Contents

Summary and Findings: Overcoming Vehicle Supply Chain Disruptions and Large Cost Increases Involves a Variety of Strategies Implemented by Governments.

Imagine purchasing a new ambulance—critical for public safety—then waiting over three years, only to encounter rising costs and no clear delivery date. This situation reflects a widespread challenge that continues to affect state and local governments across Tennessee and the nation. Interviews with approximately 30 government officials in Tennessee, representing fire, emergency medical services (EMS), highways, public works, school districts, and purchasing departments, confirm that vehicle procurement delays are extensive and potentially affect the ability to maintain essential public services. Stakeholders report delays of two to five years for specialized vehicles, like fire trucks and ambulances, which complicates fleet replacement and planning for local governments. Custom features, such as color or safety equipment needed for these emergency response vehicles, exacerbate the problem, extending delivery times beyond those for basic vehicles like pickup trucks or sedans.

Alongside these delays, vehicle costs have surged since the beginning of the COVID-19 pandemic in 2020. For instance, in 2015, an ambulance cost approximately $178,000, and in 2023, a similar ambulance was 70% more, according to a representative of the Tennessee Ambulance Service Association. The cost of other critical vehicles, like school buses and fire trucks, has also jumped. Many departments are now forced to keep older vehicles on the road longer, leading to increased maintenance costs and potential service challenges. Recognizing these issues, the Tennessee Advisory Commission on Intergovernmental Relations, in response to a request from commission member and Dickson County Mayor Bob Rial at its January 2024 meeting, directed commission staff to study the challenges faced by state and local governments in acquiring vehicles, including fire trucks, salt trucks, and school buses, and assess the potential effects on public service delivery. The commission finds there are several strategies to improve planning and flexibility that state and local governments can use to mitigate the effects of delays and cost increases for rolling stock. Each of these strategies can be implemented without action by the General Assembly.

Procurement challenges vary in part because state and local governments buy and use a wide variety of vehicles to provide public services.

State and local governments rely on a mix of light-duty and heavy-duty vehicles to deliver many different public services. While both light- and heavy-duty vehicles are essential to government operations, the extent and likelihood of procurement challenges vary in part based on vehicle type.

- Light-duty and medium-duty vehicles, such as sedans, mini-vans, SUVs, police cruisers, and pickup trucks, support administrative functions, maintenance, public safety and other basic services. These vehicles are generally easier to acquire than heavy-duty vehicles because they align more closely with consumer market production by manufacturers, making them somewhat less vulnerable to supply chain issues than their heavier counterparts.
- Heavy-duty vehicles, including fire trucks, ambulances, dump trucks, and school buses, are crucial for emergency response, public safety, infrastructure maintenance, and student transportation. But they often involve complex and customized components, requiring a more intricate manufacturing process and leading to prolonged procurement times.

Procurement challenges are mostly the result of national and international supply chain and federal regulatory issues.

For both light- and heavy-duty vehicles, the challenges related to acquiring them are not specific to Tennessee—they are national and international issues. In general, the delays in vehicle delivery and rising costs stem from global supply chain disruptions that either have their roots in or were exacerbated by the COVID-19 pandemic when production was shut down, triggering severe bottlenecks in manufacturing. According to national industry organizations such as the American Public Works Association and the National Association of State Procurement Officials, no state, including Tennessee, has been immune to these obstacles or seems to have solved the problem.

A primary pandemic-related factor causing delays has been the global shortage of microchips, a crucial component in modern vehicles. During the pandemic, many microchip manufacturing facilities shut down. The automotive industry, which relies on advanced microchips for functions like navigation, safety, and fuel efficiency, has been hit especially hard by the resulting shortage. Public service vehicles are no exception—the lack of microchips has delayed production across all vehicle types, affecting light-duty administrative vehicles as well as highly specialized units like ambulances.

A combination of labor shortages and labor reductions in vehicle manufacturing plants are another pandemic-related factor that have affected vehicle production timelines. The automotive manufacturing workforce experienced steady growth from 2016 to 2019, only to sharply decline in 2020 as a result of the COVID-19 pandemic, according to data from the US Bureau of Economic Analysis. Through a combination of layoffs and retirements, manufacturing facilities have been left with a reduced workforce, hindering production—from part fabrication to final assembly—across nearly every stage of vehicle manufacturing. It has been especially problematic for producing complex, heavy-duty

public service vehicles, which require skilled labor for specialized assembly and customization. While employment levels in the automotive manufacturing sector have rebounded since 2021, reaching pre-pandemic levels by 2023, the lingering effects of the workforce reductions during the pandemic continue to strain the supply chain and, as a result, government agencies.

In addition to these pandemic-related factors, stakeholders interviewed and industry literature point to expected changes in environmental emissions regulations as another factor affecting supply chain and cost. Whether these changes will be implemented or rolled back under the new federal administration is unclear. Regardless, the mere possibility that manufacturers might have to comply with stricter standards has affected the industry—manufacturers are already making changes to new model years. These modifications not only add complexity to the manufacturing process and lengthen production times but also require investment in research, development, and new equipment, contributing to higher costs for both manufacturers and end consumers. Heavy-duty, specialized vehicles are particularly affected because these vehicles often require specific engineering to maintain both performance and regulatory compliance.

State and local solutions to supply chain disruptions and rising costs are limited, but there are ways to mitigate some of their worst effects.

The supply chain disruptions and rising costs that state and local governments face when procuring rolling stock are largely beyond their control. Short of producing their own vehicles—a private EMS company based in Chattanooga has started buying transit vans and refitting them with necessary features to function as ambulances because it is faster and cheaper than ordering and waiting for chassis—they will generally have to make do and adapt using the resources and strategies already available to them.

Federal grant funding—a method for offsetting costs to state and local governments—is available and can be used for rolling stock, though to a certain extent it increases competition for vehicles in short supply. The increased access to funds for vehicles does not in turn increase supply and production, only demand. For example, the American Rescue Plan (ARP) Act, passed in response to the pandemic, included funding that could have been spent on public safety vehicles, and local officials in Tennessee reported using this funding for rolling stock. Access to ARP funds ended in December 2024. Other federal programs are still available, though they may be limited to certain types of vehicles: The US Environmental Protection Agency's Clean School Bus Program provides funding for electric or propane buses. Several school systems in Tennessee have accessed this funding to add electric buses (Putnam and Union counties) and propane buses (Clarksville-Montgomery County) to their fleets. Congress also passed the CHIPS

and Science Act in 2022 to boost domestic production of microchips—including those used in public service vehicles—to reduce dependency on foreign suppliers and stabilize the supply chain, thereby potentially reducing lead times for vehicle production. With early improvement becoming evident, this represents a strategic federal effort to mitigate one of the core issues contributing to vehicle procurement challenges faced by state and local governments.

At the state and local level, planning and flexibility are key approaches for addressing issues resulting from supply chain disruptions, because they enable governments to respond proactively and adaptively to delays and price increases. Planning allows governments to anticipate potential delays, allocate resources efficiently, and develop contingency measures, while flexibility ensures they can adjust to changing market conditions and explore alternative solutions. Together, these approaches help governments prepare for uncertainty, optimize resources, and maintain essential services despite external pressures.

Identified Strategies

- **Establish vehicle maintenance and replacement plans**: Agencies like Madison County's fire department are addressing procurement delays by planning well in advance, for example, by ordering fire trucks up to four years early. This proactive strategy is recommended by the National Association of State Procurement Officials (NASPO)—a national industry organization—and reflects a systematic approach to ensuring fleet readiness despite supply chain disruptions.
- **Leverage fleet management software and global positioning systems (GPS)**: Cities such as Franklin and Metro Nashville-Davidson County are using specialized software to track vehicle condition and maintenance schedules, routes, driving behavior, fuel efficiency, and other data points to help anticipate fleet needs and disruptions and improve efficiency. NASPO recommends that fleet managers consider using fleet management software.
- **Consider vehicle repair over replacement**: Governments are increasingly weighing the cost-effectiveness of repairing existing vehicles versus replacing them, as supply chain delays and rising costs force a shift in traditional decision-making practices. Metro Nashville and the Tennessee Department of Transportation (TDOT) are extending the lifespan of existing vehicles by reallocating resources to maintain and repair aging fleets. This approach helps mitigate immediate fleet shortages and delays in new vehicle procurement, though it requires balancing repair costs against long-term fleet sustainability.

School buses need additional consideration because they have mandatory replacement schedules.

- **Prepare a contingency plan for vehicle leasing or renting**: Creating a backup plan to lease or rent vehicles helps fill gaps and maintain service continuity during fleet shortages or repairs. TDOT rents vehicles to fill gaps and is considering leasing plans as another way to manage delays. NASPO also recommends having a backup leasing plan.
- **Leverage financial incentives for vehicles**: There are several funding opportunities that can be used to purchase vehicles. The City of Gallatin fire chief said the city fire department used ARP funds for new fire trucks. Local and state governments that are interested can also take advantage of rebate programs and financial incentives, such as the Volkswagen settlement, aimed at supporting the purchase of electric, hybrid, or alternative fuel vehicles, as well as funding for associated infrastructure like charging stations. For example, the Knoxville Utility Board used incentives to expand its electric fleet.
- **Use the flexibility built into state purchasing laws:** Tennessee's existing purchasing laws provide state and local governments with the flexibility to navigate challenges like delivery delays and rising costs while ensuring accountability and transparency in spending public funds. These laws emphasize control, price, openness, and accountability, as noted by the University of Tennessee County Technical Assistance Service. To adapt to market conditions without undermining fiscal responsibility, governments can use options like statewide contracts, cooperative purchasing, and competitive bidding for purchases exceeding bid thresholds. These mechanisms are available to governments to help them secure competitive pricing and manage taxpayer dollars and procurement processes effectively. While Tennessee's purchasing framework is complex, stakeholders agree it is not inherently causing problems for vehicle procurement. Instead, it provides tools for addressing challenges within the existing legal structure.
- **Maintain flexibility with vehicle and specification selection**: Agencies are adapting to supply chain challenges by prioritizing availability over loyalty to brand, model, and color. For example, multiple departments have started purchasing different brands of police cruisers instead of their historically preferred models. This flexible approach ensures that operational needs are met promptly, reducing delays caused by waiting for specific makes, models, or non-critical features.
- **Use alternative vehicles:** Cities and counties like Gallatin and Dickson County are deploying smaller, cost-efficient "rapid response" vehicles for non-fire

emergency calls, preserving the use of larger, more expensive fire engines for critical situations. This strategy reduces wear and tear on specialized equipment while decreasing cost.

- **Consolidate vehicle fleets:** Flexible approaches to vehicle management can also include consolidating fleets. Consolidating and sharing vehicles between departments or even neighboring jurisdictions can reduce redundancies and lower costs while ensuring that essential services remain uninterrupted. NASPO recommends fleet consolidation, and the state of Tennessee's fleet is consolidated under the Department of General Services and TDOT.

Analysis: Supply Chain Disruptions and Cost Increases Affecting Procurement of Rolling Stock

National and international supply chain issues have contributed to state and local governments' vehicle procurement challenges. Commission staff interviews with representatives of organizations such as the National Association of State Procurement Officials (NASPO), National Alliance of State and University Fleet Administrators (NASUF), American Public Works Association (APWA), and East Tennessee Purchasing Association (ETPA) confirm the widespread nature of these disruptions.[1] States are experiencing similar difficulties, and stakeholders acknowledge that their capacity to influence global supply chain bottlenecks is extremely limited. Global supply chain issues are affecting vehicle delivery times and increasing costs for everyone, not just Tennessee.

In response to challenges and state and local leaders' concerns, the Tennessee Advisory Commission on Intergovernmental Relations, in response to a request from commission member and Dickson County Mayor Bob Rial at its January 2024 meeting, directed commission staff to study the challenges faced by state and local governments in acquiring vehicles, including fire trucks, salt trucks, and school buses, and assess the potential effects on public service delivery. While no legislative changes are recommended, the commission's report identifies available strategies and resources to help governments navigate these persistent supply chain issues. These strategies focus on enhancing planning and optimizing fleet management to maintain public service continuity.

State and local governments procure a wide variety of vehicles to deliver public services in Tennessee.

State and local governments in Tennessee rely on a diverse range of vehicles to deliver essential public services, such as emergency response, student transportation, public works, and highway maintenance. These vehicles vary by type and function, encompassing light-duty, medium-duty, and heavy-duty vehicles, each with unique procurement challenges.

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[1] Interviews with Telice Gillom, research and innovation team, procurement content manager, National Association of State Procurement Officials, June 24, 2024; Lauren Myers, executive director, National Alliance of State and University Fleets, October 8, 2024; Regina Santana, utilities director, water department, City of Lebanon and Nicholas Bradshaw, director of fleet services, City of Knoxville, and American Public Works Association Tennessee Chapter, June 25, 2024; and Lynne Farnham, president, East Tennessee Purchasing Association, August 13, 2024.

Agencies' diverse resources, needs, and services lead to variation in vehicle types and sizes that are procured. One common way to describe them is by weight. The US Department of Transportation Federal Highway Administration (FHWA) classifies vehicles into eight categories based on weight, grouping them as light-, medium-, or heavy-duty (see table 1).[2] A manufacturer said they are producing fewer heavy-duty vehicles because they make more money off light-duty vehicles.[3] Consequently, light-duty vehicles are often more readily available than heavy-duty or specialized vehicles, such as dump trucks, fire trucks, or snowplows. According to representatives of the Dickson County Emergency Medical Services (EMS) and Tennessee Department of General Services, manufacturers prioritize consumer-focused production over government fleet needs.[4]

Table 1. Federal Highway Administration Gross Vehicle Weight Ratings and Categories

	Class of Vehicle	Gross Vehicle Weight Rating in Pounds	Examples
Light Duty	1	up to 6,000	passenger cars, light trucks, mini vans, full-size pickups, sport utility vehicles, and full-size vans
	2	6,001 to 10,000	
Medium Duty	3	10,001 to 14,000	delivery trucks, utility vehicles, motor homes, package parcel trucks, ambulances, small dump trucks, landscape vehicles, small flatbed and stake-type trucks, refrigerated and box trucks, and small and medium-duty buses (school and local transit buses)
	4	14,001 to 16,000	
	5	16,001 to 19,500	
	6	19,501 to 26,000	
Heavy Duty	7	26,001 to 33,000	large delivery trucks, motor coaches, all tractor-trailer combinations, refuse trucks, and construction vehicles
	8	over 33,000	

Source: US Department of Energy 2012; and US Department of Transportation 2009.

[2] US Department of Transportation Federal Highway Administration 2009.

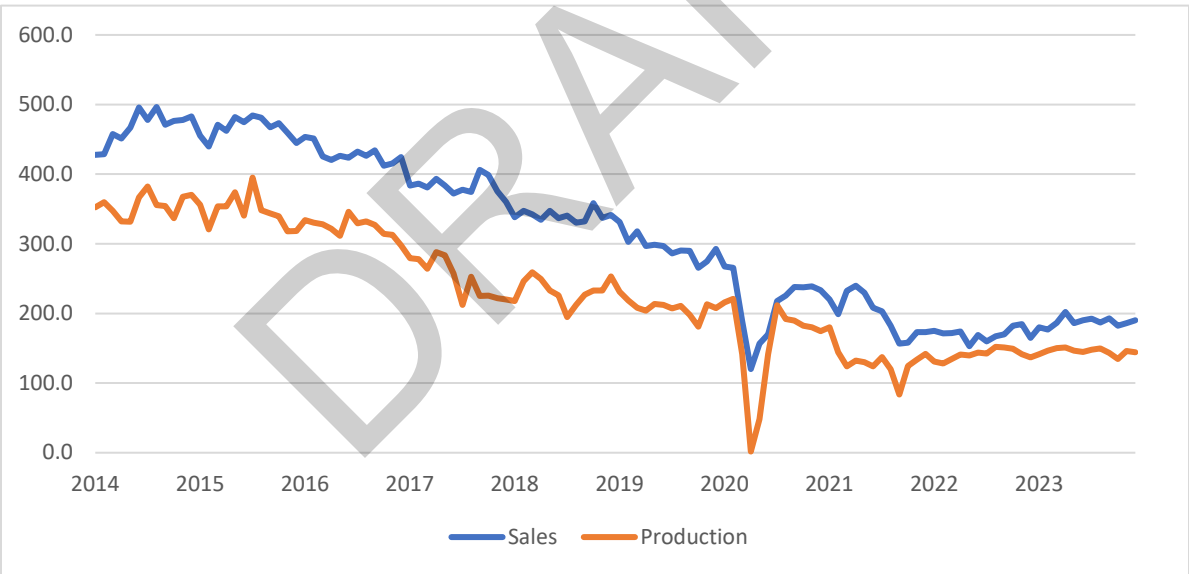
[3] Testimony at commission meeting by Donny Bear, EMS director, Dickson County, May 30, 2024; and Jenkins, Gove, Forte, and Frye 2010.

[4] Testimony at commission meeting by Donny Bear, EMS director, Dickson County, May 30, 2024; and Michael Neely, category specialist, Central Procurement Office, Tennessee Department of General Services, May 30, 2024.

Supply chain disruptions have created challenges in procuring vehicles.

The global supply chain issues surrounding vehicle procurement have roots in multiple overlapping events, greatly heightened by the COVID-19 pandemic. Although vehicle production began falling in 2015, the pandemic brought production to a standstill in 2020, as manufacturing halted and the world responded to the public health emergency.[5] US auto manufacturers were largely shut down for about two months during the early stages of the pandemic. Most automakers paused production in mid-to-late March 2020. By mid-May 2020, many plants began to reopen with new safety protocols and government restrictions in place, including staggered shifts, which reduced the number of people on site. Reduced production coupled with persistently high demand created a significant backlog that continues to affect government fleet operations.[6] For example, many fleet managers, unable to secure new units, have had to rely on older vehicles, resulting in heightened repair and maintenance costs.[7] Figure 1 highlights the production declines and the corresponding recovery in vehicle manufacturing post-pandemic.

Figure 1. Seasonally Adjusted Domestic Auto Production, 2014-2023



Source: Bureau of Economic Analysis 2024b; and Bureau of Economic Analysis 2024c.

[5] Bureau of Economic Analysis 2024b; and Bureau of Economic Analysis 2024c.

[6] Ibid.

[7] Email from Steve Emfinger, administrative service manager, Department of General Services, Metropolitan Government Nashville and Davidson County, September 10, 2024.

Another major hindrance to vehicle production has been the microchip shortage which began in the first half of 2020, following the start of the COVID-19 pandemic.[8] Modern vehicles are essentially advanced computer systems with hundreds of microchips (see figure 2), and without sufficient chips, manufacturers could not meet production demands, even after pandemic restrictions eased.[9] Additionally, over 100 industries need microchips, creating increased competition.[10] The global chip shortage was caused by a surge in demand for electronics during the COVID-19 pandemic, creating an overall shortage in microchips, coupled with supply chain disruptions and miscalculations by the automotive industry, which cut orders early on, significantly affecting the automotive industry.[11] Contributing factors included natural disasters affecting key manufacturers, geopolitical tensions leading to stockpiling of chips, and the long lead times required to scale semiconductor production, all straining an already limited manufacturing capacity.[12]

The global chip shortage has improved significantly, with shorter delivery times and increased production, thanks in part to initiatives like the federal Creating Helpful Incentives to Produce Semiconductors, or CHIPS and Science Act.[13] Signed in 2022, the Act allocated $52.7 billion to boost US semiconductor manufacturing, strengthen supply chains, and invest in research and development, encouraging major companies to build facilities domestically.[14] While the shortage has eased, challenges such as potential future supply constraints and geopolitical tensions make the Act a crucial step toward long-term resilience in the chip industry.[15] Such resilience has become increasingly important following Hurricane Helene, a natural disaster that recently hindered production of microchips.[16]

[8] Interview with Russell Moles, regional fleet sales manager for East and West Tennessee, Chrysler Dodge Jeep RAM Fiat of Columbia, August 14, 2024.

[9] Interview with Russell Moles, regional fleet sales manager for East and West Tennessee, Chrysler Dodge Jeep RAM Fiat of Columbia, August 14, 2024; and Buchannon 2022.

[10] Howley 2021.

[11] Mohammad, Elomri, and Kerbache 2022.

[12] Mohammad, Elomri, and Kerbache 2022; and Titcomb 2024.

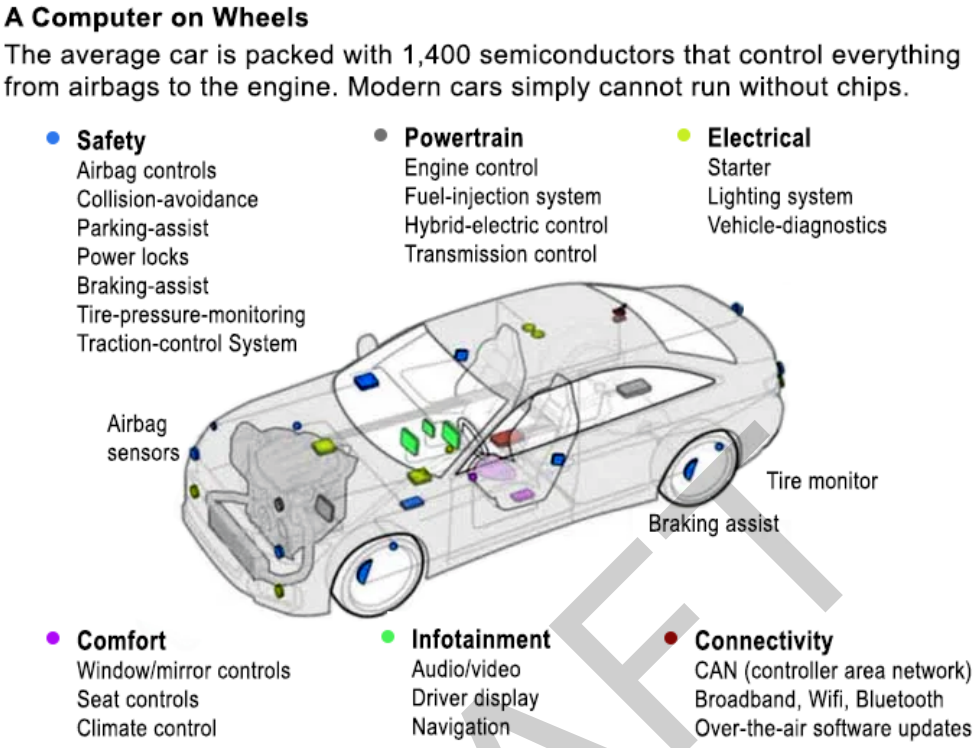
[13] The White House 2022a; H.R.4346 - CHIPS and Science Act, 117th Congress (2021-2022); and Miller 2024.

[14] Ibid.

[15] Miller 2024.

[16] Titcomb 2024.

Figure 2. Microchips in Modern Vehicles



Source: Buchanan 2022.

Labor shortages and workforce reductions in vehicle manufacturing plants have significantly impacted production timelines, particularly as a pandemic-related challenge. According to the U.S. Bureau of Economic Analysis, the automotive manufacturing workforce experienced steady growth between 2016 and 2019 but sharply declined in 2020 because of the COVID-19 pandemic.[17] This decline was affected by layoffs and retirements, leaving manufacturing facilities understaffed and hindering production at every stage—from part fabrication to final assembly.[18] The issue has been especially pronounced for producing complex, heavy-duty public service vehicles, which rely on skilled labor for specialized assembly and customization. While employment levels in the automotive manufacturing sector rebounded to pre-pandemic levels by 2023, the lingering effects of earlier workforce reductions continued to strain supply chains, affecting government agencies and other vehicle-dependent sectors (see figure 3).[19]

[17] Bureau of Economic Analysis 2024a.

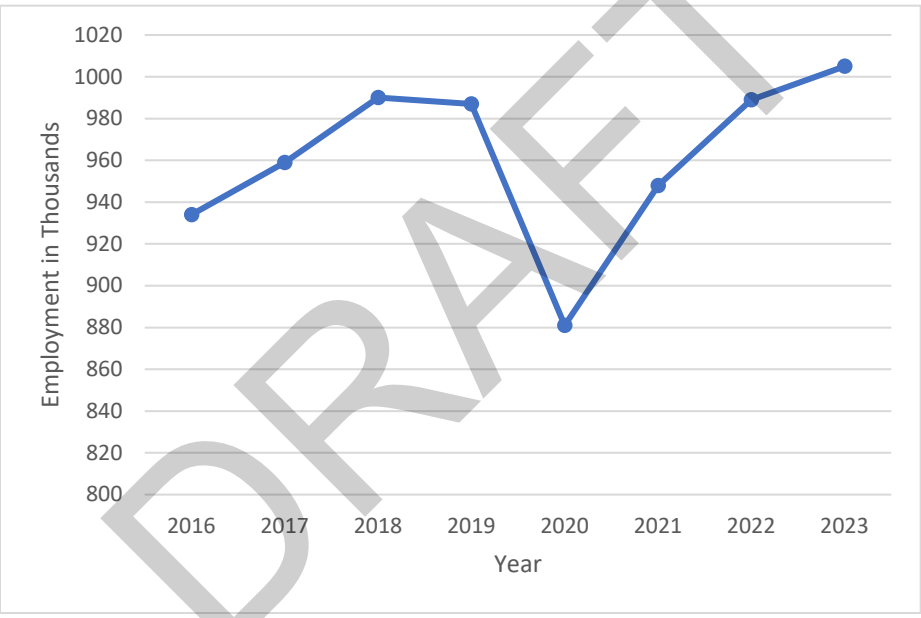
[18] IndustryNet 2024.

[19] Bureau of Economic Analysis 2024a.

Despite the slow workforce recovery, the 2023 rebound may help explain the gradual improvement in light-duty vehicle procurement.

Public agencies that manage fleets also face challenges in attracting and retaining personnel, competing with private-sector opportunities and shifting workforce expectations.[20] Representatives of the Tennessee Chapter of the American Public Works Association emphasized the severe staffing crisis, which has caused agencies like Metro Nashville to struggle to hire experienced mechanics just to maintain fleet operations.[21] Combined with global supply chain disruptions, changes in fleet management staff has resulted in a redefining of fleet operations.[22] Addressing both staffing and procurement issues is crucial to maintaining reliable services.

Figure 3. Automotive Manufacturing Employment, 2016-2023



Source: Bureau of Economic Analysis 2024a.

Increased demand also plays a role. The American Rescue Plan (ARP)—passed in 2021—allocated billions of dollars to state and local governments to address pandemic-related needs, created an influx of funds that could be used for procuring essential vehicles such

[20] Liss-Levinson 2024.

[21] Interviews with Regina Santana, utilities director, water department, City of Lebanon, and Nicholas Bradshaw, director of fleet services, City of Knoxville, June 25, 2024; and Brandon Vanatta, assets and fuel manager, and Steve Emfinger, administrative service manager, Department of General Services, Metropolitan Government Nashville and Davidson County, June 26, 2024.

[22] Fleet Management Weekly "Managing Fleet Operations in This Era of Change."

as ambulances, fire trucks, and school buses.[23] While this funding was critical for addressing immediate operational gaps, it also intensified competition for vehicles, particularly within the emergency services sectors, where production is backlogged.[24] This surge in procurement activity placed additional pressure on manufacturers, already constrained by supply chain disruptions, contributing to longer lead times and increased costs.

Looking forward, the US Environmental Protection Agency's 2027 emissions regulations may increase vehicle costs, particularly among class 8 vehicles, because of more stringent production requirements, presenting additional budgetary challenges for governments.[25] One stakeholder highlighted anticipated changes in environmental emissions regulations as a significant factor impacting supply chains and costs.[26] Although it remains uncertain whether stricter standards will be implemented or rolled back under the new federal administration, the possibility of compliance has already influenced manufacturers. To meet potential requirements, manufacturers must make changes to their vehicles.[27] These adjustments not only add complexity to production and extend timelines but also demand significant investment in research, development, and equipment, driving up costs for manufacturers and consumers alike.

Regulations aimed at reducing emissions may drive up the costs of producing Class 8 vehicles (heavy-duty trucks exceeding 33,000 pounds), adding financial strain to government budgets.[28] Heavy-duty and specialized vehicles are especially affected, as they often require specific engineering to maintain both performance and regulatory compliance, further compounding these financial pressures.

[23] The White House 2022b; US Environmental Protection Agency 2024c; and Tennessee Comptroller of the Treasury "American Rescue Plan Act Guidance for Local Governments."

[24] Carey 2023; and interview with Matt Gay, assistant chief, Madison County Fire Department, June 21, 2024.

[25] Cole 2024; and US Environmental Protection Agency 2024b.

[26] Interview with Michael Neely, category specialist, Central Procurement Office, Tennessee Department of General Services, October 3, 2024.

[27] Ulitskaya 2023; and US Environmental Protection Agency 2023.

[28] Cole 2024.

Delivery delays and cost increases are the two main vehicle procurement issues that Tennessee state and local government representatives discussed.

Delivery delays and rising costs are the primary challenges faced by Tennessee state and local governments in vehicle procurement, affecting essential services such as emergency response and student transportation. Stakeholders report significant delays for specialized vehicles like ambulances and fire trucks, with timelines extending several years and costs exceeding budget projections. For example, Dickson County EMS is experiencing a three-year delay for a new ambulance, while the City of Gallatin has seen fire truck costs nearly double since 2021, rising from $600,000 to $1.1 million.[29] Figures 4 and 5 discuss standards for ambulances and fire protection vehicles that also need to be considered.

Figure 4. Ambulances are Subject to Their Own Safety Standards

The US General Services Administration develops standards, commonly referred to as the "Triple K" standards, that are federal specifications to regulate the design, construction, and performance of ambulances. These standards ensure the safety, reliability, and functionality of ambulances used in EMS by providing detailed requirements for their manufacture and operation. Thirty states including Tennessee have adopted these standards. Tennessee adopts them under the authority of Tennessee Code Annotated, Section 68-140-307, and in rules promulgated by the Tennessee Department of Health requiring ambulances to be inspected annually; when they reach 200,000 miles, inspections must occur every 30,000 miles.

Source: US General Services Administration 2007; Horton 2024; Tennessee Department of Health, Division of Health Licensure and Regulation, Office of Emergency Medical Services, Rule 1200-12-01-.02 Emergency Medical Services Equipment and Supplies Specifications; and interview with Joyce Noles, executive director, medical center EMS, Tennessee Ambulance Service Association, June 17, 2024.

[29] Interviews with Donny Bear, director, Dickson County Emergency Medical Service, April 25, 2024; and Jeff Beaman, fire chief, City of Gallatin, May 14, 2024.

Figure 5. Standards are Recommended for Fire Protection Vehicles

Standards ensure fire protection vehicles meet rigorous design, performance, and operational criteria to protect both first responders and the public. The National Fire Protection Association (NFPA), a global nonprofit organization that is widely regarded as a leader in fire safety and protection, develops standards for fire apparatus—fire protection vehicles like fire engines and ladder trucks. NFPA's *1901* standards regulate how fire apparatus are manufactured. NFPA also develops recommended standards that states can adopt that provide guidelines for inspection, maintenance, and replacement timelines, recommending a 15-year frontline use limit and up to 25 years of total service. While Tennessee has not adopted these standards as state law, many local fire departments voluntarily follow them, according to a consultant with the University of Tennessee Municipal Technical Advisory Service.

However, the national Occupational Safety and Health Administration's (OSHA) is currently in the process of updating its "Fire Brigades Standard" to enhance safety protocols for emergency responders, which could make compliance with *NFPA 1910* mandatory. This would increase regulatory requirements for fire departments. The final rule's publication date will depend on OSHA's review of all comments and testimonies, and once published, the rule is expected to become effective 60 days after its publication. The Tennessee's state program—TOSHA—must be at least as effective as the federal program, and it may take up to two years to implement new standards at the state level.

Source: National Fire Protection Association "About Us"; National Fire Protection Association 2016; National Fire Protection Association 2024; US Department of Labor 2024; Varone 2024; and interview with Donald Pannell, fire management consultant, and David Burton, police management consultant, University of Tennessee Municipal Technical Advisory Service, May 7, 2024.

These delays compel local governments to rely on aging fleets, increasing maintenance expenses and creating reliability challenges. For instance, the Metro Nashville Department of General Services reported that its maintenance costs more than doubled from $476,767 in fiscal year 2021 to $1.1 million in fiscal year 2022, and repair costs increased from $10.8 million to $13.4 million during the same period because of challenges procuring new vehicles.[30] Such financial strain forces governments to allocate a larger share of their budgets to repairs, limiting funds available for other critical needs.

[30] Email from Steve Emfinger, administrative service manager, Department of General Services, Metropolitan Government Nashville and Davidson County, September 10, 2024.

While light-duty vehicles are becoming more accessible, a trend likely to continue, there are still delays in procurement. Comparatively, heavy-duty vehicles continue to pose significant procurement and maintenance challenges for state and local governments and require specialized equipment and servicing. Lead times for fire engines now range from 36 to 42 months for delivery, with aerial ladder trucks requiring up to 57 months, according to a University of Tennessee Municipal Technical Advisory Service (MTAS) fire management consultant.[31] Escalating costs further compound these challenges, stretching budgets and forcing difficult trade-offs. For example, the Clarksville-Montgomery County School System reports a 30% increase in school bus prices over the past year, rising from $90,000 to $135,000 per unit.[32] Figure 6 discusses required safety standards for school buses. Similarly, the Tennessee Department of Transportation (TDOT) noted a 74% increase in heavy truck costs over the past six years.[33] These price surges are not limited to purchases—parts, labor, and commercial costs have risen by 45%, further complicating fleet management decisions.[34] West Tennessee Healthcare, which contracts with Madison, Benton, Chester, Dyer, and McNairy Counties, reported that ambulance costs had increased from $178,000 to $288,000 since the pandemic.[35]

[31] Interview with Donald Pannell, fire management consultant, and David Burton, police management consultant, University of Tennessee Municipal Technical Advisory Service, May 7, 2024.

[32] Interview with Elizabeth Kong, student transportation manager, and Ricky Phillips, vehicle maintenance manager, Clarksville-Montgomery County School System, August 21, 2024.

[33] Email from Justin Underwood, director, Central Services Division, Tennessee Department of Transportation, September 10, 2024.

[34] Ibid.

[35] Email from Joyce Noles, executive director, Medical Center EMS, Tennessee Ambulance Service Association, December 4, 2024.

Figure 6. School Buses Must Comply with State and Federal Standards to Ensure the Safety of Students

Tennessee doesn't have any uncommon requirements that would affect school bus delivery or cost. States can adopt the national recommendations called National School Transportation Specifications and Procedures (NSTSP) developed by the National Congress on School Transportation every five years, and Tennessee closely follows NSTSP. The state requires school buses that have been in operation for 15 years or less to be inspected annually, and after 15 years, the Commissioner of Safety must approve their operation each year. All school buses must be retired when they reach 200,000 miles or 18 years of service.

Source: National Congress on School Transportation "Information on the 2025 NCST and Submitting Change Requests"; Rules of the State Board of Education, Chapter 0520-01-05 Pupil Transportation; and interviews with Chad Duncan, state specifications manager, IC Bus, July 2, 2024, and staff with Tennessee Department of Safety and Homeland Security, July 10, 2024.

Interviews with approximately 30 state and local government representatives from fire, EMS, public works, highways, general services, and purchasing departments across Tennessee confirm that procurement delays and cost increases are universal issues. Table 2 describes a few examples. Stakeholders emphasized the effects of these challenges, which force governments to rely on aging fleets while awaiting new vehicles. These persistent delays and rising costs underscore the need for adaptive strategies to sustain essential services amid an increasingly constrained procurement environment.

Table 2. Examples of Cost Increases and Lead Times According to Stakeholders in Tennessee

Vehicle Type	Agency	Cost Increase	Lead Time	Fleet Size
ambulance	Dickson County Emergency Medical Service	An ambulance cost approximately $275,000 in 2022, and in 2024, the same one cost approximately $306,000.	For ambulances, from order to delivery is 2 to 3 years; for fire trucks it's approximately 18 months.	16 ambulances and 4 administrative/ support vehicles
ambulance	West Tennessee Health Care (contracts with Madison, Benton, Chester, Dyer, and McNairy Counties)	About a year after the pandemic, costs jumped, from $180,000 to $285,000.	About a year ago, it took 24 to 30 months for an ambulance; now it is about 12 to 18 months.	50 ambulances
fire engine	City of Cleveland Fire Department	A truck ordered in 2016 was $630,000; now that truck is $1 million. In the past, a 3-5% annual increase was normal.	In 2016, the turn-around time was nine months. Delivery time for a truck ordered in July 2024 was estimated to be 35 months.	15 trucks, including 2 reserve trucks for backup
fire engine	Madison County Fire Department	Price is a big problem—it has doubled since 2018, from about $280,000 to $580,000 for a fire engine.	Prior to COVID, if a new fire apparatus was needed, it could be ordered in the present budget cycle, and the vehicle would arrive within 12 months. Now, it takes 44 to 48 months.	70 vehicles
school bus	Clarksville-Montgomery County School System	Three years ago, a bus could be purchased for $90,000; now the same bus is approximately $135,000. Costs have gone up 30% for school buses in the last 12 to 14 months.	Before COVID, buses could be ordered in February and delivered by July. For the last few orders, for two of the vendors, it takes a year from order to delivery.	340 school buses
school bus	Wilson County Schools	In 2004, a bus cost roughly $80,000 but now costs twice that amount.	It now takes about one year from ordering to receiving a full-size bus; it used to take 16 to 18 months.	191 buses and 65-70 white fleet vehicles

Source: Interviews with Donny Bear, director, Dickson County Emergency Medical Service, April 25, 2024, and emails received November 4 and December 6, 2024; Joyce Noles, executive director, Medical Center EMS, Tennessee Ambulance Service Association, June 17, 2024; Peter VanDusen, deputy chief, City of Cleveland Fire Department, July 24, 2024; and email received November 4, 2024; Matt Gay, assistant chief, Madison County Fire Department, June 21, 2024; Elizabeth Kong, student transportation manager, Transportation Department, Clarksville-Montgomery County School System, August 21, 2024; and Kenny Hardaway, transportation supervisor, Wilson County Schools, June 13, 2024.

Tennessee governments already follow many practices used across the nation to facilitate vehicle procurement.

The state central procurement office is making some changes to help with procurement and delivery issues. For example, by the end of 2024, the office is planning to have new contracts with terms and conditions to allow agencies to adjust the prices on purchase orders for class 6, 7, and 8 vehicles.[36] This will help agencies act quickly when prices increase and not miss opportunities to buy vehicles. Otherwise, dealers are likely to sell elsewhere at the higher price if government agencies take too long to adjust their purchase orders. The office also adjusts contracts to provide more flexibility. For example, for class 6, 7, and 8 vehicles it is changing to five-year contracts to allow more time for ordering and delivery, and the office recently added a contract for a generic heavy cab chassis that can be used as a dump truck or other type of heavy truck. Several years ago, it began allowing up to three dealers per brand for each contract to create competition and provide more purchasing options.

[36] Interview with Michael Neely, category specialist, Central Procurement Office, and Bob Williams, assistant commissioner, Vehicle and Asset Management, Tennessee Department of General Services, August 6, 2024.

Local governments can maintain fleet readiness and operational continuity in the midst of rising costs, production delays, and supply chain disruptions by adopting strategies focused on planning and flexibility. Agencies are employing innovative strategies such as long-term vehicle maintenance and replacement plans, leveraging technology like fleet management software, and adopting contingency options like leasing or renting vehicles. Flexibility is also essential, such as focusing on availability over brand loyalty, exploring alternative vehicle types, and consolidating fleet operations to best use resources. Figure 7 provides an example of a creative solution.

Figure 7. Innovation in Ambulance Design

In the face of supply chain challenges, some organizations have turned to unconventional solutions to meet operational demands. For example, Puckett EMS, a private EMS company based in Chattanooga, (Priority is the parent company), began using and remodeling transit vans into ambulances to address procurement delays and rising costs in the interfacility transport and 911 markets. This shift, driven by constraints in chassis availability and the lack of businesses offering remount services for traditional box ambulances, allowed the company to expand its fleet more cost-effectively while still meeting safety standards.

Source: Interview with Joe Dunn, vice president of operations, Puckett EMS, November 20, 2024.

Similarly, various grant programs such as the EPA Clean School Bus Program, American Rescue Plan Act (ARP), and Community Development Block Grant (CDBG), are helping agencies offset costs and invest in electric and low-emission vehicles (see appendix A). By combining detailed planning with flexible approaches, governments at all levels are better equipped to navigate procurement challenges, reduce costs, and ensure their fleets remain operational and deliver services despite external pressures.

Establish Vehicle Maintenance and Replacement Plans

Proactive vehicle maintenance and replacement planning are essential for addressing the challenges posed by extended procurement lead times. Custom-built vehicles further complicate replacement timelines because of the specialized designs required to meet unique operational needs.[37] For instance, fire trucks often involve custom chassis and

[37] Serrano 2023; and interviews with Michael Neely, category specialist, Central Procurement Office, Tennessee Department of General Services, April 23, 2024; Brandon Vanatta, assets and fuel manager, and Steve Emfinger, administrative service manager, Department of General Services, Metropolitan Government Nashville and Davidson County, June 26, 2024.

specialized equipment that extend delivery times significantly compared to stock vehicles. Madison County's Fire Department exemplifies this approach by ordering fire trucks before they need them, up to four years in advance, to ensure an operational fleet, a timeline necessitated by long delivery times for specialized vehicles such as rescue and ladder trucks.[38] These long wait times make it nearly impossible for agencies to adhere to traditional annual budgeting cycles without a forward-looking plan. Madison County's efforts align with recommendations from Fire Apparatus and Emergency Equipment, which emphasizes creating systematic replacement plans to maintain fleet readiness and mitigate operational risks.[39] Other states, like Iowa, have similarly adopted phased replacement strategies, ensuring vehicles are replaced before repair costs escalate or the vehicles become unreliable.[40] Iowa's phased approach to snowplow replacement saved $300,000 in two years by avoiding high repair costs and ensuring their fleet remained functional during critical winter months.[41] Using strategies, such as early ordering, helps agencies more effectively navigate both cost increases and procurement delays.

Leverage Fleet Management Software and Global Positioning Systems (GPS)

Fleet management software—commonly called GPS fleet management—are transforming how governments manage their vehicles, enabling data-driven decisions that improve efficiency and reduce costs.[42] The City of Franklin uses software to monitor vehicle conditions, track maintenance schedules, and predict replacement needs.[43] These tools allow agencies to identify underutilized assets, streamline maintenance, and improve fuel efficiency, ensuring their fleets remain operational despite procurement challenges. Knox County uses software to address broader fleet management concerns.[44] By establishing parameters for vehicle replacement and maintenance schedules, Knox County has reduced costs and improved overall fleet readiness.

[38] Interview with Matt Gay, assistant chief, Madison County Fire Department, June 21, 2024.

[39] Brown 2013.

[40] Mika 2018.

[41] Ibid.

[42] Bartole 2023.

[43] Interview with Brian Wilcox, purchasing manager, and Kim Hannon, fleet manager, City of Franklin, August 12, 2024.

[44] Email from Matt Myers, director of procurement, Knox County, August 6, 2024.

Fleet management systems, such as those used in Fort Wayne, Indiana, provide even greater insights into fleet operations.[45] By tracking metrics like fuel consumption, idling, and driving behavior, agencies can pinpoint inefficiencies and implement strategies to extend vehicle lifespans. The City of Gallatin recently implemented GPS tracking across its fleet, reducing unnecessary wear and tear and improving route efficiency.[46] These technological advancements align with fleet experts such as Mike Albert Fleet Solutions and NASPO's recommendations for modernizing fleet management through telematics and software tools.[47] Agencies not yet leveraging these systems can consider their potential to enhance operational efficiency and reduce costs. For example, Metro Nashville operates a fleet of around 4,000 vehicles, ranging from light-duty cars to specialized heavy-duty vehicles.[48] To manage this extensive fleet, the city invests in advanced fleet management software to track vehicle replacement cycles, schedule maintenance, and monitor overall fleet performance. This technology allows for efficient fleet operations, but it comes with high costs.[49]

Consider Vehicle Repair Over Replacement

Given the rising costs and delays associated with new vehicle procurement, many governments are prioritizing repairs to extend the lifespan of existing fleets.[50] While repair-focused strategies help mitigate immediate fleet shortages, they require careful evaluation to balance repair costs against the long-term sustainability of aging vehicles. Heavy-duty vehicles pose additional challenges because of their complex maintenance needs. Despite these challenges, prioritizing repairs remains a practical short-term solution for governments facing delayed procurement timelines. NASPO highlights integrating data from fleet management software to inform repair-versus-replace decisions, ensuring resources are allocated effectively.[51] This approach helps agencies maximize the utility of their existing vehicles while planning for future replacements by tracking vehicle usage and maintenance. A director at TDOT explained that their data

[45] Brauer 2023.

[46] Interview with Paige Brown, mayor, City of Gallatin, October 31, 2024.

[47] Stephens 2024; and Mike Albert Fleet Solutions "Seven Ways to Reduce Cost with Better Fleet Data."

[48] Interview with Brandon Vanatta, assets and fuel manager, and Steve Emfinger, administrative service manager, Metropolitan Nashville Department of General Services, June 26, 2024.

[49] Interview with Kathy Wellik, senior director of client success, Agile Fleet, October 30, 2024.

[50] Email from Nicholas Bradshaw, director of fleet services, City of Knoxville, June 27, 2024.

[51] Stephens 2024.

driven approach allowed for a number of factors to be input and analyzed to determine whether a vehicle should be replaced or repaired.[52]

Prepare a Contingency Plan for Vehicle Leasing or Renting

Leasing and renting vehicles can help address fleet shortages and delays by temporarily filling gaps. TDOT has adopted vehicle rentals to fill gaps caused by procurement delays, allowing them to maintain essential services while awaiting new vehicle deliveries.[53] Knox County has recently implemented a leasing program and anticipates seeing cost savings.[54] Agencies need to carefully consider the costs and benefits. Rutherford County, for example, has found that the program cost as much as just purchasing a new vehicle.[55] The county finance director said that during the first year there were savings, but by years two and three, the interest expenses had grown significantly and leasing no longer made economic sense.

Leasing also offers flexibility in managing procurement delays for medium- and heavy-duty vehicles. Tennessee's central procurement office provides statewide leasing and renting contracts that local governments can use to quickly access vehicles under pre-negotiated terms.[56] Like Tennessee, Washington state's lease-to-own program is an example showing a cost-effective way to finance equipment purchases like vehicles, helping agencies manage delays without compromising service delivery.[57] The Washington State Lease/Purchase COP Program streamlines vehicle procurement by providing agencies with low-interest financing, leveraging the state's strong credit rating to reduce costs. It simplifies the process with pooled resources, standardized documentation, and administrative support from the Office of the State Treasurer. These programs demonstrate the potential for leasing and renting to bridge procurement gaps while reducing maintenance costs and ensuring operational continuity.

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[52] Interview with Justin Underwood, director, Central Services Division, Tennessee Department of Transportation, July 16, 2024.

[53] Ibid.

[54] Interview with Matt Myers, director of procurement, Knox County, August 6, 2024.

[55] Interview with Michael Smith, finance director, Rutherford County, November 14, 2024.

[56] Tennessee Department of General Services "Statewide Contract Instruction (SWC)"; interview with Michael Neely, category specialist, Central Procurement Office, and Bob Williams, assistant commissioner, Vehicle and Asset Management, Tennessee Department of General Services, August 6, 2024; and email from Kelly Bekele, category specialist (services), Central Procurement Office, Tennessee Department of General Services, October 24, 2024.

[57] Pellicciotti 2024.

Leverage Financial Incentives for Vehicles

State and local governments facing rising costs and supply chain delays can benefit from a variety of funding opportunities that support vehicle procurement and production. Programs like the EPA Clean School Bus Program, the Volkswagen Clean Air Act Civil Settlement, and federal initiatives, such as the Inflation Reduction Act, provide financial resources for acquiring electric and alternative fuel vehicles and modernizing fleets.[58] For instance, Gallatin used ARP (ARP) funds to purchase fire trucks, taking advantage of an efficient federal funding process, while Knoxville's Utility Board utilized rebates to expand its electric fleet.[59]

These financial incentives, including grants, rebates, and tax credits, can ease the burden of upfront costs and encourage fleet upgrades. However, administrative challenges such as eligibility criteria, application preparation, and compliance with reporting requirements can deter participation. Wilson County Schools opted not to apply for the Volkswagen settlement grant because of concerns over administrative demands. Successfully navigating these challenges requires strong project management, effective communication with funding agencies, and systems to track expenditures and performance metrics. Appendix A outlines funding opportunities and strategies to streamline processes, ensuring governments can fully leverage financial incentives to modernize their fleets and meet operational needs.

Use the flexibility Built into State Purchasing Laws

To make purchases that exceed their bid limit, including vehicles, without undermining fiscal responsibility, state and local governments can use options like competitive bidding, statewide contracts, and purchasing cooperatives.[60] These mechanisms are available to governments to help them secure competitive pricing and manage taxpayer dollars and procurement processes effectively.[61] Tennessee law sets bid thresholds—minimum dollar amounts—for purchases requiring one of these processes. The threshold amount varies depending on the type of government and the specific laws,

[58] Tennessee Department of Environment and Conservation "Energy in Transportation"; and The White House 2024.

[59] Interviews with Jeff Beaman, fire chief, City of Gallatin, May 14, 2024; Knoxville Utility Board, "Green Fleet"; and Tennessee Clean Fuels "Funding to Replace Older Diesel Vehicles with Cleaner Fuel and Vehicle Options."

[60] Interview with Bryan Burklin, assistant director, Division of Local Government Audit, Comptroller of the Treasury, July 9, 2024.

[61] Ibid.

charters, or policies under which the local government operates. Local governments that have adopted a centralized government and have a full-time purchasing agent, as defined by law, can increase their bid threshold amount to $50,000, and those that are not centralized can increase it to $25,000.[62] Appendix B shows the bid threshold amounts for the specific county purchasing laws, and appendix C provides additional information about purchasing laws in Tennessee.

In addition to having authority under state law to conduct their own competitive bidding,[63] state and local government agencies can use statewide contracts. The state central procurement office and the state building commission facilitate statewide contracts and price agreements that various entities, including state government agencies, local governments, higher education institutions, and qualifying nonprofits, can use for their purchases.[64] These contracts leverage the state's purchasing power to offer favorable pricing and terms, promoting efficient purchasing practices and helping entities access competitively priced goods and services. Examples of statewide contracts are for vehicles; vehicle parts; rental and leasing; fleet maintenance and repairs; tires; and gasoline and diesel fuel.[65]

Additionally, cooperative purchasing allows state and local governments and higher education to make purchases through another public or private entity's contract, including other local governments, other states, or the federal government.[66] Purchasing through a statewide contract or cooperative are both examples of "piggy-backing," a term commonly used when one entity leverages another's contract for procurement.[67] These contracts with other entities have already been negotiated, reducing the need for individual competitive bids and increasing purchasing power, similar to using a statewide contract. The Tennessee Department of General Services lists a few purchasing cooperatives on their website,[68] and there are many other cooperative purchasing

[62] Tennessee Code Annotated, Section 12-3-1212; and University of Tennessee County Technical Assistance Service "Sealed Competitive Bids and Public Advertising Threshold."

[63] Tennessee Code Annotated, Sections 5-14-108; 5-21-119; and 6-56-301 et seq.

[64] Tennessee Code Annotated, Sections 12-3-102; 12-3-1201; and 33-2-1001; and Rules of the Department of General Services Central Procurement Office Chapter 0690-03-01-.01.

[65] Tennessee Department of General Services "Statewide Contract Instruction (SWC)."

[66] Tennessee Code Annotated, Sections 12-3-512; 12-3-1201; 12-3-1203; and 12-3-1205. See also University of Tennessee County Technical Assistance Service "Cooperative Purchasing."

[67] The Institute for Public Procurement "Piggyback (Piggyback Cooperatives)."

[68] Tennessee Department of General Services "COOP Contract Page."

programs in the US and Canada.[69] Cooperatives are primarily used for special purpose vehicles that are not available on statewide contracts.[70] Interlocal agreements between government entities are a specific type of cooperative purchasing arrangement in which public agencies can cooperate and enter into agreements with each other to provide public services to better meet needs in the communities.[71]

There are restrictions and exceptions that affect vehicle purchases. Although state law prohibits use of cooperative purchasing agreements for light-duty vehicles, it allows them to be used for special purpose vehicles including, but not limited to, school buses, buses with capacity exceeding 22 passengers used to provide public transportation, garbage trucks, fire trucks, or ambulances.[72] This restriction does not apply to statewide contracts. There are a few other options that can be used for purchasing vehicles that do not require competitive bidding processes while providing cost-effective alternatives and flexibility when urgent or unique needs arise. They include second-hand purchases,[73] reverse public auctions,[74] surplus purchases,[75] emergency purchases,[76] and sole source procurement.[77]

Maintain Flexibility with Vehicle and Specification Selection

Agencies are increasingly prioritizing availability over brand loyalty to expedite procurement timelines. For instance, multiple departments have shifted from one brand of police cruisers to another, adapting to current supply chain constraints.[78] This

[69] The Institute for Public Procurement "Cooperative Procurement and Cooperative Purchasing Programs."

[70] Interview with Michael Neely, category specialist, Central Procurement Office, and Bob Williams, assistant commissioner, Vehicle and Asset Management, Tennessee Department of General Services, August 6, 2024.

[71] Tennessee Code Annotated, Sections 12-9-101 et seq.

[72] Tennessee Code Annotated, Section 12-3-1208.

[73] Tennessee Code Annotated, Section 12-3-1202.

[74] Tennessee Code Annotated, Section 12-3-1208.

[75] Tennessee Code Annotated, Section 5-1-125.

[76] Tennessee Code Annotated, Section 5-21-119.

[77] Tennessee Code Annotated, Sections 12-3-504; 5-14-204; and 6-56-304.

[78] Interviews with Brian Wilcox, purchasing manager, and Kim Hannon, fleet manager, City of Franklin, August 12, 2024; and Debbie Dillion, director of purchasing, Johnson City, September 17, 2024.

pragmatic approach ensures that operational needs are met promptly, reducing delays caused by waiting for specific models or features.

Flexibility in vehicle specifications also extends to things like vehicle color. This strategy preserves specialized equipment for critical situations while decreasing operational costs. For example, flexibility with vehicle colors can help speed up procurement. Roane County's purchasing agent said that the color of police cruisers they wanted required a set number be ordered before a certain manufacturer would produce them.[79] By focusing on functionality rather than specific brands or specifications, governments can adapt their procurement practices to meet immediate service demands.

Use Alternative Vehicles

Alternative vehicles offer a practical solution for addressing fleet shortages and rising costs. Smaller vehicles like mini-pumpers and rapid response, or fast attack, units are being deployed for emergency calls, reducing dependency on more expensive fire engines.[80] Mini-pumpers are smaller fire trucks that are more navigable but have less capacity in their water tanks.[81] Similarly, rapid response units are trucks equipped with medical equipment that can provide care on site. For example, the City of Gallatin has deployed smaller rapid response vehicles for non-fire emergencies, reducing wear and tear on larger fire engines.[82] A significant portion of calls are for medical reasons and do not require a fire engine on scene. Alternative purpose vehicles and mini pumpers are also less expensive per mile to operate. This approach aligns with NASPO's recommendations for using alternative vehicles to manage costs and extend the lifespan of specialized equipment. By integrating these options into their fleets, agencies can enhance operational efficiency and reduce procurement challenges.

Consolidate Vehicle Fleets

Fleet consolidation, or the process of reducing redundancies in a fleet to improve efficiency and cost effectiveness, is a common way to increase efficiency and save money. Tennessee's state government vehicles fleet, managed by the Department of General

[79] Interview with Lynn Farnham, purchasing agent, Roane County, August 13, 2024.

[80] Interviews with Marc Alley, emergency management and fire consultant, County Technical Assistance Service, May 14, 2024; Donald Pannell, fire management consultant, and David Burton, police management consultant, University of Tennessee Municipal Technical Advisory Service, May 7, 2024; and Paige Brown, mayor, City of Gallatin, October 31, 2024.

[81] Ibid.

[82] Interview with Paige Brown, mayor, City of Gallatin, October 31, 2024.

Services and TDOT, serves as an example of centralized management as the two agencies manage fleet for all of state government.[83] This approach allows for improved efficiency by working to meet the needs of the state while also controlling fleet size. Other states, like Arizona, have achieved significant savings by consolidating fleets, such as sedans, minivans, half-ton pickups, and SUVs, saving over $6 million since 2015 through initiatives like eliminating underused vehicles.[84] Similarly, by merging the fleet operations of police, fire, public works, and utilities, the city of Springfield, Illinois, successfully reduced redundancy and improved maintenance efficiency. These efforts demonstrate the potential for consolidation to enhance resource management and reduce costs, making it a valuable strategy for Tennessee agencies to consider.

[83] Interviews with Justin Underwood, director, Central Services Division, Tennessee Department of Transportation, July 16, 2024; and Michael Neely, category specialist, Central Procurement Office, Tennessee Department of General Services, and Bob Williams, assistant commissioner, Vehicle and Asset Management, Tennessee Department of General Services, August 6, 2024.

[84] Halikowski 2021.

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Appendix A: Government Vehicle Funding Opportunities

Opportunity	Description	Key Details	Sources
Various opportunities for fire departments	Grants can help fund projects, purchase equipment, and train personnel	Not an exhaustive list	Tennessee Department of Commerce and Insurance "Grant Opportunities"
Community Development Block Grant (CDBG)	Administered by the Department of Economic and Community Development using US Department of Housing and Urban Development funds	Can be used to purchase some vehicles; Roane County has used grant funds for ambulances and a fire truck	Tennessee Department of Economic and Community Development "Community Development Block Grant"
Volkswagen Diesel Settlement	Administered by the Tennessee Department of Environment and Conservation	Supports alternate fuel and electric vehicles (EV); project solicitations will be released until eligible project funds are exhausted	Tennessee Department of Environment and Conservation 2024 "Tennessee and the Volkswagen Diesel Settlement"
US Environmental Protection Agency Clean School Bus Program	Provides funding for zero-emission (electric) buses and clean buses using alternative fuels	WKRN reported in August 2024 that eight Tennessee counties (Bledsoe, Cheatham, Davidson, Jackson, Maryville, Obion, Wayne, and Henry) received $12 million to replace diesel buses with electric ones	Tennessee Department of Environment and Conservation "Energy in Transportation"; and US Environmental Protection Agency 2024a "Clean School Bus Program"
Congestion Mitigation and Air Quality (CMAQ) Improvement Program	Administered by Tennessee Department of Transportation to improve air quality and reduce congestion	Funds transportation projects and programs that reduce air emissions from cars, trucks, and buses (mobile sources) in air quality non-attainment and maintenance areas, which are the only areas eligible for CMAQ funding	Tennessee Department of Transportation "Congestion Mitigation and Air Quality (CMAQ) Improvement Program"

Opportunity	Description	Key Details	Sources
"Reducing Diesel Emissions for a Healthier Tennessee" Rebate Program	Administered by East Tennessee Clean Fuels Coalition with Diesel Emissions Reduction Act (DERA) funding	Available in Tennessee to replace older, class 5-8 diesel vehicles with new diesel vehicles or new alternative fuel vehicles that can run on propane, compressed natural gas, or electricity or that are hybrids	Tennessee Clean Fuels "Funding to Replace Older Diesel Vehicles with Cleaner Fuel and Vehicle Options"
Low or No Emission Grant Program	Administered by US Department of Transportation Federal Transit Administration for public transportation vehicles	Available to local and state government entities for the purchase or lease of low or zero emission transit buses, in addition to supporting facilities; Memphis and Knoxville have used these funds	US Department of Energy "Low and Zero Emission Public Transportation Funding"
Inflation Reduction Act of 2022 (IRA) tax credits	Credits were expanded so state and local governments can benefit	"Elective pay" or "direct pay" provisions allow tax-exempt and governmental entities to receive a payment equal to the full value of tax credits for building qualifying clean energy projects; Knoxville Utilities Board is the first government entity in Tennessee to apply	The White House "What is Direct Pay (Elective Pay)?"
Federal Commitment to Vehicle Production	Administered by the US Department of Energy and includes grants and loans to support EV production and infrastructure	$12 billion allocated to support manufacturers transitioning from gasoline and diesel-powered vehicles to electric and hybrid models through the Domestic Auto Manufacturing Conversion Grant (available until 2031); $3 billion also allocated to support EV battery production	US Department of Energy "Domestic Automotive Manufacturing Conversion Grants"

Note: This list is not intended to be exhaustive.

Source: Duffy 2023; Gessner 2024; and interviews with Lynn Farnham, purchasing agent, Roane County, August 13, 2024; Jeff Beaman, fire chief, City of Gallatin, May 14, 2024; and Alexa Voytek, deputy director of programs, and Mark Finlay, senior energy analyst, Office of Energy Programs, Tennessee Department of Environment and Conservation, October 7, 2024.

Appendix B: Bidding Dollar Thresholds

Purchasing Law	Formal Bids	Informal Bids	Statute
County Purchasing Law of 1983	Public advertising & competitive bidding for purchases costing over the maximum applicable amount established in T.C.A. § 12-3-1212 ($25,000 in counties with non-centralized purchasing). Exceptions include emergency purchases, sole-source purchases, fuel products, and lease or lease purchase agreements costing less than the maximum amount.	Any purchase costing less than the maximum applicable amount established in T.C.A. § 12-3-1212 may be made without competitive bids & public advertisement, but whenever possible be based on three (3) competitive bids.	Formal Bids — § 5-14-204 Informal Bids — § 5-14-205 CLB authorized to lower dollar amount — § 5-14-206
CFMS of 1981	The finance committee authorizes the dollar limits for competitive bids but not to exceed amount authorized by state law for the highway & education departments or other amounts established by law (up to $50,000 in counties having centralized purchasing and a full-time purchasing agent pursuant to T.C.A. § 12-3-1212).	Any purchase costing less than the applicable maximum amount established in T.C.A. § 12-3-1212 may be made without competitive bids & public advertisement, but whenever possible be based on three (3) competitive bids.	§ 5-21-120(a)
County Purchasing Law of 1957	If the amount of the expenditure or sale is estimated to exceed the maximum applicable amount established in T.C.A. § 12-3-1212 (up to $50,000 in counties with centralized purchasing and a full-time purchasing agent) sealed bids shall be solicited. Several exceptions apply. See T.C.A. § 5-14-108.	All purchases or sales not requiring bid solicitation may be made without competitive bids & public advertisement, but whenever possible be based on three (3) competitive bids.	Formal Bids — § 5-14-108(c)(1) Informal Bids — § 5-14-108(d)(1)

Purchasing Law	Formal Bids	Informal Bids	Statute
County Uniform Highway Law (CUHL)	Public advertising & competitive bidding for purchases of $25,000 & over except for repair of heavy road building machinery or other heavy equipment or emergencies.	Any purchase costing less than $25,000 may be made without competitive bids & public advertisement, but whenever possible be based on three (3) competitive bids.	Formal Bids — § 54-7-113 Informal Bids — §54-7-113
Education	If an LEA chooses not to follow the local governing body's purchasing procedure, all purchases of supplies, furniture, fixtures and materials of every kind estimated to exceed the maximum applicable amount established in T.C.A. § 12-3-1212 (up to $50,000 for LEAs with centralized purchasing and a full-time purchasing agent) must be made on competitive bids, which must be solicited by advertisement in a newspaper of general circulation in the county. Newspaper advertisement may be waived in the event of emergency. If the LEA chooses not to follow the local governing body's purchasing procedures, the board shall contract, following open bids, for the construction of or additions to school buildings in excess of applicable amounts established in T.C.A. § 12-3-1212.	Purchases costing less than the maximum applicable threshold established in T.C.A. § 12-3-1212 (up to $50,000 for LEAs with centralized purchasing and a full-time purchasing agent) may be made in the open market without newspaper notice, but must, whenever possible, be based upon at least three (3) competitive bids. T.C.A. 49-2-203(a)(3)(C).	Formal Bids — §§ 49-2-203(a)(3)(B), 49-2-203(a)(3)(B)(iii) Informal Bids — §49-2-203(a)(3)(c) Construction Contracts — §49-2-203(a)(3)(D)

Purchasing Law	Formal Bids	Informal Bids	Statute
Counties over 150,000	Competitive sealed bids or proposals for non-emergency or non-propriety purchases that exceed the maximum applicable amount established in T.C.A. § 12-3-1212 (up to $50,000 in counties with centralized purchasing and a full-time purchasing agent). These counties may retain their present competitive bidding conditions or establish different limits by private act or charter provision.	Authorized to make purchases under the maximum applicable amount established in T.C.A. § 12-3-1212 (up to $50,000 in counties with centralized purchasing and a full-time purchasing agent) without competitive bids.	§ 12-3-1204

Source: University of Tennessee "Dollar Threshold Chart."

Appendix C: Additional Information about Tennessee's Purchasing Laws

Tennessee has laws in place that provide flexibility for state and local government purchasing, including vehicle purchases, while responsibly managing taxpayer dollars. Unlike private sector procurement, which is typically more flexible and profit-driven, public purchasing operates within a framework of strict regulations designed to uphold public trust. As CTAS explains, these laws are essential to ensure transparency and accountability in every transaction, preventing favoritism or misuse of taxpayer dollars.[85] This focus on openness and fairness guarantees that public funds are spent responsibly, while also ensuring that vendors are treated equitably. By prioritizing accountability and adhering to these laws, government entities fulfill their responsibility to be good stewards of taxpayer dollars, balancing efficiency with the public interest.

Purchasing laws allow some flexibility to governments to help them navigate challenges like delays or cost increases while also creating transparency and limits to ensure that public funds are spent responsibly. According to the University of Tennessee County Technical Assistance Service (CTAS), "Generally, the purchasing laws place an emphasis on control, price, openness, and accountability."[86] And according to the University of Tennessee Municipal Technical Advisory Service (MTAS), "Good purchasing methods are important because they allow a municipality to make the best use of its funds by ensuring taxpayers know how their money is being spent, adequately protecting municipal employees from unwarranted criticism, and giving vendors equal opportunity to solicit municipal business."[87]

The state's purchasing laws are not uniform, and there are differences and options for state, county, and city governments' authority—there are laws of general application to counties and cities and local option laws. For example, in Tennessee, local option laws allow counties to adopt purchasing regulations, which could include bidding thresholds or procurement methods. This approach gives counties and municipalities the ability to customize their operational frameworks while still adhering to overarching state guidelines. Some laws apply to both counties and cities, while some apply only to the state procurement office giving it specific authority—for example, authority to enter into

[85] University of Tennessee County Technical Assistance Service "County Purchasing vs Private Sector Purchasing."

[86] University of Tennessee County Technical Assistance Service "Legal Framework for Purchasing."

[87] University of Tennessee Municipal Technical Advisory Service "Purchasing."

statewide contracts—that local governments do not have. Purchasing laws in state statute are permissive for local governments, not prohibitive—the statute must also specifically address local governments, not other agencies, giving them express authority to make a certain type of purchase.[88] The laws are complicated, and both CTAS and MTAS have resources to assist, and local governments' legal counsel can help local governments understand and comply with laws.[89]

While states, counties, and cities all must follow general purchasing laws, the variation in authority allows counties and cities to select the approach that best suits their needs. Counties and cities can adopt a combination of local option laws, private acts, or charters that determine their purchasing authority. County purchasing authority is defined by a few laws, including the County Purchasing Law of 1957,[90] Financial Management System of 1981,[91] County Purchasing Law of 1983,[92] County Uniform Highway Law,[93] and purchasing laws for boards of education.[94] In counties that have adopted one of the optional general laws to centralize purchasing—either the 1957 or 1981 Act—the county's purchasing functions are done by a purchasing agent or through a purchasing office for the whole county. Counties that have not adopted one of these laws operate under the 1983 Act and purchasing is decentralized, meaning it is done by different agencies in the county. These counties would also follow the County Uniform Highway Law and separate purchasing laws for the board of education. Table 3 shows which purchasing laws each county has adopted.

Several general laws govern purchasing for cities, including the Municipal Purchasing Law of 1983,[95] which "establishes minimum requirements for all cities that do not have very specific charter provisions governing competitive bidding and purchasing."[96] Unique purchasing guidelines for cities are often found in their individual charters,

[88] Interview with Bryan Burklin, assistant director, Division of Local Government Audit, Comptroller of the Treasury, July 9, 2024.

[89] Ibid.

[90] Tennessee Code Annotated, Sections 5-14-101 et seq.

[91] Tennessee Code Annotated, Sections 5-21-101 et seq.

[92] Tennessee Code Annotated, Sections 5-14-201 et seq.

[93] Tennessee Code Annotated, Sections 54-7-113.

[94] Tennessee Code Annotated, Title 49.

[95] Tennessee Code Annotated, Sections 6-56-301 et seq.

[96] O'Hara, Hodge, and Ashburn 2024.

private acts, local ordinances, and policies, and therefore, how purchasing is done can vary quite a bit between cities.[97] While Tennessee's purchasing framework is complex, stakeholders agree it is not inherently causing problems for vehicle procurement. Instead, it provides tools for addressing challenges within the existing legal structure.

Table 3. Purchasing Laws by County

County	General	Highway	Schools
Anderson	1981	1981	1981
Bedford	1981	1981	1981
Benton	1939 Priv. Act Ch 541	1943 Priv. Act Ch. 250/CUHL	49-2-203
Bledsoe	1983	1941 Priv. Act Ch. 153/CUHL	49-2-203
Blount	1957	1957	1957
Bradley	1951 Priv. Act Ch. 313	1947 Priv. Act Ch. 354/CUHL	49-2-203
Campbell	1981	1981	1981
Cannon	1981	1981	1981
Carroll	2024 Priv. Act Ch. 57	2024 Priv. Act Ch. 57/CUHL	2024 Priv. Act Ch. 57/49-2-203
Carter	1981	1981	1981
Cheatham	1933 Priv. Act Ch. 250/1983	1933 Priv. Act Ch. 250/1945 Priv. Act Ch. 309/CUHL	49-2-203
Chester	1983	1951 Priv. Act Ch. 68/CUHL	49-2-203
Claiborne	1981	1981	1981
Clay	1983	1951 Priv. Act Ch. 565/CUHL	49-2-203
Cocke	1957	1957	49-2-203
Coffee	1957	1957	49-2-203
Crockett	1983	1933 Priv. Act Ch. 26/CUHL	49-2-203
Cumberland	1981	1981	1981
Davidson	Metro Charter	Metro Charter	Metro Charter
Decatur	1983	CUHL	49-2-203
DeKalb	1979 Priv. Act Ch. 63	1979 Priv. Act Ch. 63/CUHL	1979 Priv. Act Ch. 63/49-2-203

[97] Interview with Eric Spencer, finance & accounting program manager, University of Tennessee Municipal Technical Advisory Service, June 18, 2024.

County	General	Highway	Schools
Dickson*	1957	1957	1951 Priv. Act Ch. 16/49-2-203
Dyer	1983	1929 Priv. Act Ch. 421/CUHL	49-2-203
Fayette	1983	1974 Priv. Act Ch. 234/CUHL	49-2-203
Fentress	1981	1981	1981
Franklin	1981	1981	1981
Gibson	1983	1929 Priv. Act Ch. 111/CUHL	49-2-203
Giles	1981	1981	1981
Grainger	1983	1980 Priv. Act Ch. 232/CUHL	49-2-203
Greene	1957	1957	49-2-203
Grundy	1983	1939 Priv. Act Ch. 435/CUHL	49-2-203
Hamblen	1983	1949 Priv. Act Ch. 313/CUHL	49-2-203
Hamilton	1983 Priv. Act Ch. 90	1983 Priv. Act Ch. 90	1983 Priv. Act Ch. 90/49-2-203
Hancock	1983	1941 Priv. Act Ch. 149/CUHL	49-2-203
Hardeman	1989 Priv. Act Ch. 90	1989 Priv. Act Ch. 90/CUHL	1989 Priv. Act Ch. 90/49-2-203
Hardin	1983	1997 Priv. Act Ch. 62/CUHL	49-2-203
Hawkins	1957 Priv. Act Ch. 256	1957 Priv. Act Ch. 256/CUHL	1957 Priv. Act Ch. 256/49-2-203
Haywood	1983	1991 Priv. Act Ch. 24/CUHL	49-2-203
Henderson	1981	1981	1981
Henry	1983 Priv. Act Ch. 137/1995 Private Act Ch. 10/1983	CUHL	49-2-203
Hickman	1981	1981	1981
Houston	1983	1945 Priv. Act Ch. 366/CUHL	49-2-203
Humphreys	1983	1935 Priv. Act Ch. 634/CUHL	49-2-203
Jackson	1983	1951 Priv. Act Ch. 111/CUHL	49-2-203

County	General	Highway	Schools
Jefferson	1981	1981	1981
Johnson	1957	1957	49-2-203
Knox	1980 Priv. Act Ch. 286 (county charter)	1980 Priv. Act Ch. 286	1980 Priv. Act Ch. 286/49-2-203
Lake	1983	1980 Priv. Act Ch. 262/CUHL	49-2-203
Lauderdale	1983	1929 Priv. Act Ch. 304/CUHL	49-2-203
Lawrence	1957	1957	49-2-203
Lewis	1983	1937 Priv. Act Ch. 395/CUHL	49-2-203
Lincoln	1981	1981	1981
Loudon	1957	1957	1957
McMinn	1981	1981	1981
McNairy	1990 Priv. Act Ch. 171	CUHL	49-2-203
Macon	1937 Priv. Act Ch. 161/1983	1965 Priv. Act Ch. 234/CUHL	49-2-203
Madison	1981	1981	1981
Marion	1983	1933 Priv. Act Ch. 24/CUHL	49-2-203
Marshall	1965 Priv. Act Ch. 69/1983	1965 Priv. Act Ch. 69/1955 Priv. Act Ch. 238/CUHL	49-2-203
Maury	2018 Priv. Act Ch. 47	2018 Priv. Act Ch. 47/CUHL	2018 Priv. Act Ch. 47
Meigs	2007 Priv. Act Ch. 28	2007 Priv. Act Ch. 28/CUHL	49-2-203
Monroe	1981	1981	1981
Montgomery	1957	1957	49-2-203
Moore	Metro Charter	Metro Charter	Metro Charter
Morgan	1981	1981	1981
Obion	1983	CUHL	49-2-203
Overton	1957	1957	49-2-203
Perry	1983	1977 Priv. Act Ch. 18/CUHL	49-2-203
Pickett	1983	1957 Priv. Act Ch. 104/CUHL	49-2-203
Polk	1957	1957	49-2-203
Putnam	1981 Priv. Act Ch. 63	1989 Priv. Act Ch. 122/CUHL	49-2-203
Rhea	1981	1981	1981

County	General	Highway	Schools
Roane	1957	1957	1933 Priv. Act Ch. 477/49-2-203 (schools informally use 1957)
Robertson	1981	1981	1981
Rutherford	2017 Priv. Act Ch. 17	1951 Priv. Act CH. 55/CUHL	49-2-203
Scott	1981	1981	1981
Sequatchie	1983	CUHL	49-2-203
Sevier	1983	1969 Priv. Act Ch. 133/CUHL	49-2-203
Shelby	1974 Priv. Act Ch. 260	1974 Priv. Act Ch. 260	1974 Priv. Act Ch. 260/49-2-203
Smith	1981	1981	1981
Stewart	1983	1951 Priv. Act Ch. 171/CUHL	49-2-203
Sullivan	2020 Priv. Act Ch. 46	2020 Priv. Act Ch. 46	2020 Priv. Act Ch. 46
Sumner	2002 Priv. Act. Ch. 113	2002 Priv. Act. Ch. 113/CUHL	2002 Priv. Act Ch. 113
Tipton	1941 Priv. Act Ch. 518	1973 Priv. Act Ch. 114/CUHL	49-2-203
Trousdale	Metro Charter	Metro Charter	Metro Charter
Unicoi	1983	1949 Priv. Act Ch. 678/CUHL	49-2-203
Union	1981	1981	1981
Van Buren	1983	1951 Priv. Act Ch. 460/1986 Priv. Act Ch. 111/CUHL	49-2-203
Warren	1981	1981	1981
Washington	1957	1957	49-2-203
Wayne	1983	1941 Priv. Act Ch. 32/CUHL	49-2-203
Weakley	1981	1981	1981
White	1981	1981	1981
Williamson	1957	1957	49-2-203
Wilson	1981	1981	49-2-203

*Dickson County - 1951 Priv. Act Ch. 16 does not apply to bridges or school buildings.

Source: University of Tennessee County Technical Assistance Service "Legal Framework for Purchasing."