Appendix 9-1: Scenario Comparison Charts

A comparative analysis based on more than two hundred scenario performance measures were conducted and this section illustrates the resulting charts for the selected performance measures previously shown in Table 9-11. It should be noted that all the comparison charts include the performance measure for the existing transportation system.

Category: Multimodal Transportation System

Encouraging multimodal travel makes the best use of the transportation system, reduces greenhouse gas emissions, and improves quality of life. This scenario performance measure category compares the share of trips to work by Non-Single occupancy vehicle (Non-SOV) modes. These modes include carpool, public transportation, walking, bicycling and telecommuting. Higher levels of Non-SOV travel would yield numerous benefits: reduced congestion, better air quality, and healthier residents, to name a few. This measure is similar to the MAP-21 performance measure for non-SOV travel, but uses slightly different geography and Census data.

Figures 9.20 compares the scenario performances for the Non-SOV occupancy vehicle work trip measure during a typical morning peak period and similarly, Figure 9.21 shows the predicted annual transit ridership including transfer trips.

Figure 9-20: Percent of Non-Single Occupancy Travel Measure by Scenarios

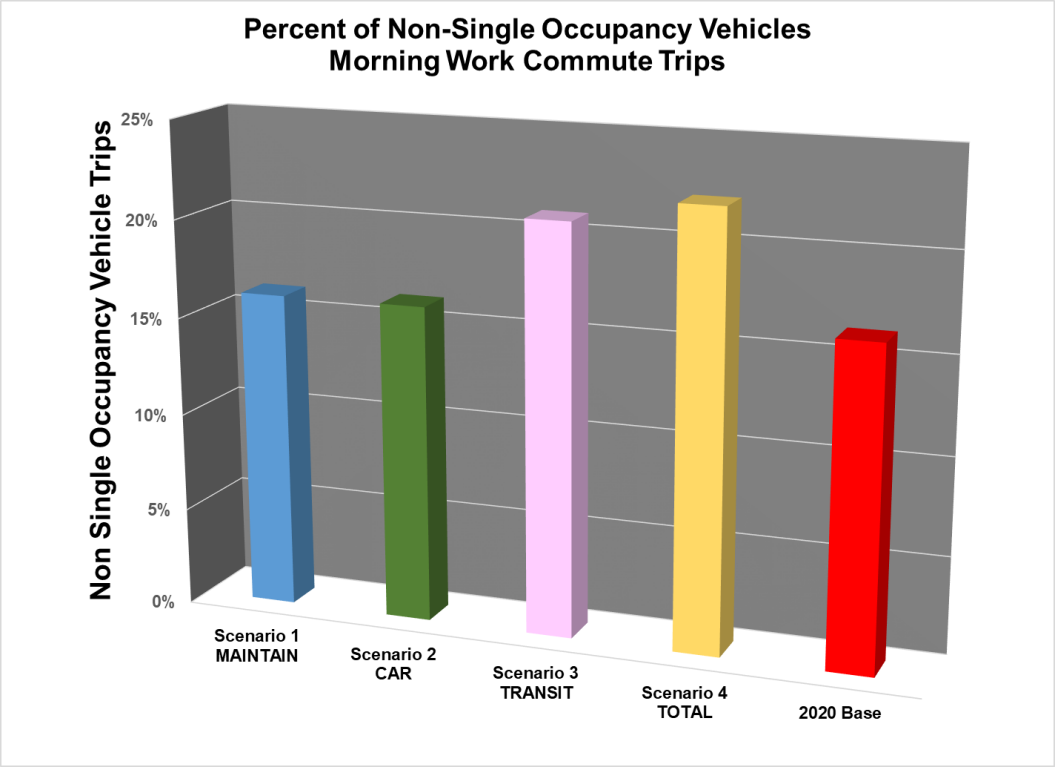
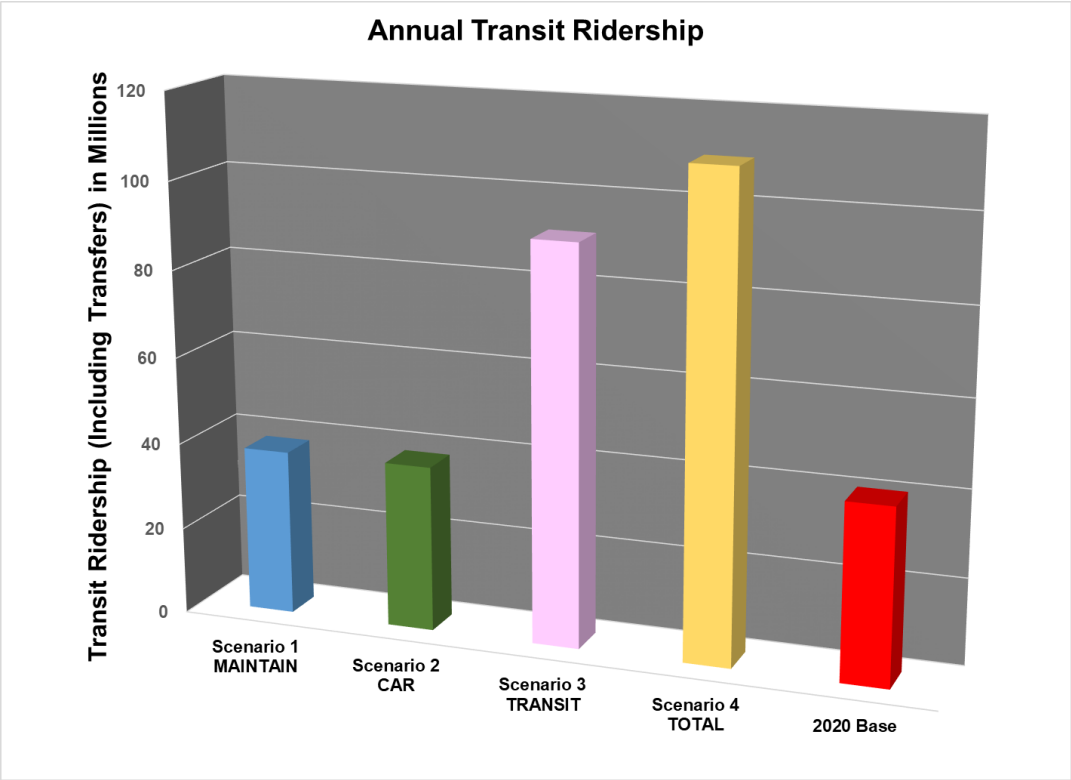


Figure 9-21: Annual Transit Ridership Measure by Scenarios



As shown, scenarios 3 and 4 lead the multimodal transportation system measures. Comparing to the existing transportation system, the Non-SOV percent of scenario 4 is about one-third higher. Since scenarios 3 and 4 include the rail extensions and relocating some percent of workers closer to the rail stations and the regional major job hubs, then their transit ridership will increase three fold compared with the current annual ridership.

Category: Access to Transportation System

When people say, "location, location, location," they really mean "accessibility, accessibility, accessibility."

Transportation planning is moving from traffic-based analysis to mobility-oriented and accessibility-based analysis. This section compares scenario accessibility measures to different transit modes and freeway system. Figures 9.22 to 9.26 display the scenario accessibility measures.

Figure 9-22: Number of people within 15 Minutes Walk Access to All Transit Stops by Scenarios

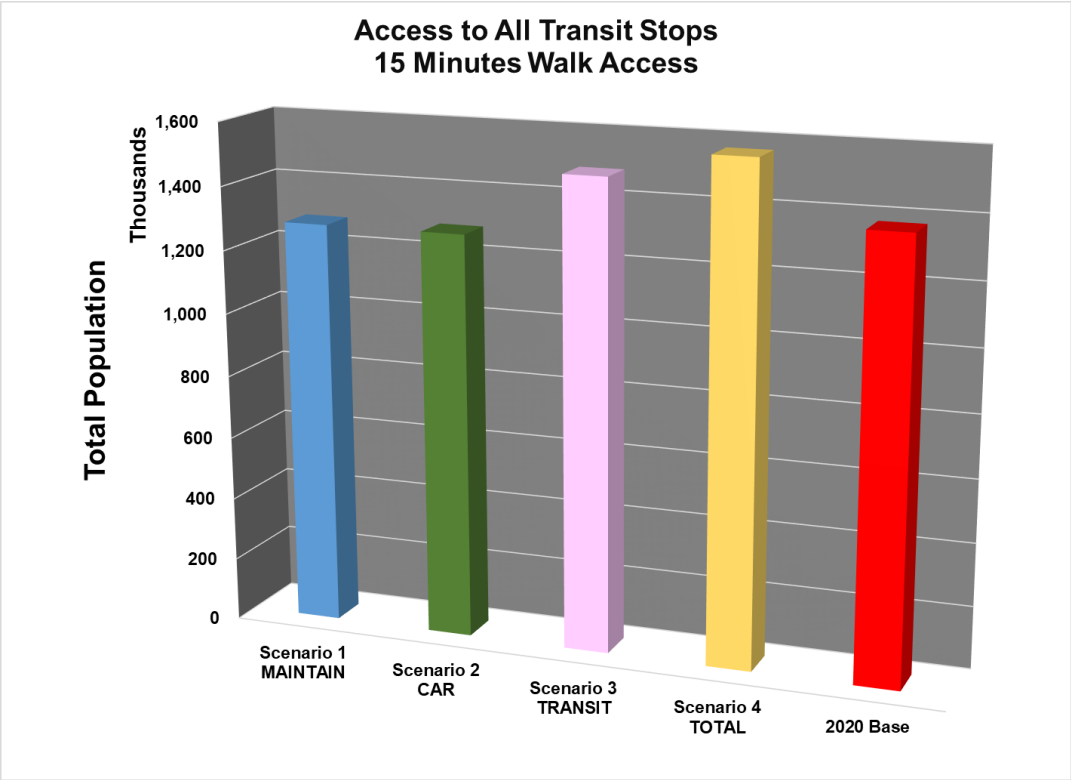


Figure 9-23: Number of people within 15 Minutes Walk Access to Rail Stations by Scenarios

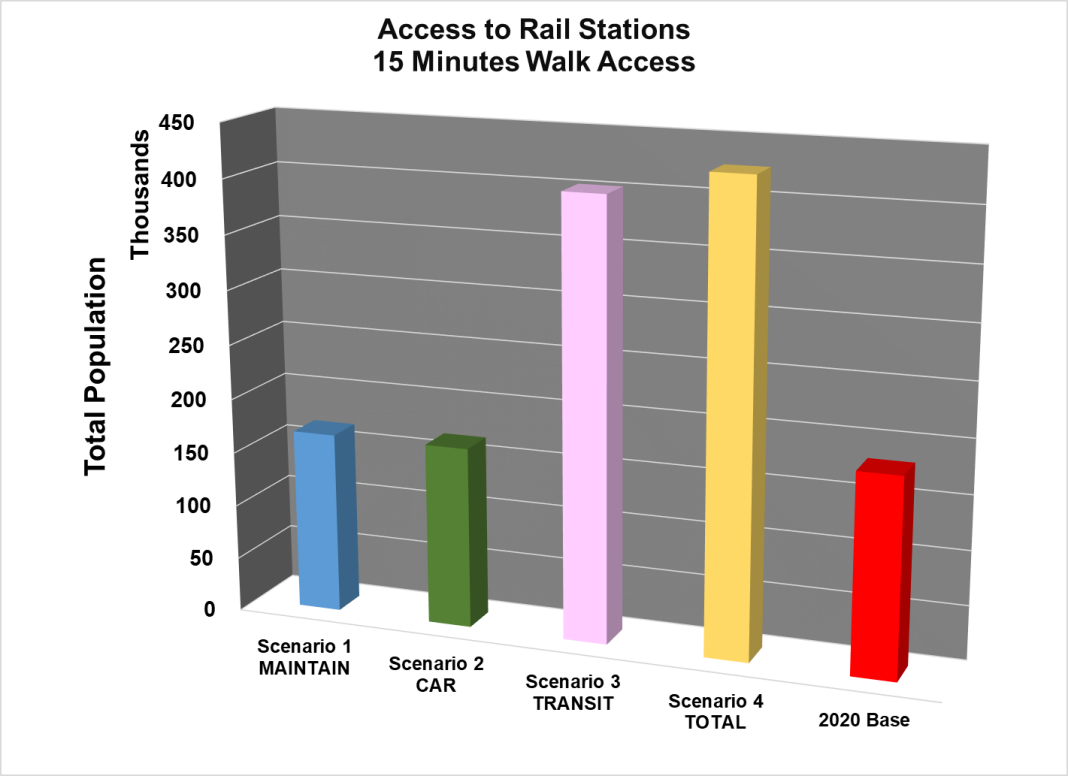


Figure 9-24: Number of Workers within 15 Minutes Walk Access to Rail Stations by Scenarios

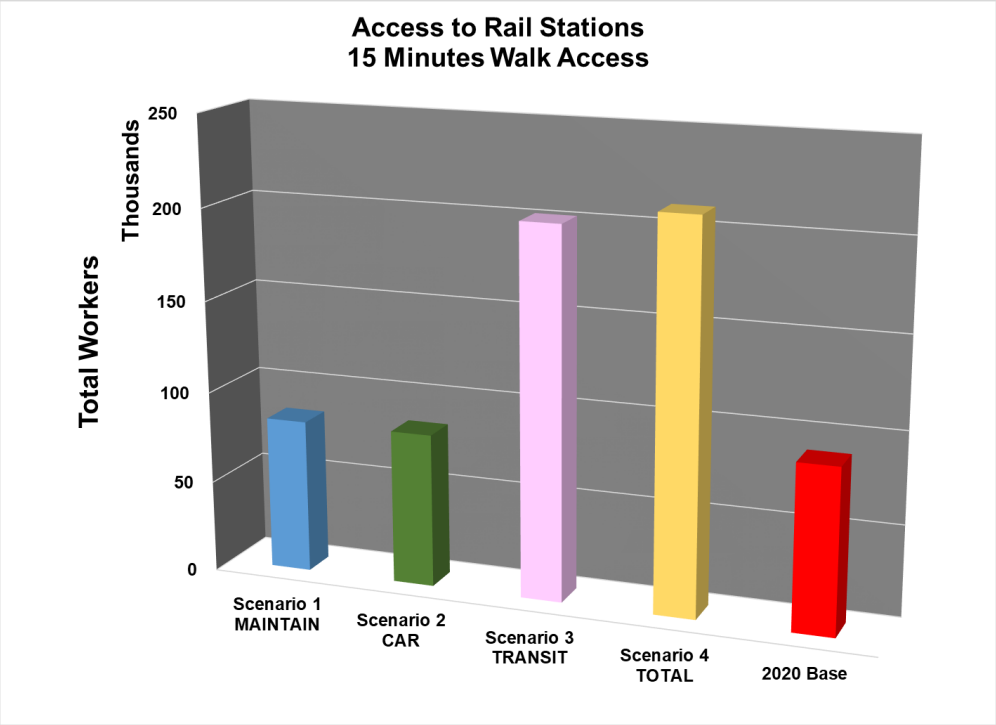


Figure 9-25: Number of Total Available Jobs within 15 Minutes Walk Egress from All Transit Stops by Scenarios

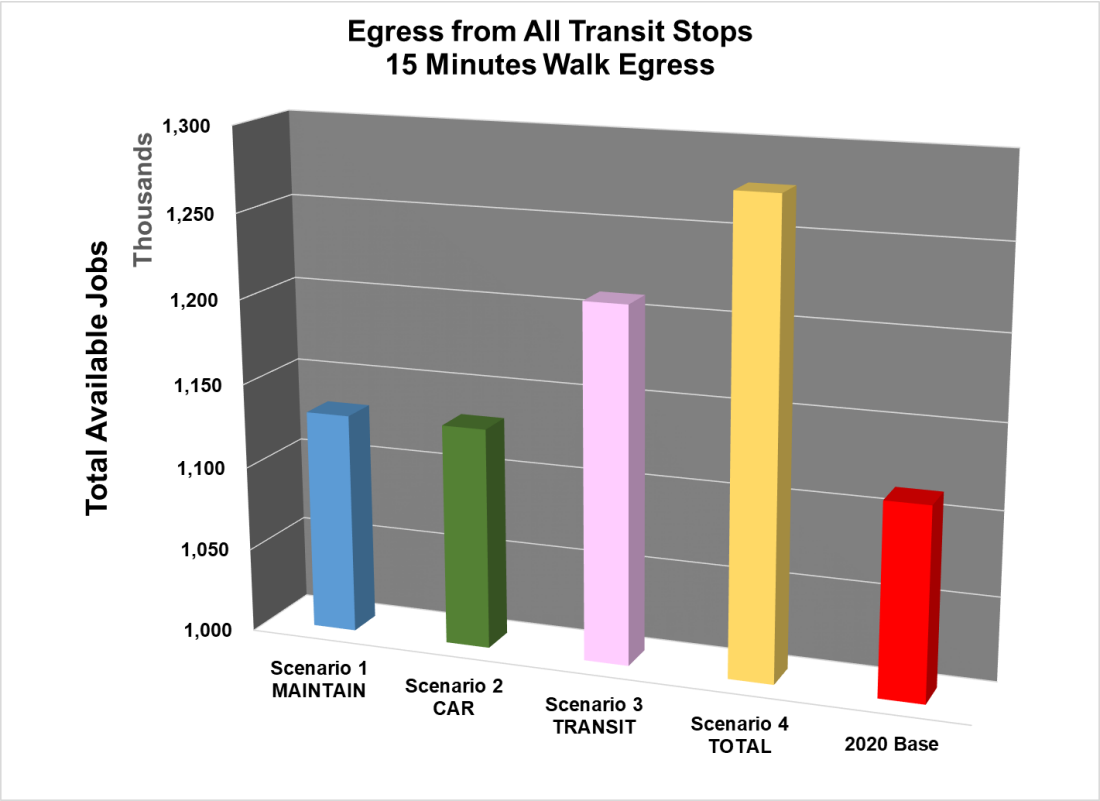
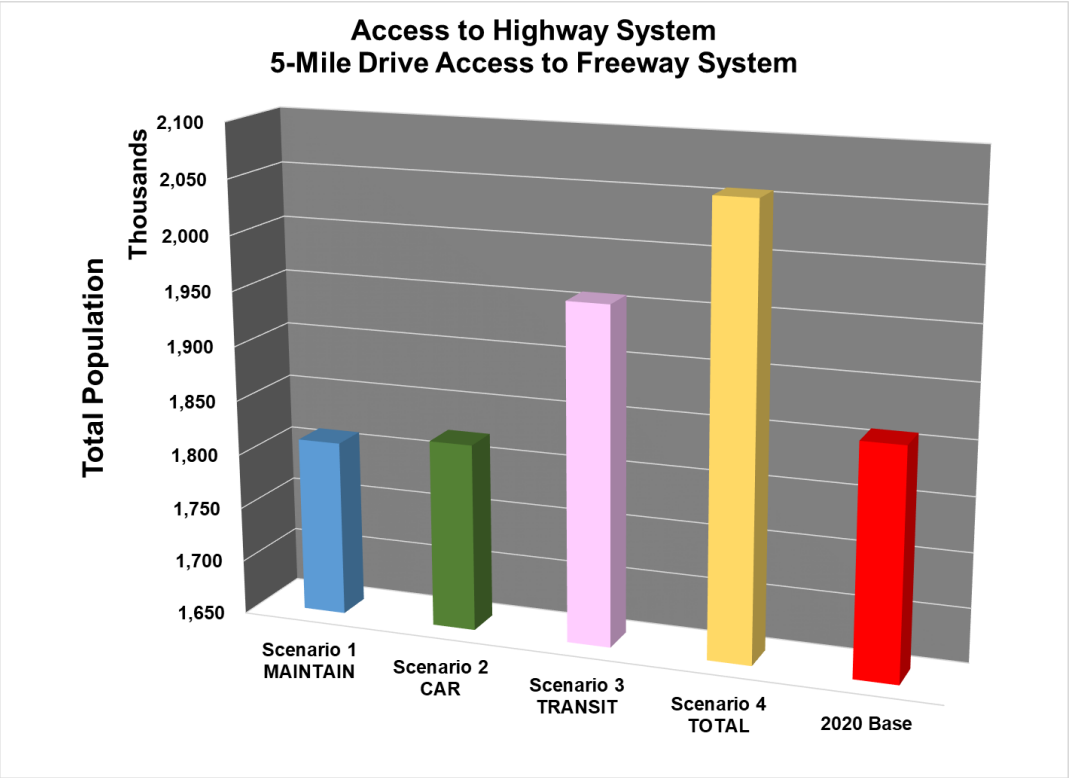


Figure 9-26: Number of People within 5-Mile Drive Access to Freeway System by Scenarios



Again as shown, scenario 4 leads the accessibility coverage measures including walk access, egress from transit stations to employment centers as the “last-mile” connectivity, and access to highway interchange within a short drive of five miles or less.

Category: Highway Optimization Use

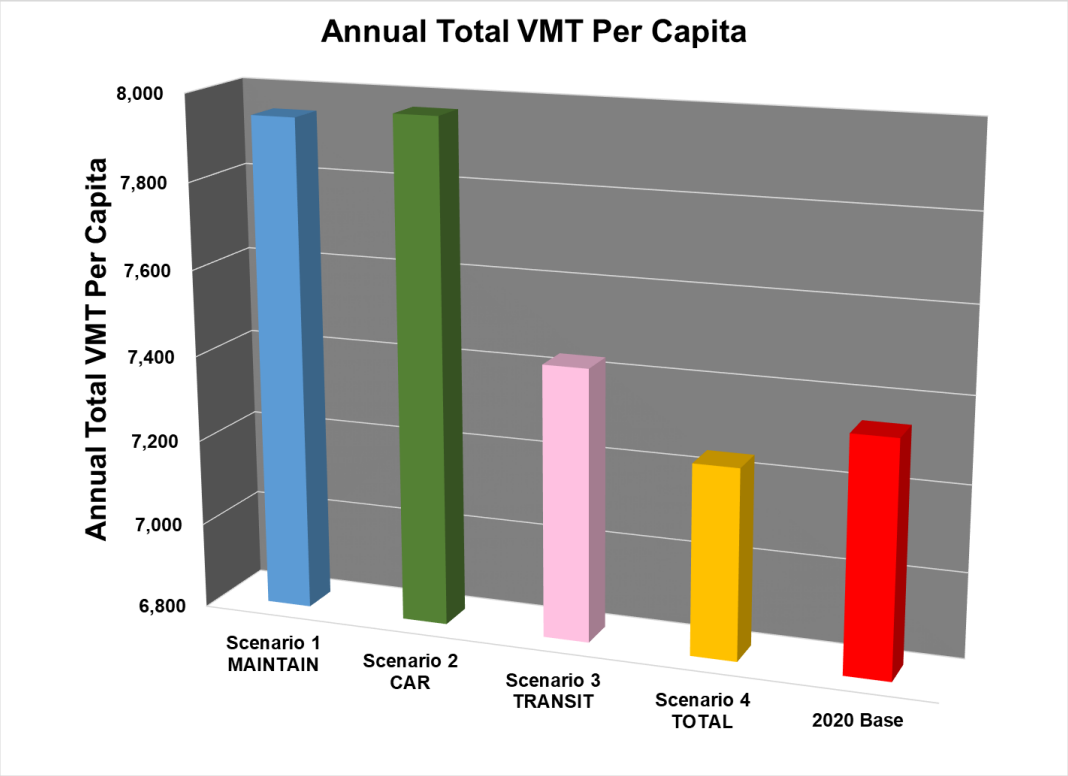
VMT is a key measure in the scenario comparative analysis, but VMT alone is not enough in this type and many other types of analysis. For instance, higher VMT in a highway and street network may reduce speed in some streets, in turn, leading to delay. However, higher VMT results in higher gallons of motor fuel being purchased and then higher fuel tax collected. Therefore, VMT as a measure of travel demand, should be combined with, for example, traffic engineering fundamental measures such as speed, capacity, mode of travel, trip purpose, etc., and then they turn out to be a meaningful analytical measure for comparing scenarios.

Scenarios 3 and 4 were assumed with higher population and employment compared with two other scenarios. Therefore, VMT per capita is more appropriate measure for the scenario comparison.

Figure 9-27 shows annual total auto and truck VMT per capita for scenarios. In scenarios 3 and 4, some of daily trips are diverted from drive alone mode to other modes of carpool, transit and

non-motorized. This diversion coupled with some workers residing closer to where they work, results in lower VMT per capita for scenarios 3 and 4, although their total VMTs are higher than those of the other scenarios.

Figure 9-27: Annual Total VMT per Capita by Scenario

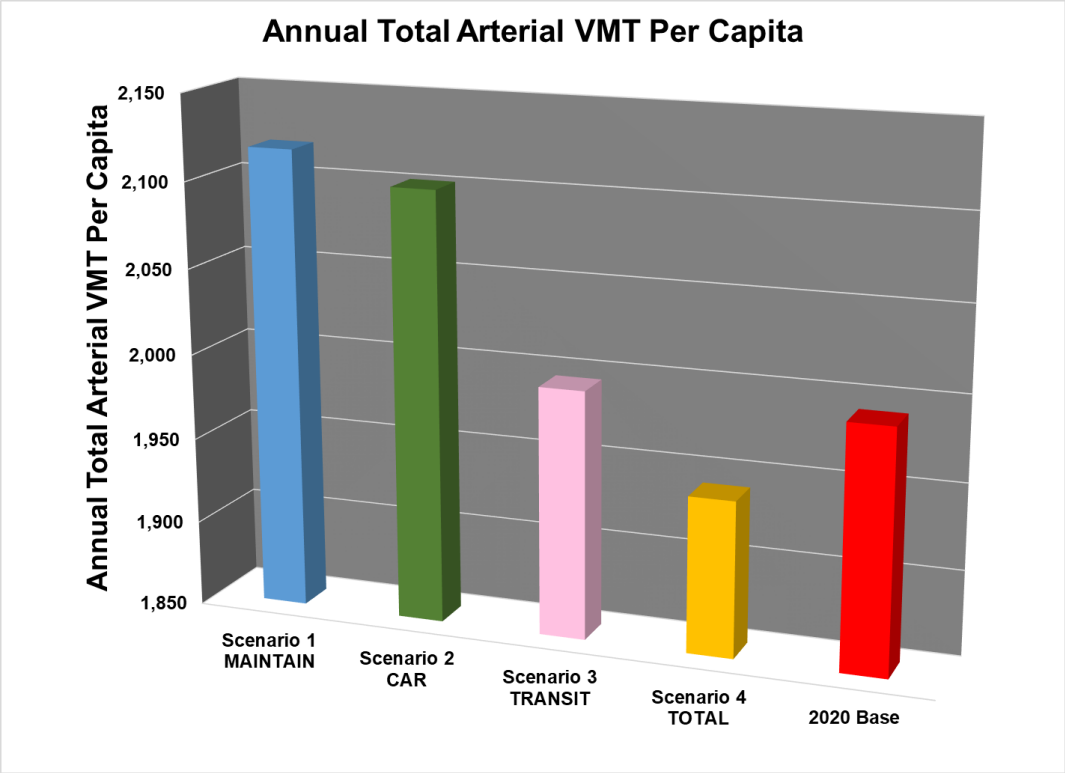


Category: Arterial Network Restoration

VMT measures for arterial network follows a similar explanation of freeway VMT, discussed in the previous performance measure category.

Figure 9-28 illustrate annual total auto and truck arterial VMT per capita for scenarios.

Figure 9-28: Annual Total Arterial VMT per Capita by Scenario



Category: Transportation Cost

In any transportation system of a region, there are three players:

- Commuters: Users of the system who generate travel demand by making trips,
- Authorities: Government and Non-government organizations who provide and manage the supply side,
- Residents: Non users of the system who live in the region.

Any transportation policy, such as road capacity expansion, safety enhancement, or travel restriction, affects those players in different ways. As discussed in Chapter 3, congestion cost manly impacts commuters and emission cost affects all the residents in the region. Figures 9-29 and 9-30 shows the congestion and emission costs of the four scenarios and the existing costs per capita. Distribution of population and employment have the main impact on the congestion cost and the technology adoption impacts the emission costs.

Figure 9-29: Annual Congestion Cost Per Capita by Scenario

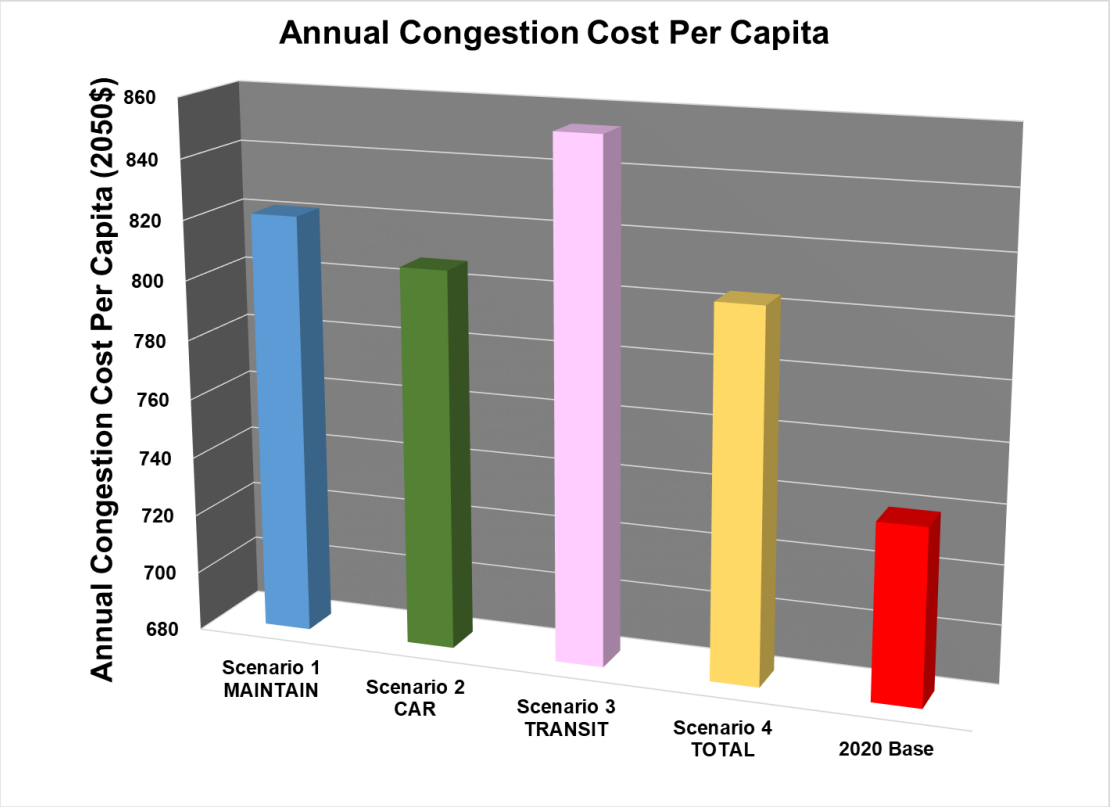
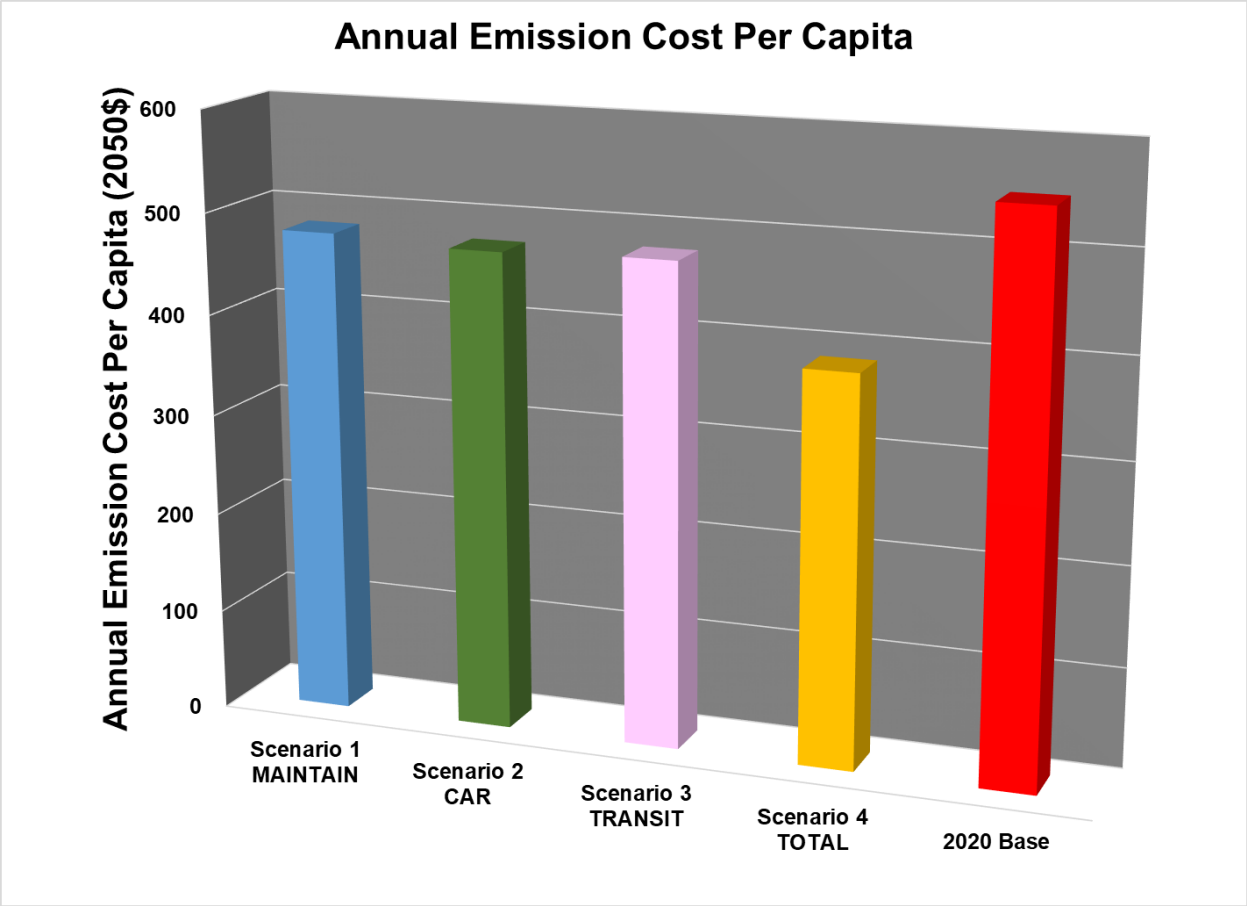


Figure 9-30: Annual Emission Cost Per Capita by Scenario



Category: Travel Time

Transportation performance measures based on travel time quantities satisfy a range of mobility purposes and they show the effect of many transportation and land use solutions. The regional major job hubs are destinations for a high number of work trips and the mismatch between workers' home and work locations is more demonstrative if work trip travel times to the regional major job hubs are analyzed.

Since, the EJ population is more dependent on transit service than other population sectors, Figures 9-31 and 9-32 show the average auto and transit travel times from EJ neighborhoods to the regional major job hubs.

Figure 9-31: Average Auto Travel Time from EJ Neighborhoods to All Regional Major Job Hubs by Scenario

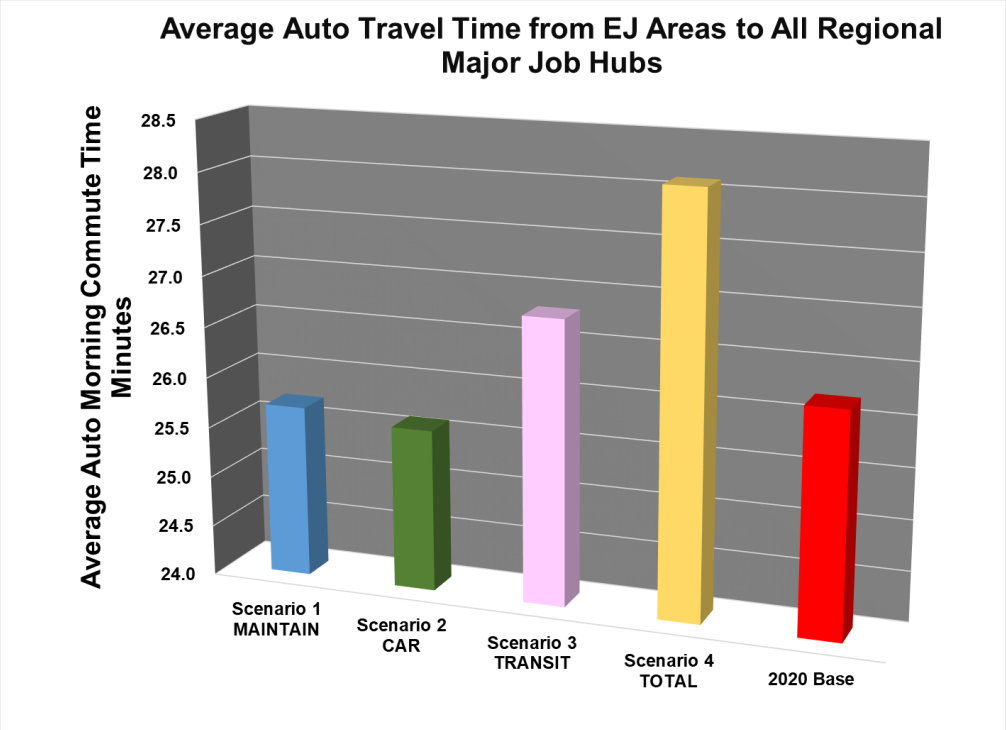
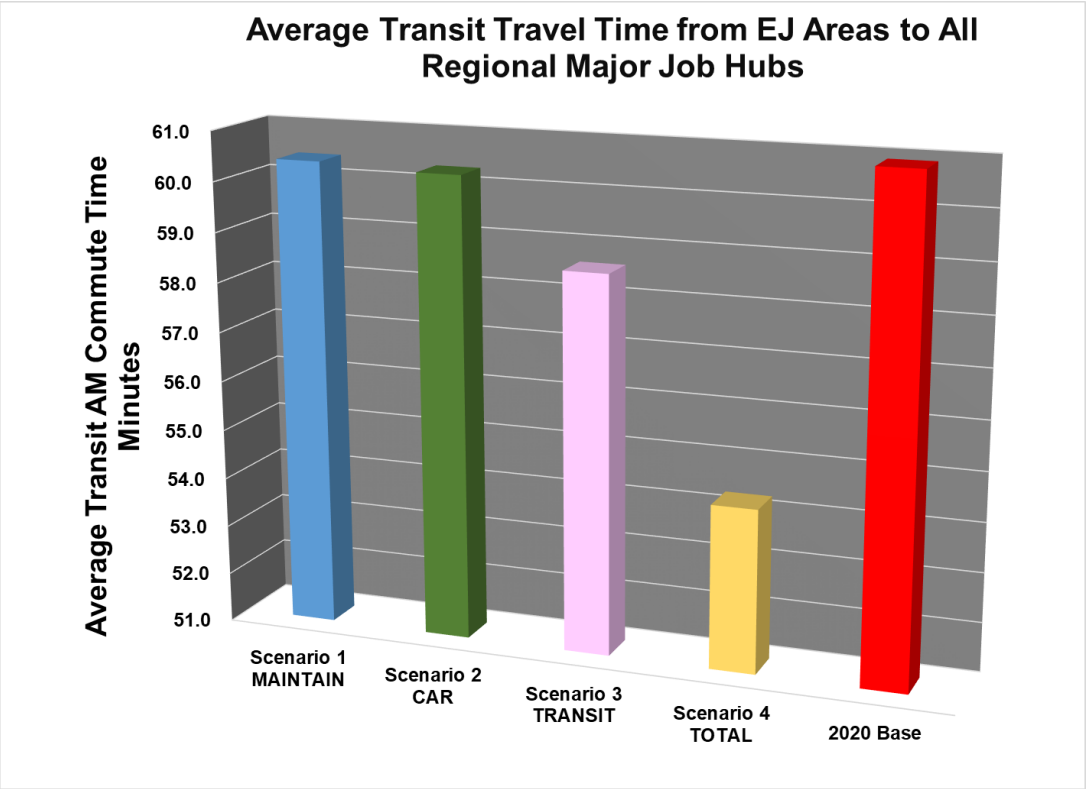


Figure 9-32: Average Transit Travel Time from EJ Neighborhoods to All Regional Major Job Hubs by Scenario



As shown in Maps 9-31 and 9-32, workers are relocated to the target area in scenarios 3 and 4 and are using the arterial street network for their work commutes. Therefore these streets in the target area are more congested and work commuter time is about 10 percent higher than those of scenarios 1 and 2. On the contrary, in scenarios 3 and 4, workers will reside around the rail stations and major job hubs, therefore the average transit commuter times is about 10 percent lower than those of the other scenarios.

Category: Regional Major Job Hubs

All scenarios generally attempt to reduce the average work commuter time by auto or transit to about 30 minutes. Figures 9-33 through 9-36 show the number workers from EJ and non-EJ areas living in the 30 minutes commute sheds around regional major job hubs for the four scenarios. Also the number of available jobs inside the 30-minute commuter sheds are compared.

Figure 9-33: Number of Workers inside 30 Minute Auto Commute Time Shed by Scenario

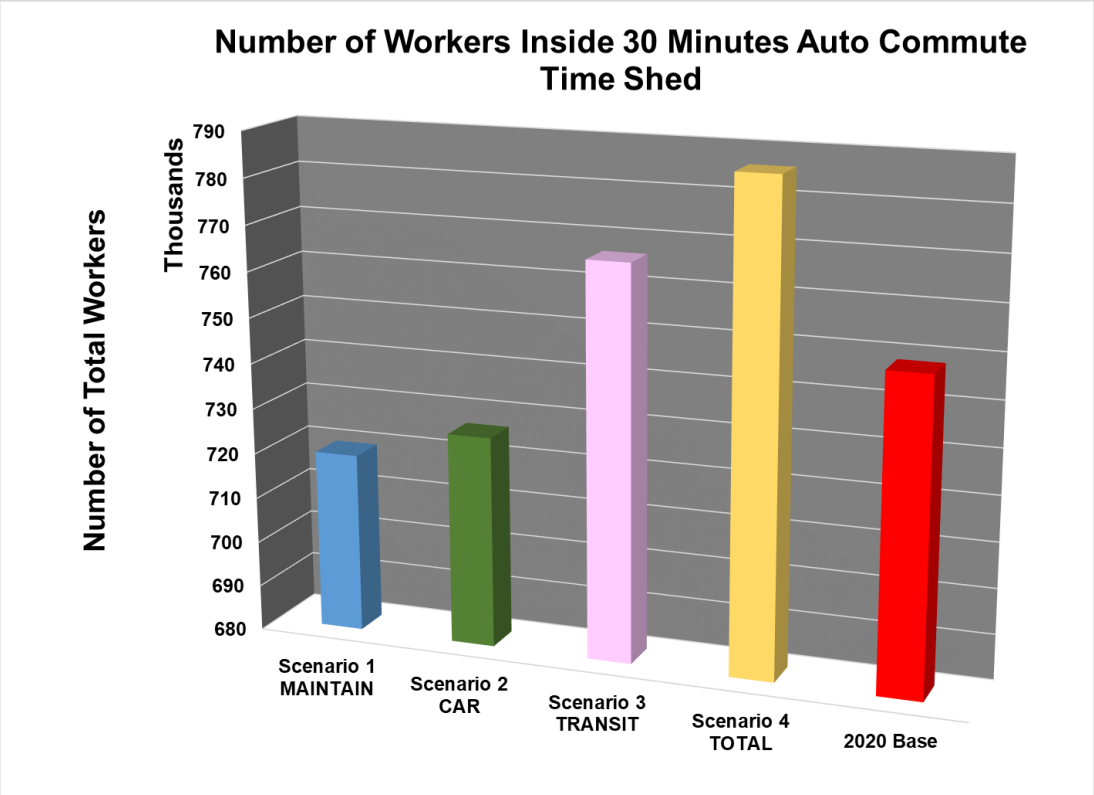


Figure 9-34: Number of Workers inside 30 Minute Transit Commute Time Shed by Scenario

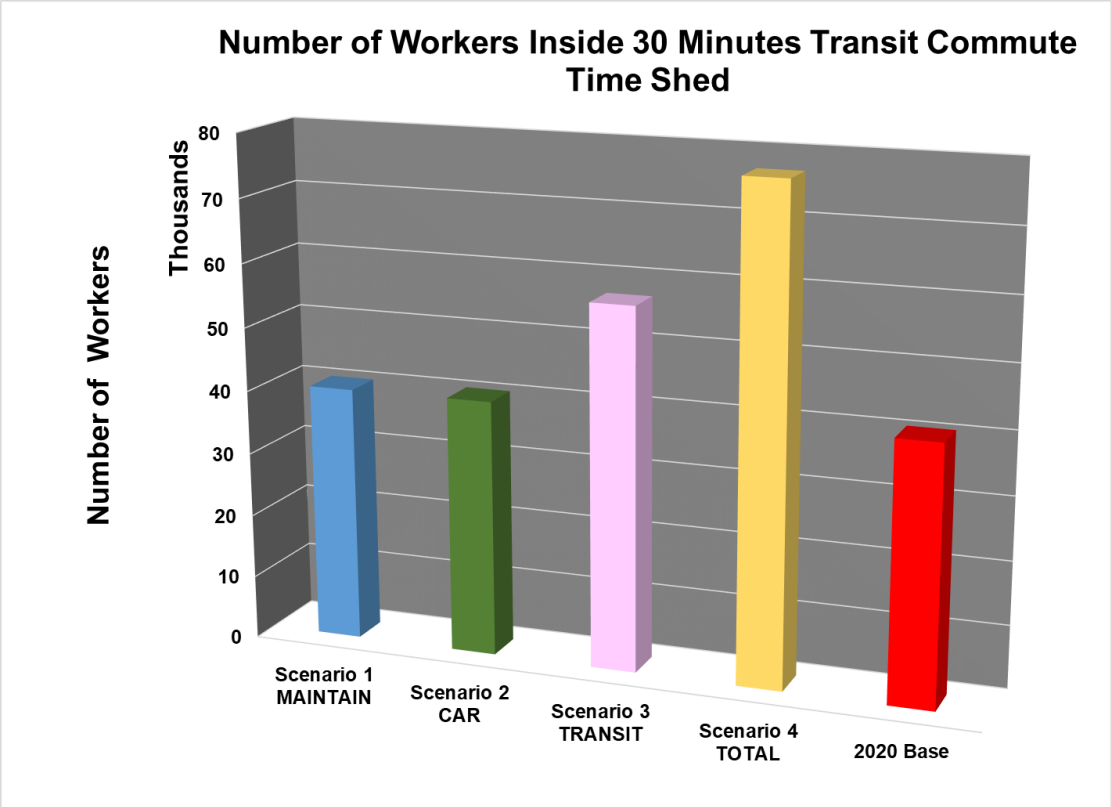


Figure 9-35: Number of EJ Area Workers inside 30 Minute Transit Commute Time Shed by Scenario

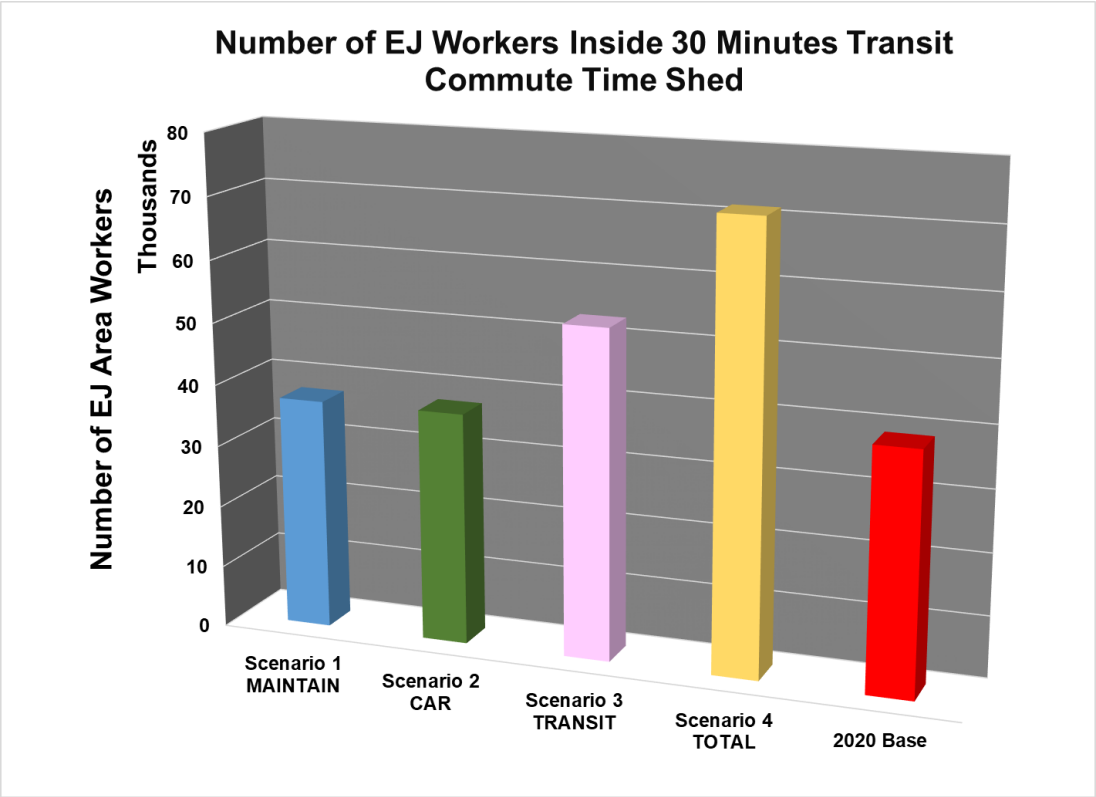
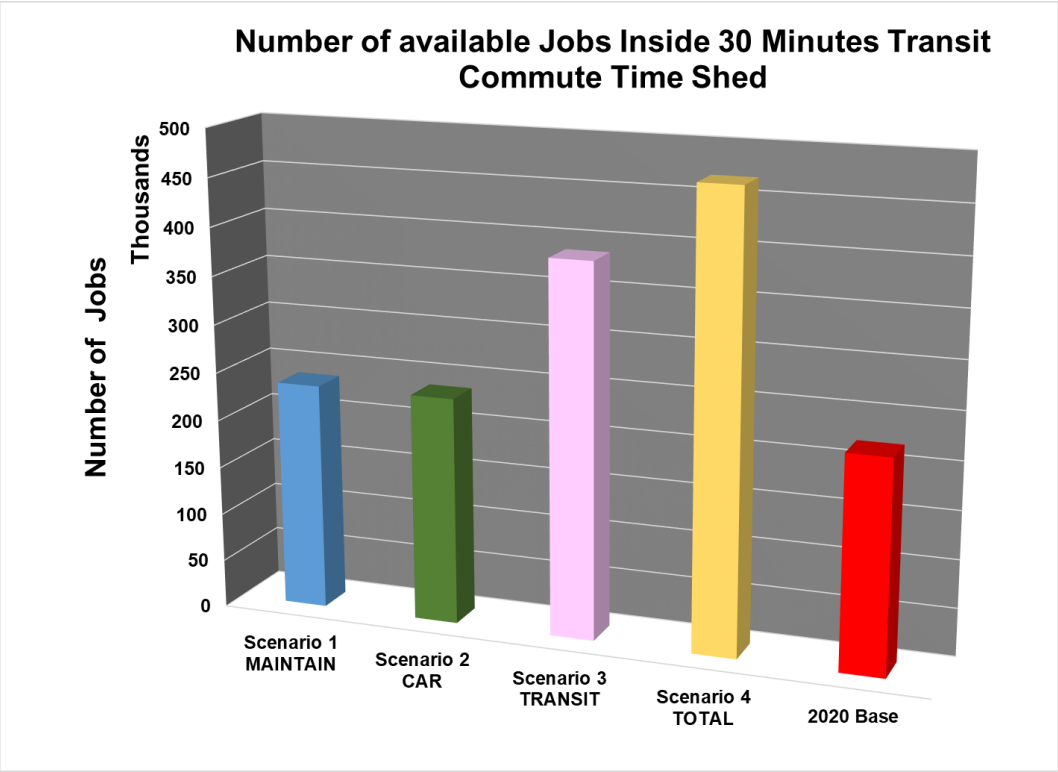


Figure 9-36: Number of Available Jobs inside 30 Minute Transit Commute Time Shed by Scenario



Category: Technology Adaptation

Section 9.3.4 discussed the technology adoption by scenarios. Figure 9-37 displays the comparison results based on Table 9-10.

Figure 9-37: Percent of Autonomous and Electric Vehicles Share of Daily Vehicular Trips by Scenario