* Put another way, TxDOT projects that by 2045, the same number of cars will use this road whether they add twelve lanes or not. See the table below.

Table 1: Loop 1604 Average Annual Daily Traffic by Year

	From	To	1970	1980	1990	2000	2010	2018	2045 No-Build	2045 Build
	SH 16	La Cantera Parkway	1,300	11,000	13,000	50,000	95,000	127,000	243,000	243,000
	La Cantera Parkway	US 281	1,500	9,000	26,000	83,000	108,000	150,000	287,000	290,000
	US 281	Bulverde Road	1,500	6,000	19,800	63,000	78,000	131,000	257,000	257,000
	Bulverde Road	I-35	1,400	8,000	20,000	61,000	81,000	112,000	220,000	225,000

Source: TxDOT 1970; TxDOT 1980; TxDOT 2019a

Table 1 presents traffic data by decade from 1970 to 2010 plus 2018 and the highest projected average annual daily traffic (AADT) traffic volumes on Loop 1604 for the 2045 No-Build Alternative and the 2045 Build Alternative (see Section 4.1). **Exhibit 1** shows the existing and future traffic volumes and travel times along Loop 1604 for the "No Improvement" and the "With Improvement" conditions, which correlate to the No-Build Alternative and Build Alternative, respectively.

Faulty congestion mitigation methodology underpins major highway expansion projects like this across the state. Expansion projects will dominate TxDOT's plans for years to come unless TxDOT reckons with the folly of congestion relief. TxDOT must reevaluate this goal, particularly as it comes into conflict with another major goal: safety.

Safety

Among policymakers, experts, and advocates, improving safety in transportation is a largely unanimous goal with little consensus on how to actually achieve safer roads. Safety is an ever present topic in transportation planning circles mainly due to just how dangerous it is to walk, bike, and drive in the United States. Compared to other similarly developed countries, people in the US are 4-6 times more likely to die in a traffic collision.⁹ In 2021, nearly 43,000 people died on US roads and sidewalks; 7500 of those were pedestrians.

Texas is sadly at the forefront of what many planners call a traffic death 'epidemic.'¹⁰ Texas consistently leads the nation in traffic-related deaths, including deaths on highways. Traffic collisions have killed 3500 Texans per year on average over the last decade. One of TxDOT's central safety messaging campaigns, #EndtheStreakTX, highlights the tragic statistic that at least one Texan has died on a Texas road every day for 21 years straight - stretching back to November 2000.

According to TxDOT, the cause of our dangerous roads is a combination of design and behavioral issues: poorly designed roads, roads behind current design practices, inconsiderate and careless drivers, and driving while intoxicated. TxDOT's messaging around the #EndtheStreakTX campaign is actually fairly indicative of their general disposition towards traffic safety. A recent press release reads:

Texas Transportation Commissioner Laura Ryan, a champion for road safety and TxDOT's #EndTheStreakTX campaign, said every Texan must do their part. And while the goal of ending the deadly streak is ambitious, Ryan said, it is far from impossible.

"We stick with it. We keep telling the story. We fight back when people say personal responsibility is not a thing. It is. And we don't give up," Ryan said. "I am hopeful that it will happen sooner than later, but I am confident that it will happen."

Most crashes and fatalities are preventable and caused by things such as speeding, drunk driving and distracted driving. That's why the approach to reaching zero deaths must be through what TxDOT calls the 3 E's – engineering, education and enforcement. That way, everyone has a responsibility to keep our roads and fellow drivers safe.¹¹

While TxDOT's identification of the 'causes' of road fatalities isn't exactly wrong, the focus on personal responsibility to solve the issue misses the mark. To add some context: the Texas Transportation Commission (TTC), of which Laura Ryan is a member of, is the governing board of TxDOT. The Governor-appointed commissioners set transportation policy, oversee budgeting

⁹ ["Deaths and Injuries in Road Crashes Are a 'Silent Epidemic on Wheels' Governing.com. 2022.](#)

¹⁰ ["New Report: America's Epidemic of Traffic Deaths Is Getting Worse." Strong Towns. 2022.](#)

¹¹ <https://www.txdot.gov/inside-txdot/media-center/psas/end-streak.html>

and project selection, and serve as the executive body for the TxDOT bureaucracy. Given her role and the extent of her authority over transportation planning in the state, it's somewhat odd to see her and the agency she represents put so much of the onus of the problem on personal responsibility. This misplaced blame can at least partially be explained by TxDOT's flawed conception of road safety and competing planning priorities that the agency is unwilling or unable to reconcile.

While TxDOT's various planning documents do outline a number of modernizing engineering and design strategies intended to lessen the frequency and severity of traffic collisions, missing from nearly all of these plans is the major factor of *speed*. Vehicle speed is one the primary factors in fatal traffic collisions. USDOT guidance on road safety explains:

"Speeding increases both the frequency and severity of crashes, yet it is both persistent and largely accepted as the norm amongst the traveling public.² Unsafe speeds are now a well-documented and understood factor in death and injury, especially among people outside of a vehicle."¹²

Smart Growth America, who produces a yearly safety report entitled "Dangerous by Design," explains

"Designing roads for high speeds dramatically increases the likelihood that a person struck while walking will be killed. At 40 miles per hour, 85 percent of crashes involving a person walking are fatal. Designing streets for slower speeds is directly connected to improving safety and reducing deaths."¹³

As we explored in the previous section, TxDOT congestion mitigation strategies run directly contrary to the notion of reducing vehicle speed on a systemic level. TxDOT highway expansion projects are instead designed to create space to allow personal vehicles to move as fast as possible at any given moment. Returning to Litman's critique of the Urban Mobility Report, TxDOT congestion methodology only considers a road to be functioning efficiently if vehicles are traveling as fast as they would if there were no other vehicles on the road, even if that speed exceeds the legal limit. Litman explains, "between a quarter and a half of the UMR's estimated congestion costs represent speed compliance."

¹² [Safer Speeds. USDOT](#)

¹³ ["Dangerous by Design." Smart Growth America, 2021.](#)

Despite “Promote Safety” and “Optimize System Performance” being two of TxDOT’s three strategic goals, the agency has done little to reconcile the conflicts between the two. Instead, TxDOT leadership sees reducing vehicle speed as the individual driver’s responsibility. Another quote from Commissioner Ryan:

“Driver behavior is one of the causes, but also one of the most important solutions. This is not blame. These are facts. We all have a role. TxDOT can do more, and we accept that responsibility. The driving public can do more. For instance, in 2021, a total of 1,522 people were killed because of speed, and a total of 1,219 people were killed because they were not wearing a seat belt. These were *decisions made by people* that could have potentially saved 2,741 lives.” (*emphasis added*)¹⁴

It takes a certain level of cognitive dissonance to spend billions on widening highways to increase traffic speeds while simultaneously blaming drivers for speeding. TxDOT’s inconsistency on this point goes beyond misplacing responsibility, however. In recent years, TxDOT has actively undermined Texas cities’ attempts at improving safety.

Vision Zero and Local Initiatives

Many states and localities have recently adopted Vision Zero programs, the central goal of which is to eliminate traffic deaths by a certain time period (often 2030-2050). The international Vision Zero movement professes that all traffic-related deaths and serious injuries are preventable, human failure is inevitable, and a systems approach is better than relying on individual responsibility. Lower speeds are a key principle of Vision Zero.

Houston, Austin, San Antonio, and Laredo each have adopted Vision Zero goals and plans. As the Vision Zero network calls for, these cities are attempting to implement strategies focused on systematically removing human fallibility from the safety equation by reducing speeds and improving road design. This has led to a philosophical conflict with TxDOT.¹⁵ But we are also seeing disagreements play out in real time.

Returning to San Antonio’s Broadway road diet as an example, we have firsthand evidence of what happens when a safety measure conflicts with congestion mitigation. One of the primary goals of the road diet is to create a safer design on a street which has been a severe injury area for both pedestrians and bicyclists. The city’s redesign would have reconfigured two travel lanes for bike lanes, a proven safety countermeasure from FHWA.¹⁶ Despite this potential benefit, TxDOT rescinded control of the road and halted the plan based on the reasoning that reducing lanes would increase congestion. TTC Chair Bruce Bugg: “What we’re trying to do is stay

¹⁴ “2021 Marks Second Deadliest Year On Texas Roads.” TxDOT. 2022.

¹⁵ “The Streak: 20 years, 70K deaths and unfulfilled plans for zero road fatalities in Texas.” Dug Begley. 2020.

¹⁶ U.S. Federal Highway Administration, 2021. “Road Diets.”

consistent with our congestion relief initiatives and not go backwards by reducing capacity. This action we're contemplating has nothing to do with — against bike lanes or whatever — it has to do everything with maintaining capacity."

This issue will likely persist as the state continues to funnel money into projects that increase speed while failing to enact proven safety measures.

...

TxDOT has failed to achieve its expressed goals, even within their own narrow conception of what constitutes transportation and how infrastructure affects our daily lives. These failures have consequences, almost always borne by the people of Texas. The continuing prioritization of speed over all else has almost certainly contributed to annual traffic fatalities in Texas. Policies and projects that increase reliance on cars for basic daily needs all but guarantee continuing environmental problems in major urban areas.

Looking at Houston specifically, the enormous amount of cars on the road daily have contributed to Houston's worsening air. Our city has yet again failed to meet attainment under the National Ambient Air Quality Standards (Houston has *never* been in attainment - meaning sufficient air quality - since the passage of the Clean Air Act in 1963). Houstonians were subjected to three separate '500 year' flood events between 2016-17: Tax Day floods, Memorial Day floods, and Hurricane Harvey. Impermeable concrete surfaces, such as the kind used for the massive network of highways crisscrossing the city, have proven to be a leading contributor to urban flooding issues.

All of this is to say that TxDOT's flawed philosophy and narrow conception of transportation infrastructure hasn't just wasted time and taxpayer money, it's actively harming the state. Modern planning institutions must incorporate the growing understanding of how transportation impacts everyone's daily lives: not just getting from point A to point B, but how the infrastructure provides or denies access and opportunity; how it protects or destroys environmental sustainability and resiliency; how it enhances or hinders public safety and quality of life.

TxDOT is nevertheless primed to double down on outdated and outmoded planning paradigms despite ample evidence of their inadequacy. The draft 2023 Unified Transportation Program contains \$34.58 *billion* dollars allocated explicitly for highway widening projects across Texas. Above we have summarized some of the local and practical problems with this approach. Below, we will explore how this highway widening agenda will accelerate an ever-growing existential threat: climate change.

Why are we still building highways? A Climate Perspective

Greenhouse Gas Emissions Reductions Outlook

Climate change caused by anthropogenic activities over the past ~150 years may prove to be the most difficult challenge the collective We face over our lifetimes. Despite clear evidence of impending crises, the weight and momentum of human social and economic activity is seemingly carrying us faster and closer to a point of no return, where no amount of emissions reductions, mitigations, and adaptations will be able to stave off mass ecological collapse and untold human suffering.

Climate change has often been referred to as a 'super wicked problem' - "its causes are multiple and complex, its impacts are uncertain and interrelated, and potential solutions to climate change might well cause further problems."¹⁷ The breadth of climate change causes and impacts are difficult to even properly conceive of, much less master and sufficiently address.

Given the nature of climate change, it is easy to understand how its rapidly growing impacts can go unnoticed by the general public. However, the global outlook on this issue has steadily deteriorated over the past few years, as evidenced by the increasingly dire reports coming out of the International Panel on Climate Change (IPCC). The latest report as of this writing, released April 2022, notes that the global community has all but missed its opportunity to reduce emissions enough to limit global warming to 1.5C; warming beyond this will drastically increase the number and size of ecological disasters across the world.¹⁸ The international community of scientists that comprise the IPCC warn that emissions must be cut rapidly, at a pace not yet achieved by any of the world's largest emitters.

The US shares a large responsibility for the amount of greenhouse gasses (GHG) emitted every year. According to a 2018 GHG inventory, the US is responsible for over 6000 Mt CO₂e (metric tons of carbon dioxide equivalent), which is second in total by a nation and first measuring by capita.¹⁹ Disturbingly, total US carbon emissions have increased yearly since the signing of the Paris Climate Agreement in 2015.²⁰ 2020, the year of the onset of the COVID-19 pandemic, was the one exception. The 'lockdowns' that occurred intermittently to prevent COVID spread led to a sharp decrease in carbon emissions that year. Emissions promptly rebounded in 2021.²¹

The transportation sector has overtaken power generation in the past decade as the largest contributor to US GHG emissions. A recent report by the Georgetown Climate Center estimates that nearly a third of US carbon emissions source from transportation, with roughly 80 percent

¹⁷ ["Climate change is a super wicked problem." Chris Reidy, 2013.](#)

¹⁸ ["Climate Change 2022: Mitigation of Climate Change." IPCC, 2022.](#)

¹⁹ ["This Interactive Chart Shows Changes in the World's Top 10 Emitters." World Resource Institute, 2020.](#)

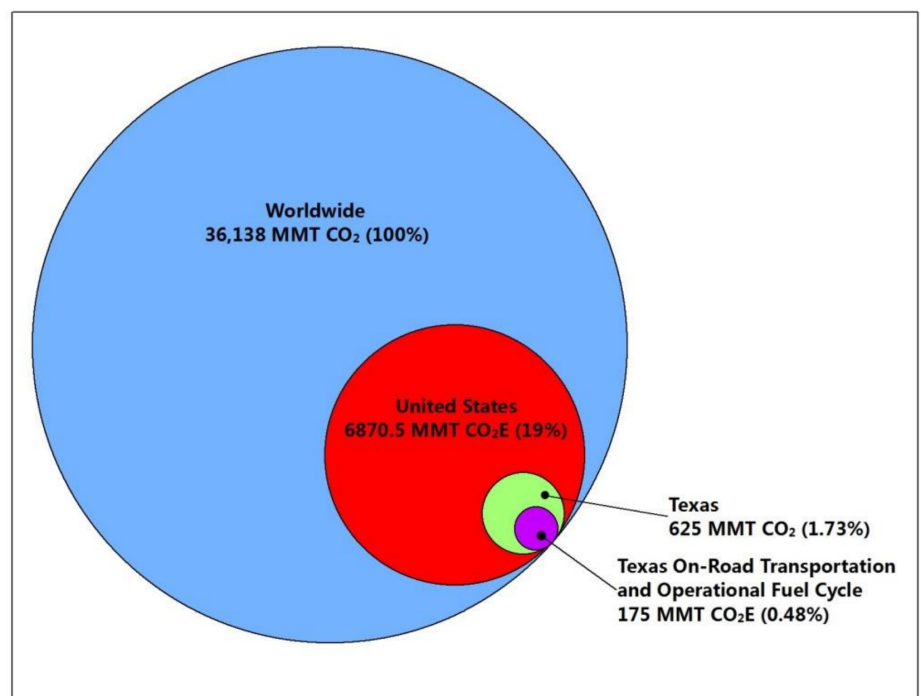
²⁰ ["Inventory of U.S. Greenhouse Gas Emissions and Sinks." Epa.gov.](#)

²¹ ["Preliminary US Greenhouse Gas Emissions Estimates for 2021." Rhodium Group, 2022.](#)

of that chunk coming from cars and trucks.²² Transportation was also the largest source of fluctuation in emissions between 2020 and 2021 - the sector saw “a 10 percent increase in emissions in 2021 after a 15 percent decline in 2020,” according to a report produced by the Rhodium Group. Per the same report, “much of that rebound was driven by a rise in diesel-fueled trucks carrying goods to consumers as e-commerce surged, with freight traffic climbing above pre-pandemic levels.”

The most recent inventory of Texas statewide GHG emissions was conducted in 2014. Even at this earlier date, Texas was well ahead of the national trend in that the transportation sector accounted for roughly a third of the state’s GHG emissions. This proportion has likely grown in the subsequent decade. Given how much of Texas’ transportation system relies on SOV automobile trips, this disproportionality compared to the national trend is unsurprising. Texans have to drive more, therefore we emit more. *(Note: this disproportionality does not suggest that Texas industrial GHG sources are relatively ‘clean’. We emit an insane amount from industry and electricity production as well, we just emit more from transportation. It should all be alarming.)*

Figure 4: Comparison of 2014 Texas, U.S., and Worldwide CO₂ Emissions



Source: TxDOT, 2017

This brief summary of the GHG emissions outlook is all to say that our future looks bleak. Among the world’s leading emitters, emissions outputs do not seem to be slowing down in any significant way. In many cases, emissions are increasing. Such is the case in the US, and the growing transportation sector is at the forefront of these increasing emissions. Texas alone is responsible for an alarmingly disproportionate amount of emissions per capita, largely due to the amount we drive.

²² [“Issue Brief: Estimating the Greenhouse Gas Impact of Federal Infrastructure Investments in the IJJA.” Georgetown Climate Center, 2021.](#)

To the seasoned climate activist and new reader alike, all this can seemingly amount to an insurmountable cascade of issues. And they're right. To return to the concept of a super wicked problem, the extent of the causes of climate change and the potential solutions necessary to curb these causes are quite impossible to conceive of in their entirety. This author believes that the nature of this issue leads to, in part, the widespread ambivalence about what many describe as an impending apocalyptic event. This author also suspects that we will ultimately fail in our attempts to stop or even substantially limit global warming. However, *this does not mean it's not worth throwing our entire weight into the fight*. As Dr. Jim Skea recently put, "Every fraction of a degree matters. Even if we go beyond 1.5 [degrees Celsius], that doesn't mean we throw up our hands and despair." But our energy should not be expended randomly. If the nature of the super wicked problem suggests the causes and solutions are so disparate and unwieldy, we should take that as a sign to focus on the immediate and local.

Reducing Transportation GHG Emissions

So, what *can* We do to reduce emissions? What is immediate and local? For the 26 million plus Texans across the state, cars and their emissions are about as immediate and local as it gets. Most climate action planning documents call for a two-pronged approach to address transportation emissions. These prongs can generally be described as: mode switch, or driving less in favor of more sustainable modes of transportation; and fuel switch, or powering our vehicles with cleaner, renewable energy sources. Ideally, some combination of policies supporting these goals would eventually result in carbon neutrality in the transportation sector. The steady growth of electric vehicles in the personal vehicle marketplace has been cause for hope for many. However, a growing body of research indicates that EVs will not prove to be a panacea - we cannot switch fuels fast enough to meet our goals, and everyone owning an EV presents a host of issues of their own (EVs still produce a significant amount of air quality issues, and sourcing materials for EV and battery production can be just as detrimental as a combustion engine).^{23 24 25 26}

This leaves driving less as an attractive but oft overlooked option. The factors that would create an environment where driving less was an option - improved land use, improved multimodal options - have a host of other co-benefits as well. Fewer SOV trips improves safety for people inside and out cars, and can lead to improved air quality. Better walking and biking options offer more accessibility and encourage healthy lifestyle habits. Effective public transportation has proven to reduce congestion as well.

²³ ["Electrification of light-duty vehicle fleet alone will not meet mitigation targets." Alexandre Milovanoff. 2020.](#)

²⁴ ["Electric Cars Won't Solve Climate Change." Connor Bronsdon. 2021.](#)

²⁵ ["Electric Vehicle Adoption Not Happening Fast Enough to Meet Climate Goals." Arianna Skibell. 2021.](#)

²⁶ ["Electric Vehicles Won't Save Us." Coby Lefkowitz. 2021.](#)

Regulatory bodies are increasingly accepting and operating on these arguments. Since the passage of the Infrastructure Investment and Jobs Act (IIJA), FHWA has been laying the groundwork for policies intended to prioritize projects and investments that improve multimodal infrastructure, encourage safety and accessibility, and reduce emissions. FHWA issued a memo in December 2021 offering guidance on how IIJA funds should be used by states. The second paragraph highlights expected priorities:

This guidance is intended to serve as an overarching framework to prioritize the use of BIL (Biden Infrastructure Law) resources on projects that will Build a Better America. The intent of the guidance also is to ensure that the funding and eligibilities provided by the BIL will be interpreted and implemented, to the extent allowable under statute, to encourage States and other funding recipients to invest in projects that upgrade the condition of streets, highways and bridges and make them safe for all users, while at the same time modernizing them so that the transportation network is accessible for all users, provides people with better choices across all modes, accommodates new and emerging technologies, is more sustainable and resilient to a changing climate, and is more equitable.

Appropriately dry enough, but interesting in that it explicitly highlights safety, accessibility, and sustainability while excluding mobility or congestion reduction. The memo charges states with applying these priorities to both 'legacy' programs (formula funding pots such as the National Highway Performance Program and Surface Transportation Block Grants) as well as programs created by the IIJA. In addition to laying out steps for how these funds can be prioritized, the memo includes a section specifically arguing against these funds being used on capacity expansion projects. FHWA even states they will "encourage—and where permitted by law, require—recipients of Federal highway funding to select projects that improve the condition and safety of existing transportation infrastructure within the right-of-way before advancing projects that add new general purpose travel lanes serving single occupancy vehicles (SOV)."

Despite this rhetoric, one of the primary impediments to reducing reliance on SOVs nationwide is unfortunately the IIJA itself. Most every state and MPO planning apparatus is built around highway proliferation. Federal funding has historically supported this. Funding for new and expanding highways has been heavily prioritized over all other modes since the birth of the national highway system. This focus on highways helped create the situation we're in today.

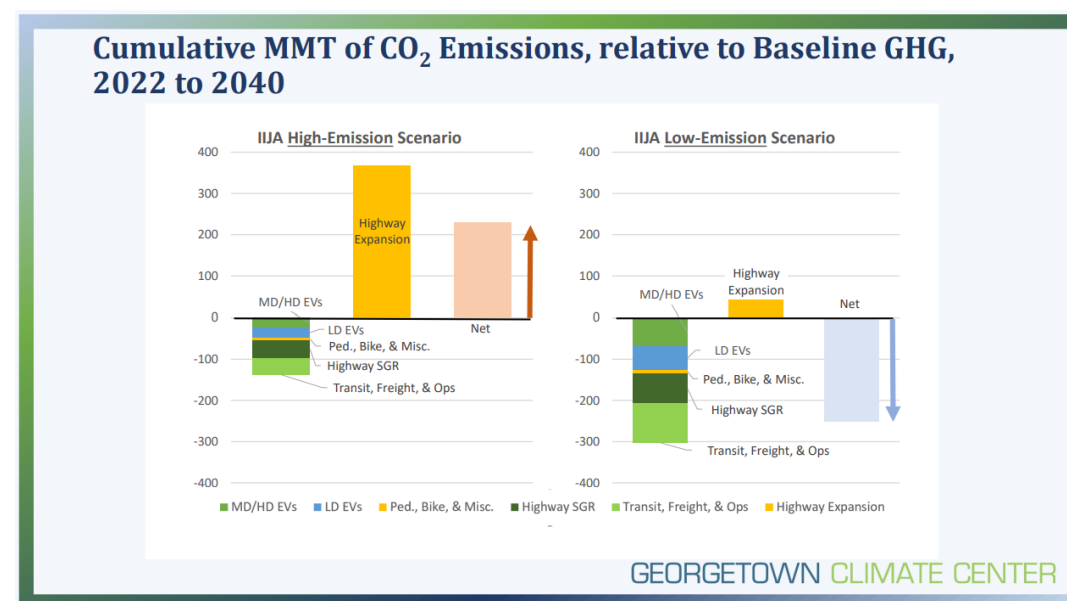
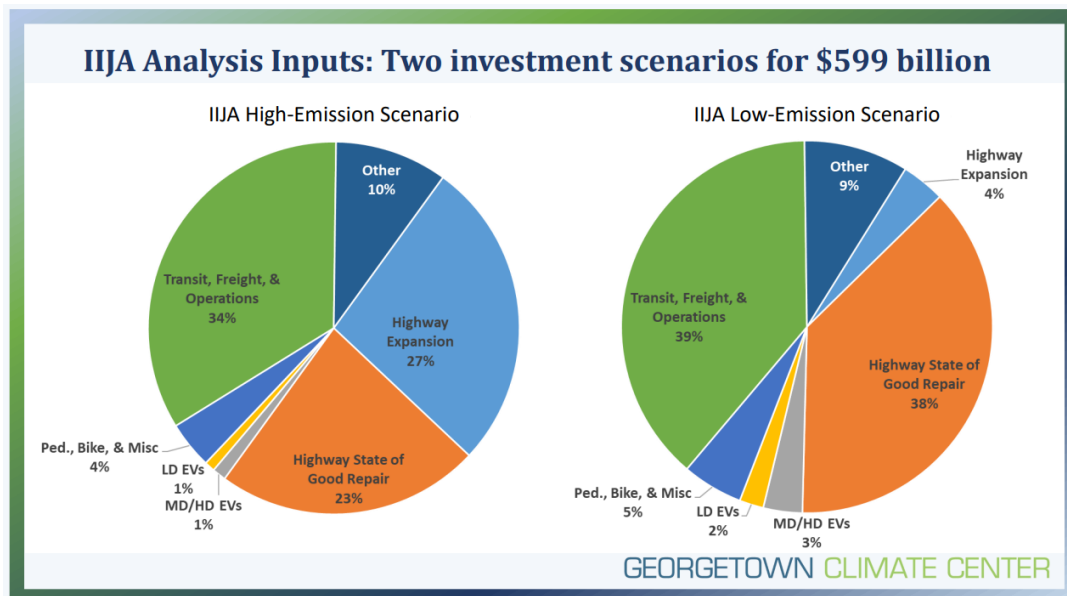
Many transportation policy observers held out hope that the IIJA would mark a change of course. Unfortunately, it did not. While the IIJA did allot an unprecedented amount of funding for multimodal transportation (as well as a host of other programs focused on climate, safety, and environmental justice initiatives), this funding was yet again dwarfed by the also unprecedented proportion for highways - \$432 billion for highways versus \$109 billion for transit. Even as FHWA

is making a policy argument for reducing reliance on highways, the IIJA itself goes a long way to solidify the status quo.

The Georgetown Climate Center recently published a report quantifying how this investment in the status quo will impact our GHG emissions reductions targets. The report details much of what we've summarized here - the transportation sector is the largest source of GHG emissions in the US, largely caused by the reliance on personal vehicles, and reducing VMT is the primary strategy to reduce these emissions. But can the new federal legislation improve our outlook?

Researchers developed two scenarios for potential investments of IIJA funds - High Emissions and Low Emissions.

As you can see in the figures, the primary factor determining emissions outputs from potential IIJA investments is the proportion allocated for highway expansions.



They write:

The Infrastructure Investment and Jobs Act includes hundreds of billions of dollars available for a range of low-carbon transportation investments: new and improved transit, EV charging infrastructure, highway resurfacing and other strategies can all help to reduce emissions. However, if a substantial portion of IIJA funding is directed toward highway expansion, emissions increases from induced demand associated with highway expansion have the potential to reverse the benefits of the low-carbon transportation investments.

The report shows that “states have long had significant flexibility to use [federal] funds to meet various transportation needs and priorities,” and that using this flexibility to change transportation investment strategies is essential to reducing GHG emissions.

Though convincing a state DOT to alter its primary investment priorities is challenging enough, Texas has an additional regulatory layer impeding sustainable transportation spending. Texas’ primary pot of state transportation funding - the State Highway Fund (SHF) - is constitutionally dedicated to being used exclusively on highway projects.²⁷ TxDOT claims that even if they wanted to use the funds on other types of projects, ~97% of state transportation funds in Texas must be used on highways and nothing else. So what does this mean for the massive influx of federal funds (over \$30B over the next five years²⁸) about to crash into Texas? Unless significant changes are made to the SHF structure and use, a vast majority of any ‘flexible’ federal funds will likely be used for highways. The current draft 2023 Unified Transportation Program contains \$34.58 billion dollars allocated explicitly for highway widening projects.

Thus, Texas is primed to help realize the High Emissions scenario outlined in the Georgetown report. This is unacceptable, and we urge TxDOT and state elected leadership to take necessary steps to rectify this situation. We’ve outlined our recommendations below.

²⁷ Art. III Sec. 49-g, Texas Constitution.

²⁸ [“Federal Funds to Texas.” Texas Comptroller, 2021.](#)

Policy Recommendations

- **Reevaluate congestion mitigation as a planning goal.** TxDOT's efforts to systematically reduce congestion have failed and the methodology underpinning these efforts is irreparably flawed. Additionally, this methodology runs directly counter to the urgent problems of traffic safety and emissions reduction. TxDOT and its leadership must reckon with this failure before the state spends billions of dollars more on doomed expansion projects.
- **Eliminate the Texas Clear Lanes program.** The billions of dollars in this discretionary fund would be much better used on expanding multimodal infrastructure, improving safety, and repairing existing roads.
- **Expand the use of the State Highway Fund (SHF).** The SHF contains nearly all of our state-generated transportation funds, yet is solely dedicated to use on highways. Restricting these funds from being used on public transit, sidewalks, bike lanes, and many other types of transportation infrastructure is asinine. The Texas Legislature must pass legislation to remove these restrictions.
- **Acknowledge the reality of climate change and create a transportation emissions reduction plan aligned with federal goals.** The climate crisis is upon us. State leadership ignoring this reality can only result in hardship borne by the people of Texas. TxDOT must develop an emissions reduction plan that aligns with the federal goal of 50 percent reduction of carbon emissions from 2005 levels by 2030.

New and Exciting Futures

To summarize our perspective: we are in dire straits. Successive climate reports indicate we're barreling past irreversible mitigation targets and are failing to successively implement policies to slow this momentum. Even isolating aspects of the emissions crisis to more wieldy chunks - as we've attempted to do here - can line up a series of challenges seemingly too difficult to overcome within the timeframe the crisis demands.

I personally feel doubtful about our chances at success, nor do I know what 'success' looks like. I'm certain I'm not the only one that feels powerless in the face of this existential threat. But we do have power. At the very least, we have the capability within ourselves to ask questions and challenge the status quo of our everyday lives. Interrogating the 'realities' of our social and economic norms can open the door to imagining new and exciting futures. And this, in my mind, is the key element to any worthwhile stand against climate change - breaking the crisis of imagination and constructing new realities people will enthusiastically embrace.