Northern Nevada Regional Growth Study 2015-2019

Volume I: A Forecast of Northern Nevada's Employment, Population, Households & Associated Tax Revenues

RCG ECONOMICS

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I. Summary of Findings

RCG Economics LLC ("RCG") prepared the Northern Nevada Regional Growth Forecast ("RGF") under contract to the Economic Planning Indicator Committee ("EPIC", the 33 members of EPIC are listed in the Introduction). EPIC includes the "Technical Committee," which met nearly every week starting in mid-October 2014 to provide data, feedback and guidance to the study process.

These two groups are collectively called the "EPIC Team", and both participated in preparing this socioeconomic forecast.

The purpose of this study is to forecast how many jobs and residents will be located in the Study Area's EPIC Zones by 2019, based on current and anticipated growth trends. The where and how growth will occur is largely based on expected changes in land uses and economic activity over time.

The EPIC Team has used state-of-the-art and well-accepted modeling techniques created by Regional Economics Models, Inc. ("REMI") to forecast the demographic, economic and revenue changes that are expected to drive the region's growth from 2015 to 2019 (see Appendix A: Methodology). Census tract data from the U.S. Census Bureau were used to create a series of growth maps for the region that reflect different growth scenarios.

The region used in this study is referred to as the "Study Area." It is comprised of five counties: Carson City, Douglas, Lyon, Storey and Washoe. Within these five counties, there are 18 "EPIC Zones" (see Exhibit I-1). The EPIC Zones were created in a collaborative effort between RCG Economics and the 33-member EPIC.

The Study Area has undergone striking socioeconomic changes since 1990. As the 21st century unfolds, these changes are projected to continue. How the regional economy evolves, where this economic activity will occur, where its residents will live and work and how the transportation system will influence, and be influenced by, growth will be an important matter for decades.

This report, while the based on the best available data, is still a projection that will need to be monitored and adjusted as data becomes available. It is for this reason that the EPIC has agreed to monitor the projections against actual data on a monthly basis (using December 2014 as the base) and to meet quarterly to see if adjustments to the report are necessary. A full review and update of the report is planned for 2017. It is expected that the actual data will generally track with one of the proposed scenarios which will enable the region to better predict the long term impacts of the growth.

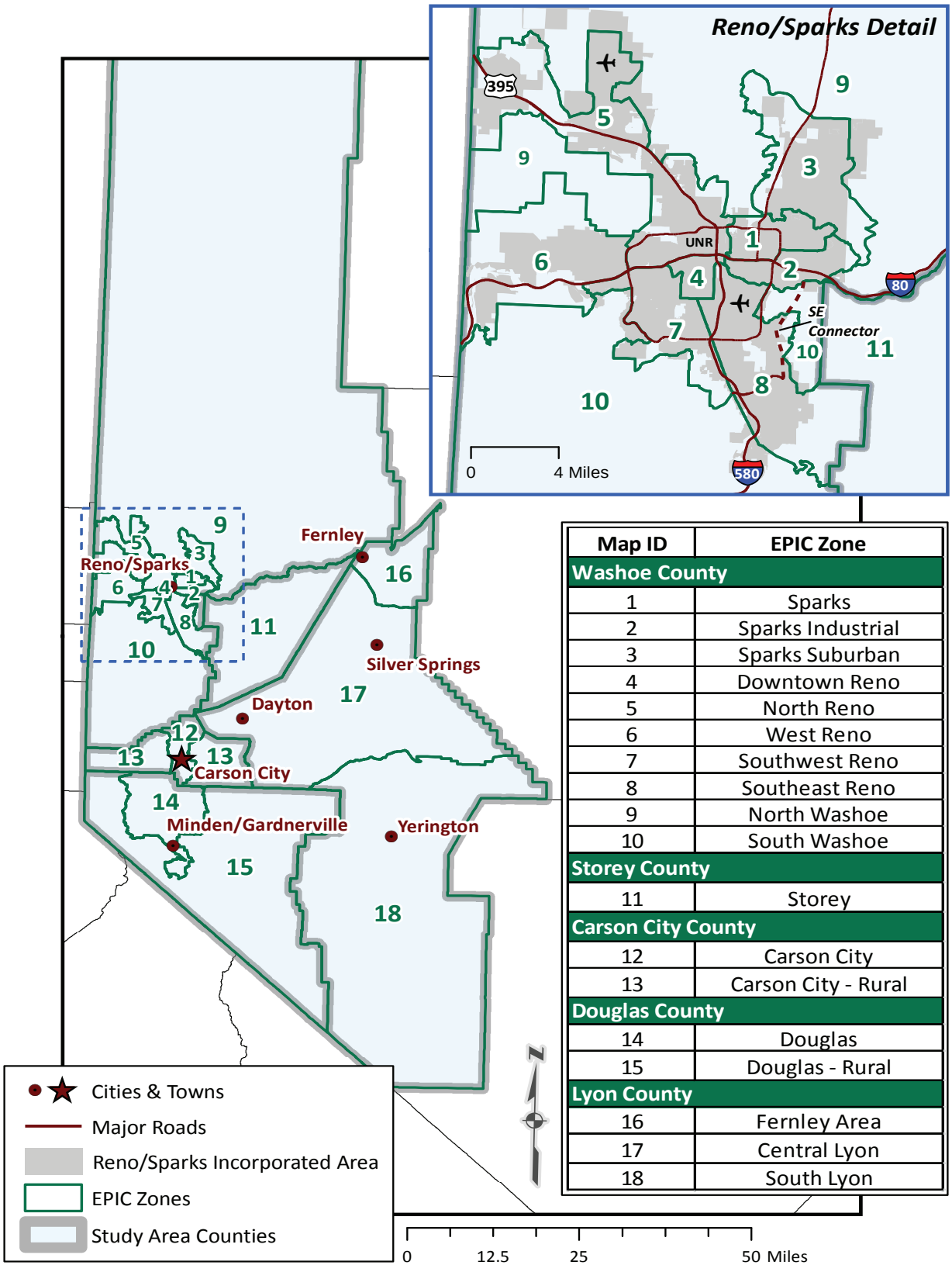
The maps included herein were prepared by the Truckee Meadows Regional Planning Agency.

What Does the Future Hold?

RCG, with the assistance of the EPIC and its Technical Committee, developed three growth scenarios for a jointly selected five-year study period that extends from 2015 through 2019. These growth scenarios are summarily present below. Scenario B, the mid-growth alternative, forms the basis of this report and Scenarios A and C are described in detail in the companion "Atlas" to this report. The decision to focus on Scenario B is based on what the EPIC and the Technical Committee expect the Study Area's demographic and economic growth to be during the study period. Furthermore, Scenario B has a "sub-scenario" - B2. The employment and population estimates in Scenario B come from the REMI model provided by the Nevada State Demographer. However, Scenario B2 envisions a higher rate of population growth. Both Scenarios B and B2 share the same employment projection through 2019. Scenario B2 is discussed in Appendix B.

According to the Nevada State Demographer, the Study Area had 580,649 residents and 329,470 jobs in 2010. By 2014, the Study Area reached a population of 595,907, an increase of 2.8 percent. It had a job-base of 348,499 in 2014, up by 5.8 percent from 329,470 in 2010.

Exhibit I-1: Study Area EPIC Zones Index Map, 2015



Map ID	EPIC Zone
Washoe County	
1	Sparks
2	Sparks Industrial
3	Sparks Suburban
4	Downtown Reno
5	North Reno
6	West Reno
7	Southwest Reno
8	Southeast Reno
9	North Washoe
10	South Washoe
Storey County	
11	Storey
Carson City County	
12	Carson City
13	Carson City - Rural
Douglas County	
14	Douglas
15	Douglas - Rural
Lyon County	
16	Fernley Area
17	Central Lyon
18	South Lyon

Source: EPIC Committee

By 2019, the Study Area is forecasted to have an additional 42,395 residents for a total of 638,302 under Scenario B. This is a jump of 7.1 percent during the five-year study period from 2015 through 2019, or 1.4 percent growth per year.

In terms of employment, the Study Area is projected to have 400,870 workers under Scenario B, an additional 52,371 workers above the 2014 estimate by 2019 (See Exhibit I-2).
It should be noted that the Nevada State Demographer's job figures are based on complete employment counts used by the Bureau of Economic Analysis ("BEA"). Unlike payroll job estimates kept by the Bureau of Labor Statistics ("BLS"), the former includes jobs such as sole proprietorships, contract work and commission-based jobs.

The three regional job growth scenarios for the Study Area are:

Scenario	Job Growth Forecast (2015-2019)
A	56,600 (rounded)
B	52,400 (rounded)
C	47,400 (rounded)

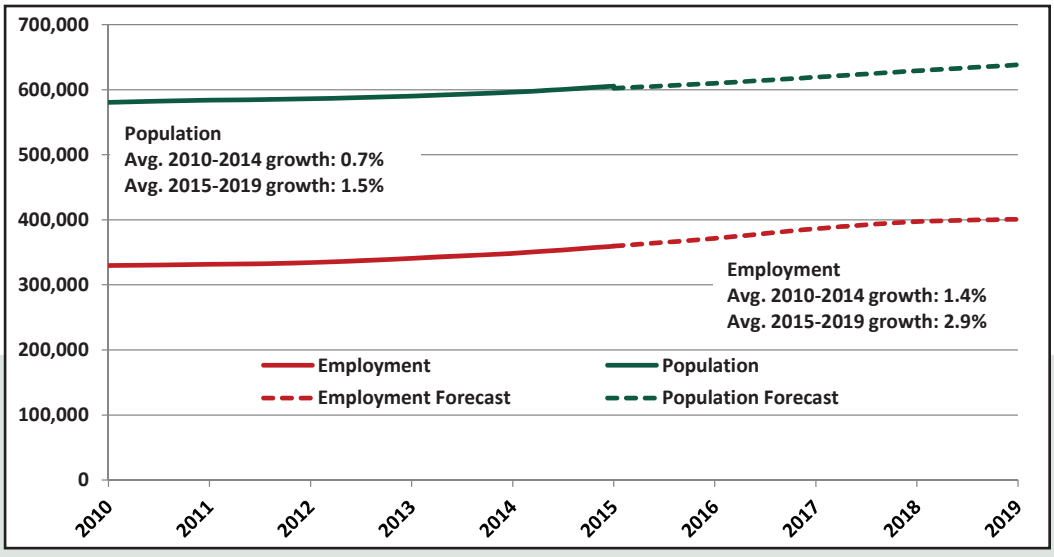
Additionally, the EPIC developed four population forecasts for the Study Area. They are:

Scenario	Population Growth Forecast (2015-2019)
A	46,200 (rounded)
B	42,400 (rounded)
B2	64,700 (rounded)
C	37,800 (rounded)

Regional Growth Patterns

The Study Area is seeing steady and improving demographic and employment growth driven by a regional economy that is becoming increasingly diversified due to a proactive regional business recruitment and retention strategy, locational/transportation advantages (e.g., access to Interstate-80 and the Union Pacific Railroad)[1], a pro-business climate in Nevada and a progressively well-funded economic development program. As illustrated in Exhibit I-2, the Study Area will continue to see noteworthy job growth between 2015 and 2019. The darker green, the larger amount of job growth.

Exhibit I-2: Scenario B Study Area Employment & Population Growth, 2010-2019



Source: EPIC Committee

The suburban and exurban[2] portions of the Study Area are projected to see especially strong employment growth during the study period. A small group of four zones - EPIC Zones 4 (Downtown Reno), 5 (North Reno), 8 (Southeast Reno) and 11 (Storey) - are projected to account for over 50 percent of the Study Area's job growth through 2019.

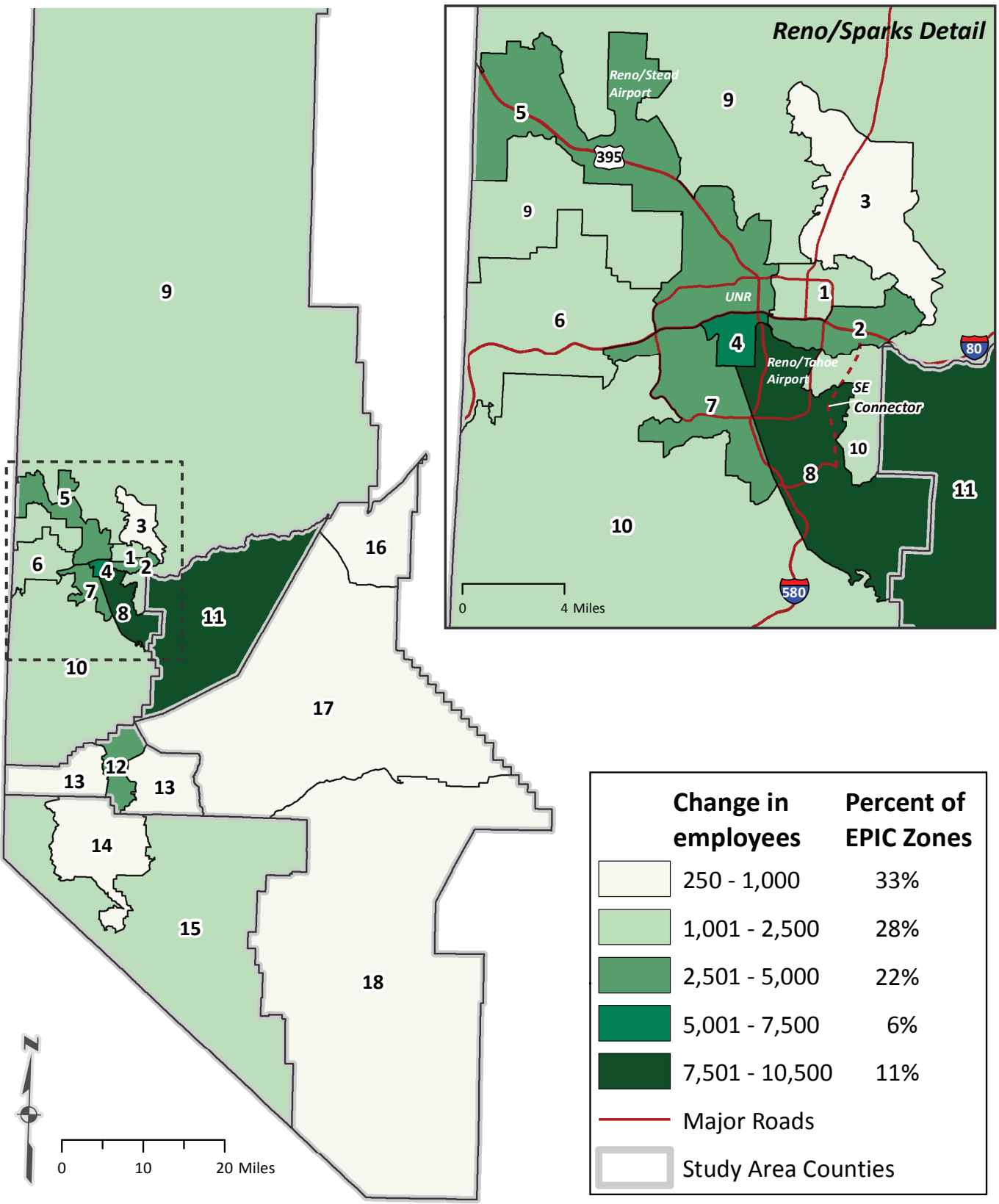
Under Scenario B, five zones are forecasted to account for about two-thirds of the projected population growth to come during the study period. They are EPIC Zones 3 (Sparks Suburban), 5 (North Reno), 8 (Southeast Reno), 9 (North Washoe) and 10 (South Washoe) and are all located in Washoe County. The darker blue (see Exhibit I-4), the larger amount of population growth.

While the economic and population growth that the Study Area experienced starting in 2000 was one of the swiftest in the U.S., it is substantially slower than what the region saw between 1990 and 2000. Through 2019, the Study Area's population and job growth are projected to be dynamic, but not as fast as the annual rates experienced before the advent of the Great Recession.

[1] *"A single carrier ("UPRR") owns and maintains all of the mainline trackage in Nevada; BNSF has trackage rights on about three-quarters of the UPRR mainline routes, including the right to serve some existing and all new customers." Nevada State Rail Plan Nevada Department of Transportation, March 2012.*

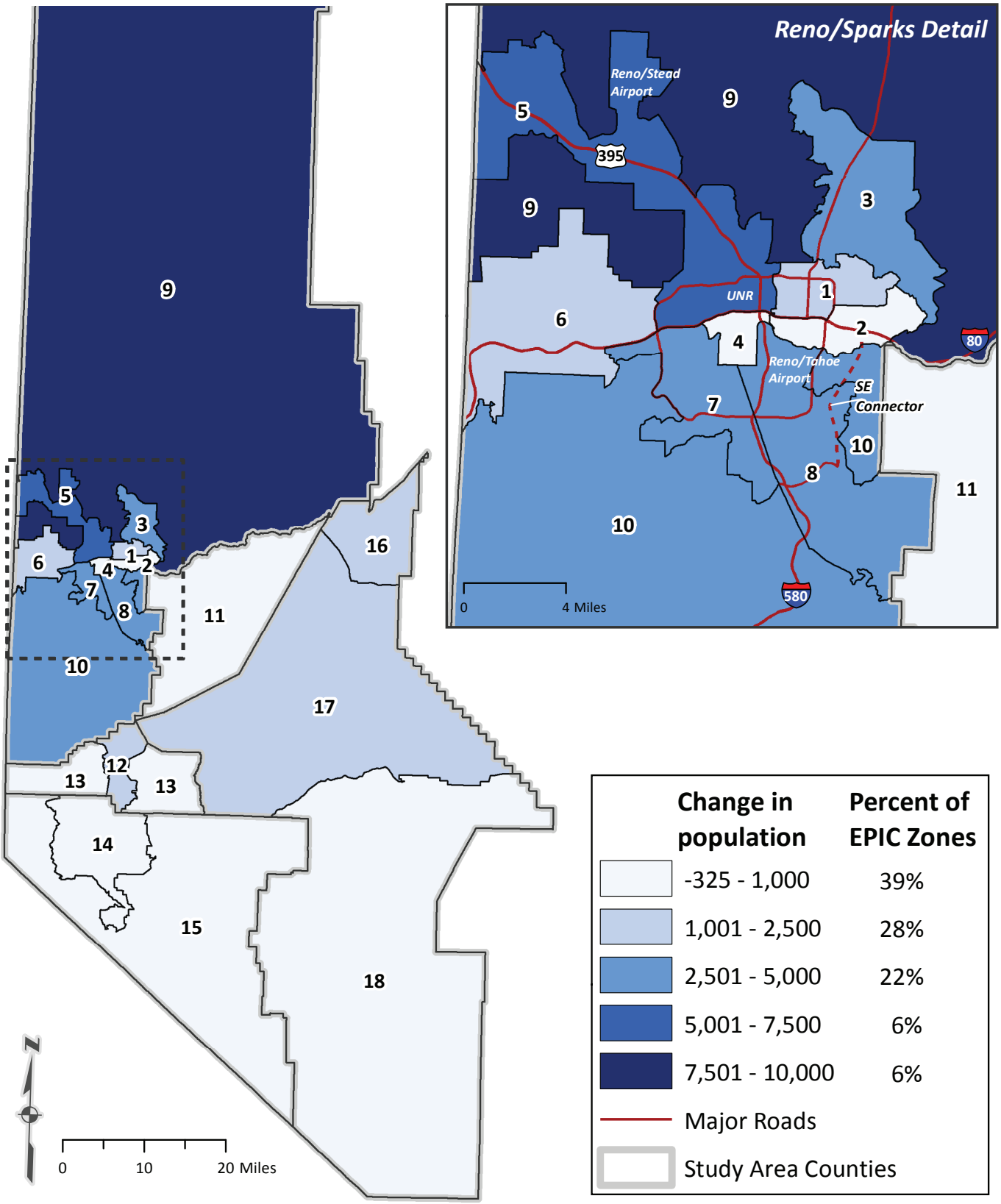
[2] *A semirural region located just beyond the suburbs of an urban center or city.*

Exhibit I-3: Scenario B Study Area Employment Growth, 5-Year Study Period*



*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Exhibit I-4: Scenario B Study Area Population Growth, 5-Year Study Period*

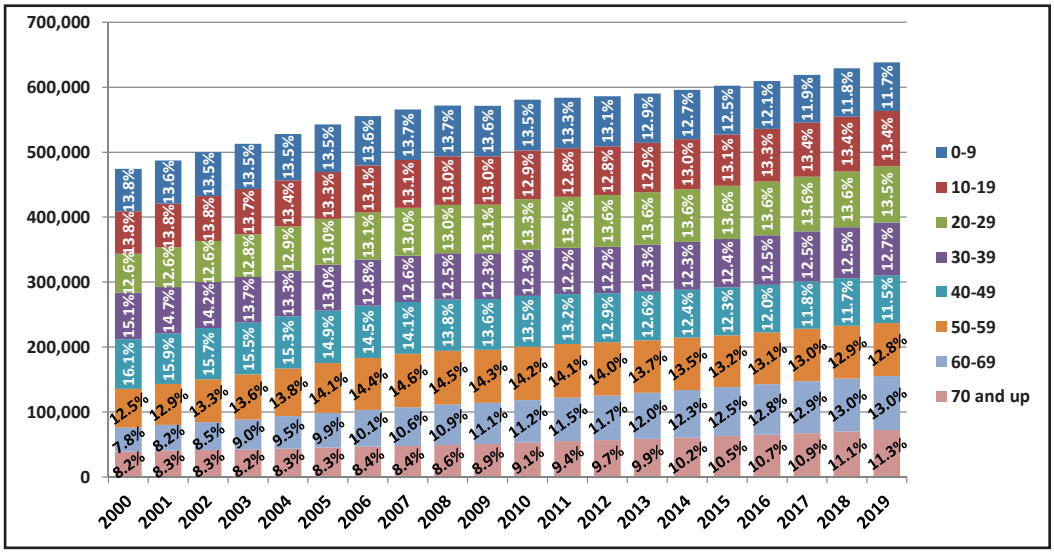


*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

An Aging but More Diverse Population

Population growth is only part of the story. RCG reviewed the State Demographer's ASRHO (Age, sex, race and Hispanic origin) estimates and projections, and used them as the basis for assigning age, race and ethnicity shares to the population. During the last 14 years, the Study Area's population has generally become older. Between 2000 and 2019, residents aged 60+ are expected to grow from 76,180 to 155,324, or by 104 percent, under Scenario B. This means that the share of the Study Area's population age 60+ is projected to grow from 16.1 to 24.3 percent of the population (see Exhibit I-5).

Exhibit I-5: Scenario B Study Area Population Growth & Share, by Age Group, 2000-2019



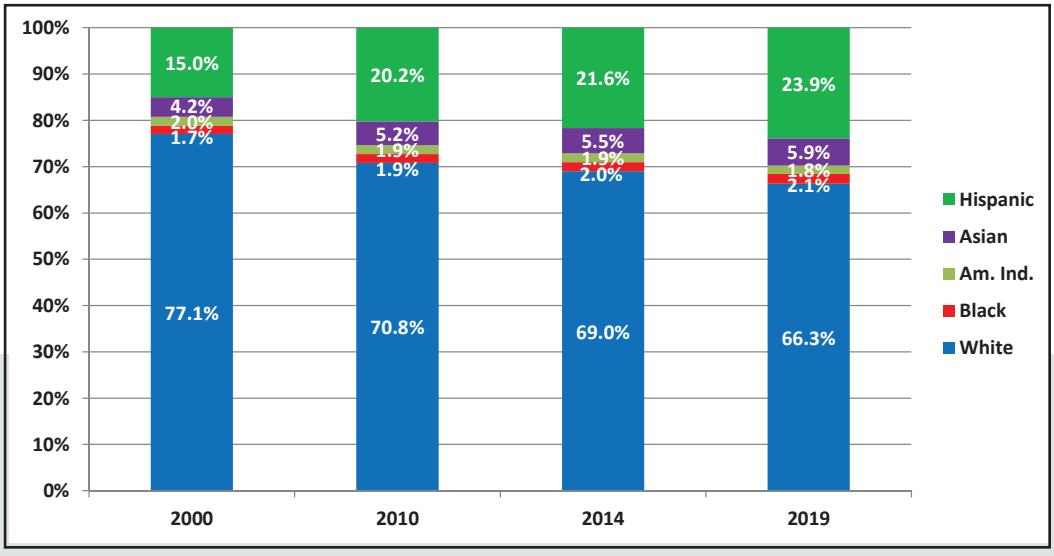
Source: EPIC Committee

Under Scenario B, on the other side of the population distribution, the number of persons under 20 years of age is forecasted to increase from 130,656 in 2000 to 160,105 in 2019 (22.5%) but their share of the population is expected to decline from 27.6 to 25.1 percent.

Diversity: Growth & Implications

A key piece of the Study Area's socioeconomic narrative is the increasing ethnic diversity of its residents. According to the U.S. Census Bureau, the proportion of white residents in the Study Area is dropping. At the same time, the region's Hispanic population has risen. For example, in 2000, Hispanics represented 15 percent of the population. By 2014, they had reached 20.2 percent and by 2019, it will be 23.9 percent. This follows the national trend.

Exhibit I-6: All Scenarios Study Area Population Share, by Race, 2000-2019



Source: EPIC Committee

However, in addition to a growing Hispanic community, the region's Asian population is expected to make substantial gains, growing from 5.5 to 5.9 percent between 2014 and 2019 under all Scenarios: A, B, B2 and C (see Exhibit I-6).

What Do These Socioeconomic Trends Indicate for the Study Area?

General Growth

The Study Area's growth through 2019 will be characterized by an increasingly diverse and more technologically advanced economy, which will require an increasingly skilled and educated labor force. This growth and advancement may require policymakers in the Study Area to make key decisions regarding infrastructure needs. This report is meant to assist them with making any needed decisions.

Aging/Generational

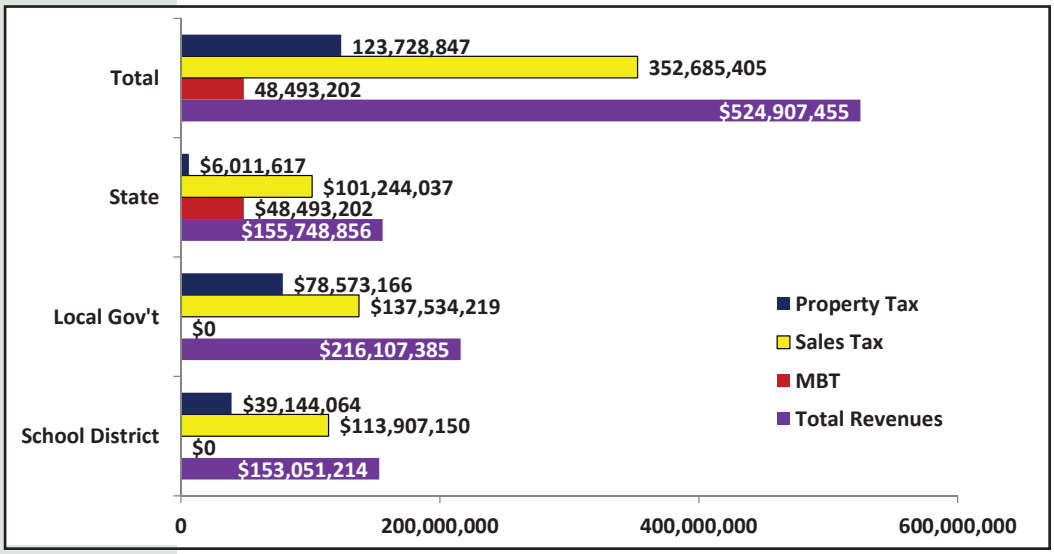
Aging and ethnic shifts in the Study Area will also generate new beliefs and concerns regarding housing demand, health care needs and lifestyle options. The historical demand and preference by Study Area households and families to live in traditional single-family detached dwellings could surrender to a demand for more urbanized attached or small-lot housing choices. Additionally, there will be a growing demand for health and senior care services of all kinds. More active and less passive transportation choices, like biking and walking, particularly in the Study Area's urban core, are becoming more preferred by residents and employees alike, according to the American Planning Association.

Funding the Future

Along with changing living preferences and increased infrastructure needs, will come new tax revenues to help fund the changing landscape and needs of the Study Area. Additional monies, resulting from the Study Area's growth during the study period, will start being generated in 2015 and leveling out in 2019 as the construction of the Tesla Gigafactory is completed. The figures below consider total new revenues added to the Study Area over the study period.

Putting Nevadans back to work and attracting new residents and businesses will help replenish the budgets of the Study Area's jurisdictions and school districts, as well as, the State of Nevada. These budgets were severely affected by the Great Recession.

Exhibit I-7: Scenario B Study Area Tax Revenues, 5-Year Study Period*

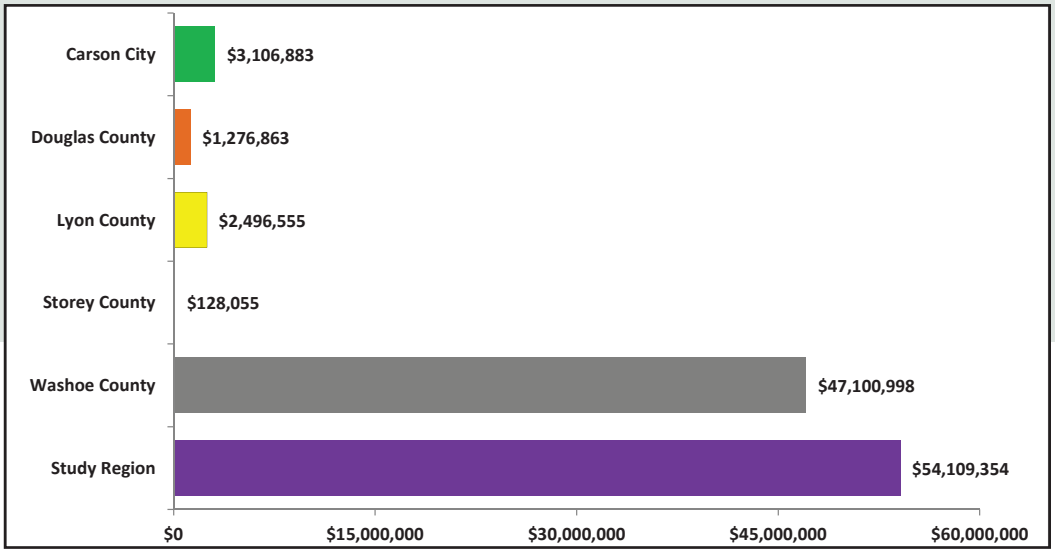


*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Scenario B, for example, forecasts the addition of almost $525 million in new tax revenues to the Study Area by 2019 due to growth (an average of $105 million per year). Most of the new projected revenues are projected to be realized in the last two years of the study period. Scenario B's total collections for the selected taxes are forecasted to represent 22.5 percent growth over what was collected in 2014 for these taxes (see Exhibit I-7).

There are also projected new revenues due to new motor vehicle fuel tax ("Gas Tax") monies. These funds would be created from increased economic activity due to new employment. The new funds calculated for the gas tax would be distributed to all five counties as shown in Exhibit I-8.

Exhibit I-8: Scenario B Study Area Gas Tax Revenues, 5-Year Study Period*



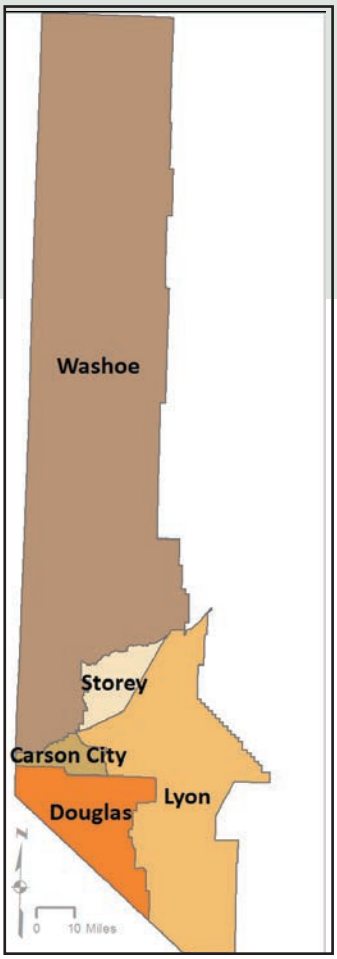
*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Scenario B is expected to bring in over $54 million in new gas tax revenues by the end of 2019, an average of nearly $11 million per year. These collections are forecasted to represent a 68 percent increase over what was collected in 2014 by Study Area governments.

The new revenues will allow Study Area governments and other entities to prepare for the increased community needs that are to come. ■

II. Introduction

The Study Area, like the rest of Nevada, was hard-hit by the Great Recession, which officially started in December 2007. The region became victim to a domestic housing crisis, a spike in gas prices that hit tourism, the global financial crisis and an economy that was less than optimally diversified. As noted, the Study Area (see Exhibit II-1) is made up of five Nevada counties: Washoe, Storey, Lyon, Douglas and Carson City.



In the four intervening years since the end of the Great Recession, Northern Nevada has made noteworthy progress in its economic recovery and development glide paths. With the state's second largest MSA (Reno-Sparks), the Study Area has experienced some of Nevada's biggest successes in terms of business expansions and attractions since the recession ended in the mid-2009. Consequently, Northern Nevada is beginning to see that its hard fought and focused efforts are beginning to pay significant dividends.

With announcements of major expansions and relocations by several companies, such as GreatCall (400 jobs), Nutrient Foods (300 jobs), Cenntro Automotive Company (300 jobs) and Clear Capital (400 jobs), the Study Area has seen a huge decline in unemployment during the last few years. The result is that the Study Area's "headline" unemployment rate has plummeted from a high of 14.5 percent in January 2011 to 6.9 percent in June 2015.

Additionally, one cannot forget one of Nevada's most significant economic development "wins" in the state's history: Tesla Motors in 2014. The company is constructing its first "Gigafactory" in Storey County, less than a 15-minute drive east of the Reno-Sparks area. This factory is expected to employ 6,500 people at full operational capacity, and will effectively double the world's lithium-ion battery energy production. It will make Northern Nevada one of the world's major centers for battery manufacturing overnight. However, the best times are still to come. Even more economic growth is just over the horizon.

Clustering Effects

However, the most important benefit of Tesla and other prominent economic drivers, like the three million square-foot, $1 billion data center that Switch of Las Vegas is bringing to the Study Area, is the "clustering effect". Clustering will drive the region's economic future and its population growth.

According to the Harvard Business School's Institute for Strategy & Competitiveness:

"A cluster is a geographic concentration of related companies, organizations and institutions in a particular field that can be present in a region, state or nation. Clusters arise because they raise a company's productivity, which is influenced by local assets and the presence of like firms, institutions and infrastructure that surround it."

They can comprise providers of specific inputs, such as equipment, parts and services, along with suppliers of unique infrastructure. Clusters can expand downstream to customers and suppliers, and horizontally to makers of supporting manufactured goods to businesses in sectors connected by expertise, technology or shared contributions. Additionally, clusters can include public and private organizations like universities, regulators, think tanks, workforce training servicers, trade groups and economic development authorities.

Modern competition is reliant on efficiency, not just on access to inputs or the size of distinct firms. Efficiency (productivity) depends on the way businesses vie, not just on the specific spheres where they compete. Firms can be very efficient in a sector, such as apparel, technology or electronics, assuming they

employ state-of-the art systems, hi-tech manufacturing, and put forward one-of products and services. Essentially, any industrial sector can use cutting-edge tools, and can be "knowledge intensive"; and, this the power of the clustering effect.

However, the complexity with which firms compete in a particular locality is heavily affected by the character of its business setting. For instance, firms cannot use cutting-edge supply-chain methods in the absence of a superior transportation/distribution network. Neither can firms successfully vie on advanced service lacking highly-trained workers. Additionally, companies cannot productively function under burdensome regulations. Some aspects of the business environment, such as the legal structure or corporate tax rates, impinge on all companies. This said, the more pivotal feature of the business setting is frequently particular to clusters. They comprise many of the most highly critical competitive fundamentals of a growing and evolving regional economy; and this is what makes them so important to a community.

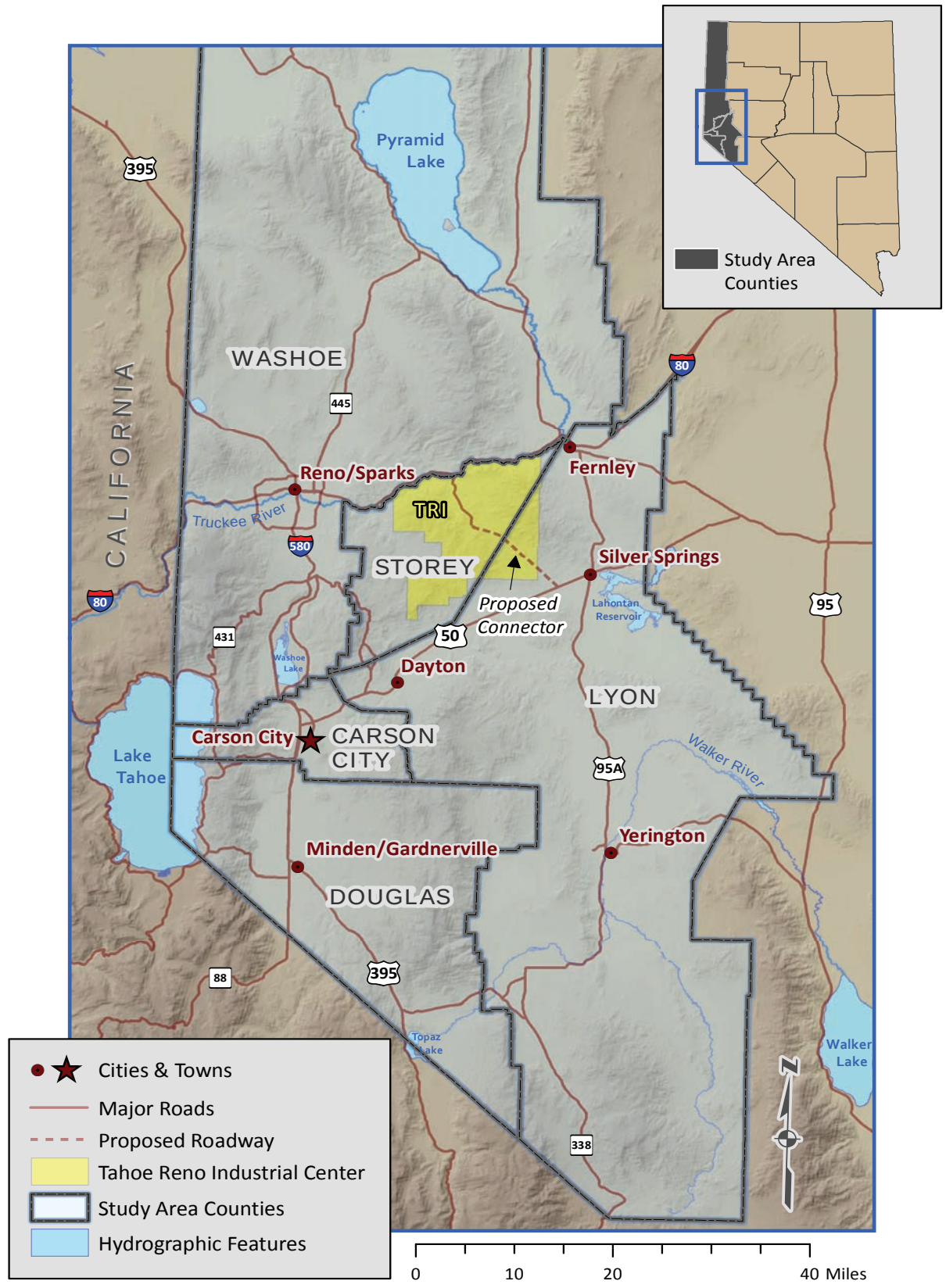
For example, a lithium-ion battery factory, like Tesla's Gigafactory, can spawn a very important economic cluster. For instance, Research and Development offers a tremendous potential to attract other similar battery operations to Nevada. Several of the skills involved in producing microchips are related directly to the lithium battery industry. Additionally, according to the Congressional Research Service (https://fas.org/sgp/crs/misc/R41709.pdf):

"The lithium-ion battery supply chain, expanded by ARRA investments, includes companies that mine and refine lithium; produce components, chemicals, and electronics; and assemble these components into battery cells and then into battery packs. Auto manufacturers design their vehicles to work with specific batteries, and provide proprietary cooling and other technologies before placing batteries in vehicles. Most of these operations are highly automated and require great precision. It has been estimated that 70% of the value added in making lithium-ion batteries is in making the cells, compared with only 15% in battery assembly and 10% in electrical and mechanical components."

It is because of the Study Area's anticipated economic growth wave during the next five or so years, that the 33-member EPIC decided to commission *Volume I: Northern Nevada Regional Growth Forecast, 2019*. This forecast is designed to assist Northern Nevada public and private sector policymakers and entities.

In addition to the high-level information and data included in the body of this report, more detailed data and information are included in the appendices and *Volume II: Northern Nevada Atlas*. Volumes I and II, and the appendices can be accessed by clicking on edawn.org. ■

Exhibit II-1: Study Area and County Reference Map, 2015



Source: EPIC Committee

III. Demographics & Housing Analysis

Demographic Characteristics and Growth

The EPIC mutually and cooperatively developed three regional growth scenarios for the Study Area for the period from 2015-2019:

Scenario	Job Growth Forecast (2015-2019)
A	56,600 (rounded)
B	52,400 (rounded)
C	47,400 (rounded)

However, only Scenario B is included in the body of Volume I. Scenario B represents the mid-point scenario of the three job scenarios analyzed. Moreover, it is the scenario that the EPIC determined was most realistic and representative of how the Study Area's job market is likely to grow during the five-year study period. The other two scenarios, A and C are included in Volume II.

Additionally, the EPIC developed four population forecasts for the Study Area. They are:

Scenario	Population Growth Forecast
A	46,200 (rounded)
B	42,400 (rounded)
B2	64,700 (rounded)
C	37,800 (rounded)

EPIC's chosen population forecast, Scenario B, includes 42,395 jobs, based on extensive discussion, dialogue and analysis.

Scenario B2 was added as a companion higher population forecast to Scenario B's job forecast. Scenario B2 is discussed in Appendix B and the Atlas.

The tables herein, and in the Atlas, provide county-level, zone-level and census tract-level results. Within the current text, only county- and zone-level results are shown. As noted, the study period encompasses job and population growth from the beginning of 2015 through the end of 2019.

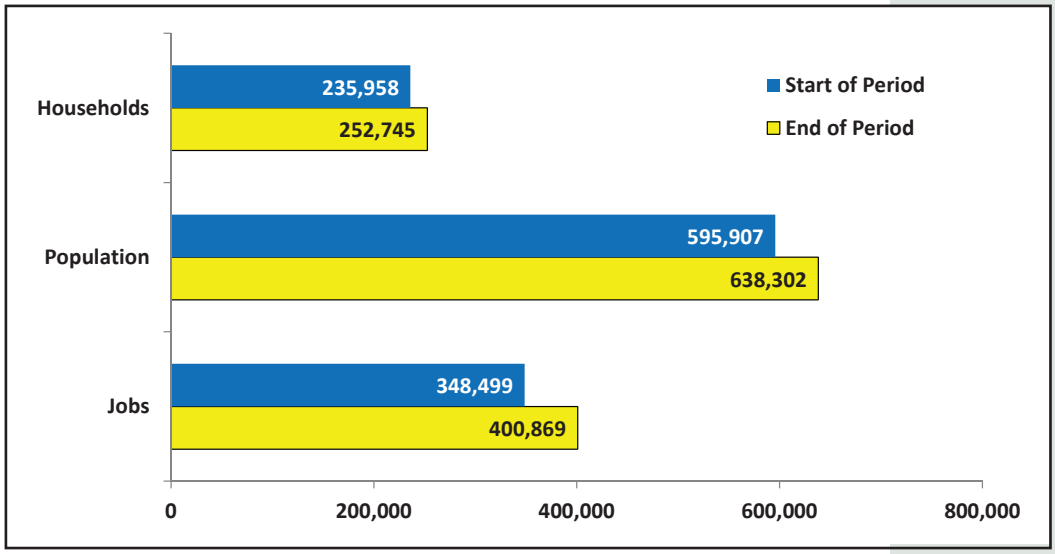
Under Scenario B, the Study Area is projected to experience growth of (see Exhibit III-1):

- 52,370 full- and part-time jobs, from 348,499 to 400,869
- 42,395 residents, from 595,907 to 638,302
- 16,787 households, from 235,958 to 252,745

Note: Under Scenario B, there is projected growth of approximately 10,000 more new jobs than population during the study period. This could occur for two reasons: (1) The possibility that many of the new projected jobs under Scenario B being absorbed by Study Area residents that are currently unemployed or underemployed; and (2) The current jobless numbers are based on BEA employment numbers, based on complete employment, including payroll employees, sole-practitioners, contractors, part-time workers, etc. Additionally, RCG considered job growth, under all scenarios, in the context of the "natural growth" of the Study Area economy. This allowed for a comparison of the differences in employment, population and households under each growth scenario.

Natural economic growth is defined herein as growth expected to occur with or without the Tesla Gigafactory or any other large, one-of-kind employer entering the Study Area. Therefore, natural growth can be seen as an ongoing expansion in the number of new companies in the region because of population growth, economic development efforts, business conditions and locational advantages.

Exhibit III-1: Scenario B Total Study Area Employment, Population & Household Forecast, 5-Year Study Period*



*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

This is an important issue. Large, new and established companies surely are the foundation of additional economic growth. As they expand or become more industrious, or produce new initiatives, the Study Area will benefit. That said, it is the formation of small and medium organically-grown firms, which act as "natural engines" for developing and growing a region's economy. New innovations, products, services and technologies are the nuclei of new businesses. When they expand from a single worker to 10, 30 or beyond, they spawn an extra-large share of employment. New firms produce new jobs that produce new wages and incomes, which are expended, generating a cycle of continual growth. This is why it is considered natural.

Another important measure of the historical and projected growth of the Study Area is how the region has, and is, expected to change. In this context, Exhibit III-2 compares similarly sized Western U.S. combined statistical areas ("CSA") under Scenario B. Coincidentally, the Reno-Carson City-Fernley CSA coincides with the Study Area exactly.

The anticipated growth of approximately 42,000 new residents under Scenario B would make the Study Area the fastest growing of these five CSAs, on a percent basis.

Exhibit III-2: Scenario B Population Forecasts, Selected Western US Combined Statistical Areas, 5-Year Study Period*

Combined Statistical Area	Start of Period	End of Period	# Change	% Change
Reno-Carson City-Fernley, NV	**595,907**	**638,302**	**42,395**	**7.1%**
Boise City-Mountain Home-Ontario, ID-OR	738,991	791,529	52,538	7.1%
Spokane-Spokane Valley-Coeur d'Alene, WA-ID	686,947	725,943	38,996	5.7%
Modesto-Merced, CA	796,160	838,030	41,870	5.3%
Visalia-Porterville-Hanford, CA	610,057	638,212	28,155	4.6%

*Sources: Nevada State Demographer, Woods & Poole. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

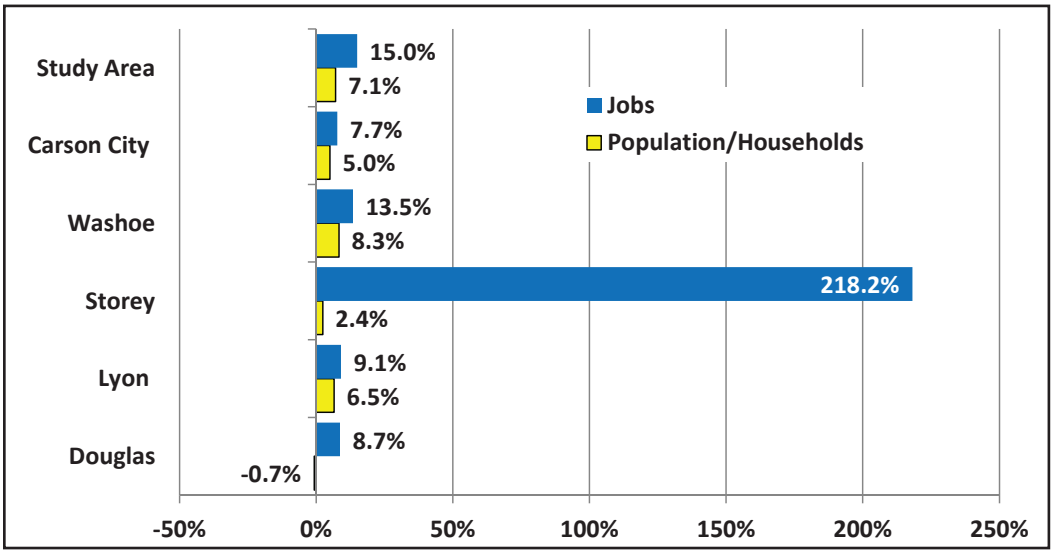
Future Growth among the Five Counties

The Study Area's population and households are projected to grow at the same rate within each scenario in this Study. The reason is that the number of households was calculated directly from the population estimates by using the Nevada State Demographer's weighted persons per household estimate of 2.53. Therefore, while the population and household forecasts are different under each scenario, the rates of growth within scenarios are the same. For example, in Scenario B, the Study Area population is projected to grow by 7.1 percent over the five-year period, as will the number of households.

Job growth in Storey County is projected at 218 percent, because of Tesla-driven economic expansion. (see Exhibit III-3) However, Storey County's population growth will be just 2.4 percent, because it is a geographically small county with little land zoned for residential development. The vast majority of the county's workers are expected to live in other "Study Area" counties and make the relatively short commute (<30 minutes from Reno-Sparks or Fernley) to Storey County.

Additionally, Douglas County is projected to see a very small loss of population and households in Scenario B. Douglas County has seen small population declines for several years, but that trend is expected to reverse once the Tesla Gigafactory is up and running, and ancillary and natural growth pick up.

Exhibit III-3: Scenario B Percent Job & Population/Household Growth, by County, 5-Year Study Period*



*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Exhibit III-4: Scenario B Study Area & County
Employment, Population & Household Growth, 5-Year Study Period*

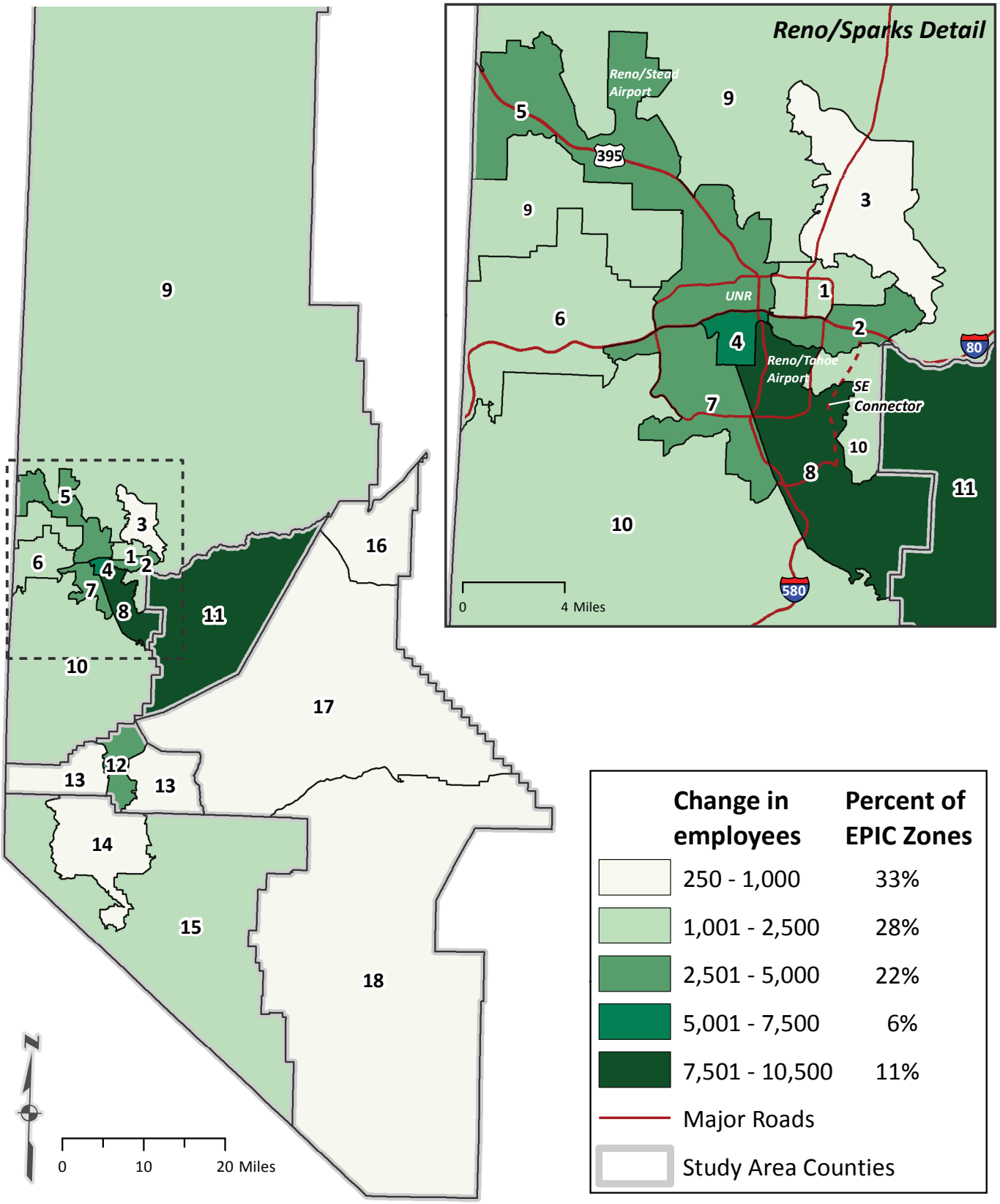
Employment	Start of Period	End of Period	Total Growth	% Change	Avg. Growth
Douglas	29,741	32,322	**2,581**	8.7%	1.7%
Lyon	17,230	18,802	**1,572**	9.1%	1.8%
Storey	4,813	15,315	**10,502**	218.2%	43.6%
Washoe	258,158	292,899	**34,741**	13.5%	2.7%
Carson	38,557	41,531	**2,974**	7.7%	1.5%
Total	**348,499**	**400,869**	**52,370**	15.0%	3.0%

Population	Start of Period	End of Period	Total Growth	% Change	Avg. Growth
Douglas	46,855	46,520	**-335**	-0.7%	-0.1%
Lyon	51,918	55,314	**3,396**	6.5%	1.3%
Storey	3,947	4,041	**94**	2.4%	0.5%
Washoe	439,004	475,512	**36,508**	8.3%	1.7%
Carson	54,183	56,916	**2,733**	5.0%	1.0%
Total	**595,907**	**638,302**	**42,395**	7.1%	1.4%

Households	Start of Period	End of Period	Total Growth	% Change	Avg. Growth
Douglas	18,553	18,420	**-133**	-0.7%	-0.1%
Lyon	20,558	21,902	**1,345**	6.5%	1.3%
Storey	1,563	1,600	**37**	2.4%	0.5%
Washoe	173,830	188,285	**14,456**	8.3%	1.7%
Carson	21,455	22,537	**1,082**	5.0%	1.0%
Total	**235,958**	**252,745**	**16,787**	7.1%	1.4%

*Source: EPIC Committee, Nevada State Demographer. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Exhibit III-5: Scenario B Study Area Employment Growth, 5-Year Study Period*



*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Exhibit III-6: Scenario B Study Area Employment Growth, by Zone, 5-Year Study Period*

Zone #	Epic Zone	Start of Period	End of Period	Emp. Growth	Emp. % Growth
1	Sparks	12,806	14,167	1,361	10.6%
2	Sparks Industrial	33,046	37,474	4,428	13.4%
3	Sparks Suburban	6,039	6,849	810	13.4%
4	Downtown Reno	51,008	56,322	5,313	10.4%
5	North Reno	25,982	30,914	4,932	19.0%
6	West Reno	8,010	9,190	1,180	14.7%
7	Southwest Reno	25,076	27,949	2,873	11.5%
8	Southeast Reno	68,514	78,831	10,318	15.1%
9	North Washoe	7,357	8,440	1,083	14.7%
10	South Washoe	20,320	22,763	2,444	12.0%
11	Storey	4,813	15,315	10,502	218.2%
12	Carson City	35,185	37,907	2,723	7.7%
13	Carson City - Rural	3,372	3,623	251	7.4%
14	Douglas	12,013	12,542	529	4.4%
15	Douglas - Rural	17,728	19,780	2,052	11.6%
16	Fernley Area	6,262	7,066	803	12.8%
17	Central Lyon	6,378	6,856	477	7.5%
18	South Lyon	4,589	4,880	291	6.3%
Total	Study Area	348,499	400,869	52,370	15.0%

*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

- EPIC Zones 8 and 11 (Southeast Reno and Storey County) are projected to see the most job growth between 2015 and 2019 (10,318 and 10,502 jobs, respectively).

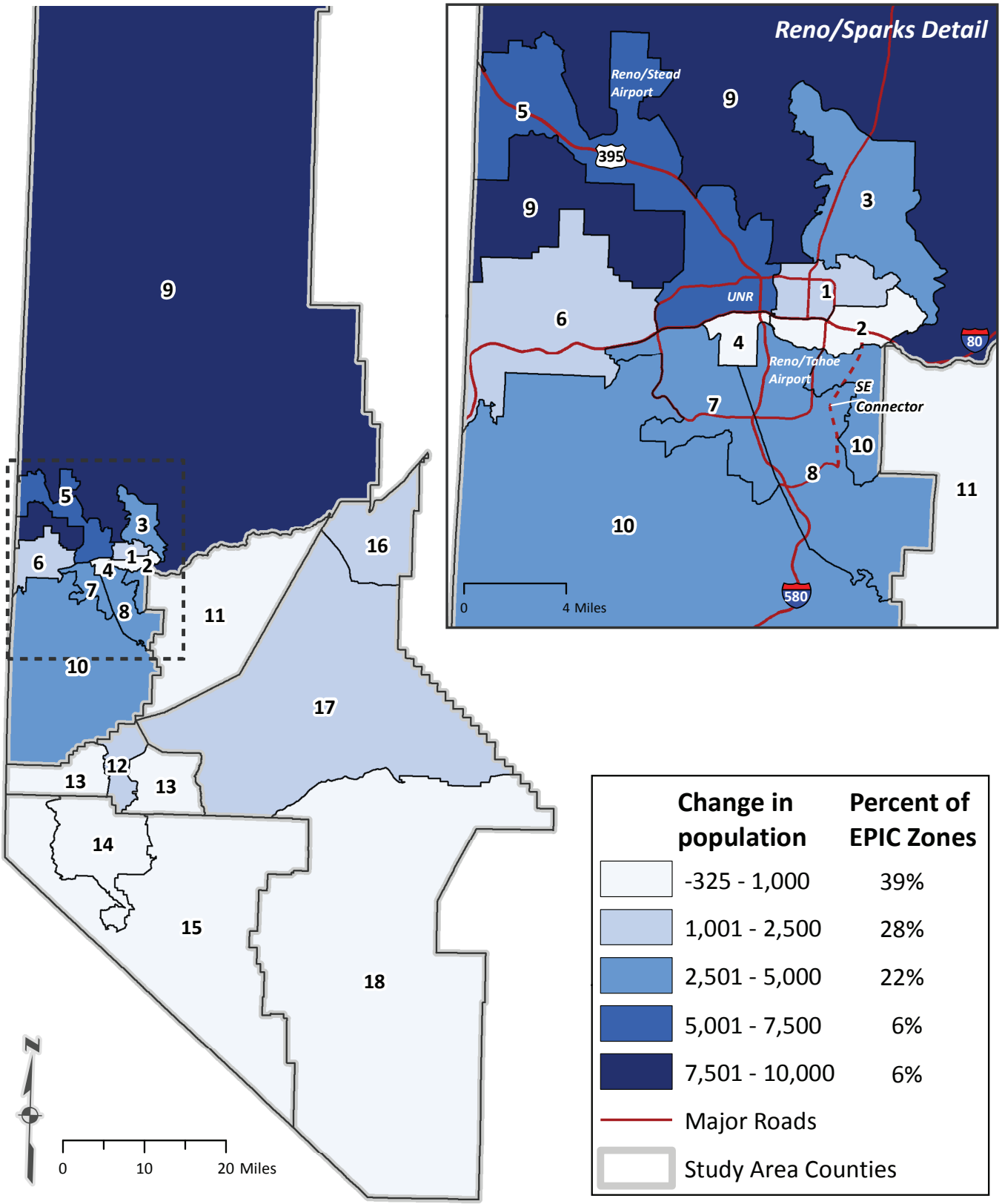
- EPIC Zone 2 (Sparks Industrial) and EPIC Zone 5 (North Reno), which also encompass industrial land, are expected to see significant job growth, as well (4,428 and 4,932 jobs, respectively). In Scenario B, Tesla's Gigafactory does not ramp-up to full operations as quickly as originally planned.

- The smallest amounts of job growth in the Study Area are forecasted to occur in EPIC Zone 13 (Carson City-Rural) and EPIC Zone 18 (South Lyon), which are projected to see just 251 and 291 new jobs.

- Meanwhile, EPIC Zone 4 (Downtown Reno) is expected to experience strong (10 percent or 5,313 jobs) growth.

For a more in-depth view of employment data at the census tract level, see the *Volume II: Northern Atlas*.

Exhibit III-7: Scenario B Study Area Population Growth, 5-Year Study Period*



*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Exhibit III-8: Scenario B Study Area Population Growth, by Zone, 5-Year Study Period*

Zone #	Epic Zone	Start of Period	End of Period	Pop. Growth	Pop. % Growth
1	Sparks	55,851	58,236	2,385	4.3%
2	Sparks Industrial	4,234	4,453	219	5.2%
3	Sparks Suburban	33,157	37,510	4,352	13.1%
4	Downtown Reno	21,330	22,131	800	3.8%
5	North Reno	85,642	91,887	6,245	7.3%
6	West Reno	30,447	32,867	2,420	7.9%
7	Southwest Reno	43,865	46,979	3,114	7.1%
8	Southeast Reno	57,610	62,066	4,456	7.7%
9	North Washoe	61,781	69,835	8,054	13.0%
10	South Washoe	45,086	49,548	4,462	9.9%
11	Storey	3,947	4,041	94	2.4%
12	Carson City	46,291	48,414	2,123	4.6%
13	Carson City - Rural	7,892	8,501	609	7.7%
14	Douglas	33,748	33,739	-10	0.0%
15	Douglas - Rural	13,107	12,781	-325	-2.5%
16	Fernley Area	19,303	20,642	1,338	6.9%
17	Central Lyon	22,867	24,504	1,637	7.2%
18	South Lyon	9,748	10,168	421	4.3%
Total	Study Area	595,907	638,302	42,395	7.1%

*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

- EPIC Zone 5 (North Reno) and EPIC Zone 9 (North Washoe) are forecasted to experience the highest population growth (6,245 and 8,054 persons, respectively) through 2019 compared to the other EPIC Zones under Scenario B.

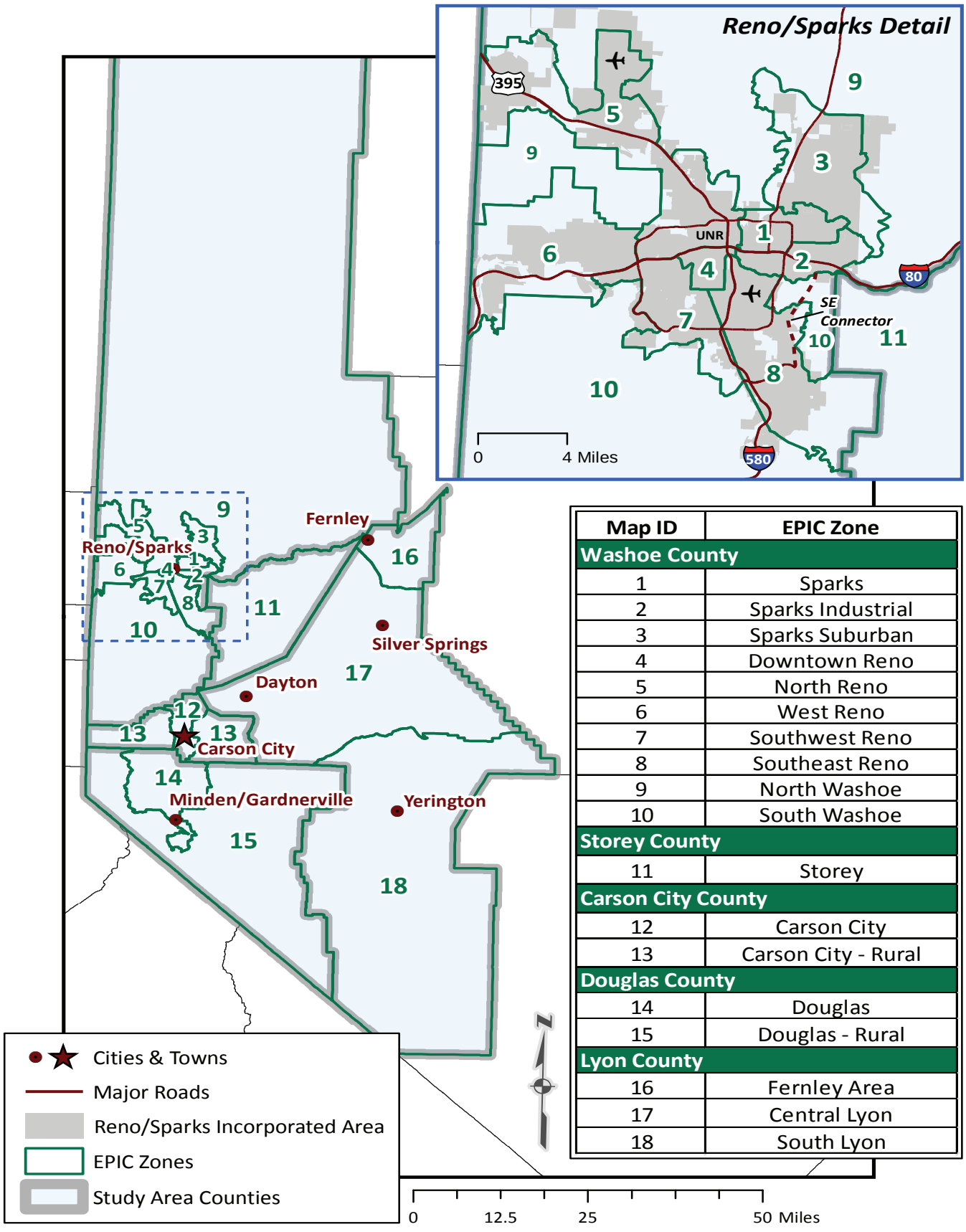
- EPIC Zone 10 (South Washoe) is projected to expand by 4,462 persons during the study period.

- EPIC Zone 3 (Suburban Sparks) is expected to gain 4,352 persons.

It is anticipated that redevelopment and adaptive reuse will play a major role in the evolution of the Reno-Sparks MSA's urban core during the study period. Two of these core zones, EPIC Zone 1 (Sparks) and EPIC Zone 4 (Downtown Reno) are projected to see population increases of approximately 2,385 and 800 persons, respectively.

EPIC Zone 14 (Douglas) and EPIC Zone 15 (Douglas-Rural) are expected to see negative growth through 2019 under Scenario B, with -10 and -325 persons, respectively. These zones are forecasted to be the only ones to experience a population loss over the study period in Scenario B.

Exhibit III-9: Study Area EPIC Zones Index Map, 2015



Map ID	EPIC Zone
Washoe County	
1	Sparks
2	Sparks Industrial
3	Sparks Suburban
4	Downtown Reno
5	North Reno
6	West Reno
7	Southwest Reno
8	Southeast Reno
9	North Washoe
10	South Washoe
Storey County	
11	Storey
Carson City County	
12	Carson City
13	Carson City - Rural
Douglas County	
14	Douglas
15	Douglas - Rural
Lyon County	
16	Fernley Area
17	Central Lyon
18	South Lyon

Source: EPIC Committee

Effects on Housing Demand & Supply

In analyzing the population and household forecasts above, we can infer the effects on the demand and supply for rental and for-sale housing in the Study Area during the study period.

A household, by definition, occupies one housing unit. It is also important to note that the number of persons in a household varies in size (based on the type and size of units) with a weighted average for the Study Area of 2.53 persons in 2014, according to the Nevada State Demographer. RCG has assumed that this estimate will not change significantly during the five-year study period.

Households of job migrants can be of a different average size than households of local workers. People are born and die, and more jobs can lead to greater household formations. Still, over the course of the study period (2015-2019), there is unlikely to be a significantly large shift in the average household size at the region level. Therefore, the expected change in the number of households in the Study Area can be viewed as generally representing the change in the number of occupied housing units.

As housing demand increases, developers will ramp-up construction over time. However, with a vacancy rate (roughly 12 percent as of 2013, based on household and total inventory data from the U.S. Census Bureau) that remains relatively high compared to historical averages, demand in the early years of the study period will likely tend toward absorbing the existing vacant housing stock rather than on the need for new homes. As the residential vacancy rate moves toward a seven- to 10-percent equilibrium level, demand for rental and for-sale housing will shift toward new dwelling units.

We would also like to note that the information regarding housing supply and demand in this report will be expanded upon in the upcoming Residential Housing Study being undertaken by the Truckee Meadows Regional Planning Agency, as part of their shared work program with the Washoe County School District. This study will provide a detailed analysis of housing supply in the Truckee Meadows region, as well as demand projections for the next twenty years, a discussion of the types of housing that will be needed in the region during that period and the fiscal impacts of various residential development scenarios.

The household forecasts developed in this report for the Study Area are illustrated in Exhibit III-10. Exhibit III-11 is a map showing areas in the EPIC Zones where future residential development is likely to occur.

Exhibit III-10: Scenario B Study Area Household Growth, by Zone, 5-Year Study Period*

Zone #	Epic Zone	Start of Period	End of Period	HH Growth	HH % Growth
1	Sparks	22,115	23,059	944	4.3%
2	Sparks Industrial	1,677	1,763	87	5.2%
3	Sparks Suburban	13,129	14,853	1,723	13.1%
4	Downtown Reno	8,446	8,763	317	3.8%
5	North Reno	33,911	36,384	2,473	7.3%
6	West Reno	12,056	13,014	958	7.9%
7	Southwest Reno	17,369	18,602	1,233	7.1%
8	Southeast Reno	22,811	24,576	1,765	7.7%
9	North Washoe	24,463	27,652	3,189	13.0%
10	South Washoe	17,853	19,619	1,767	9.9%
11	Storey	1,563	1,600	37	2.4%
12	Carson City	18,330	19,170	841	4.6%
13	Carson City - Rural	3,125	3,366	241	7.7%
14	Douglas	13,363	13,359	-4	0.0%
15	Douglas - Rural	5,190	5,061	-129	-2.5%
16	Fernley Area	7,643	8,173	530	6.9%
17	Central Lyon	9,054	9,703	648	7.2%
18	South Lyon	3,860	4,026	167	4.3%
Total	Study Area	235,958	252,745	16,787	7.1%

*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

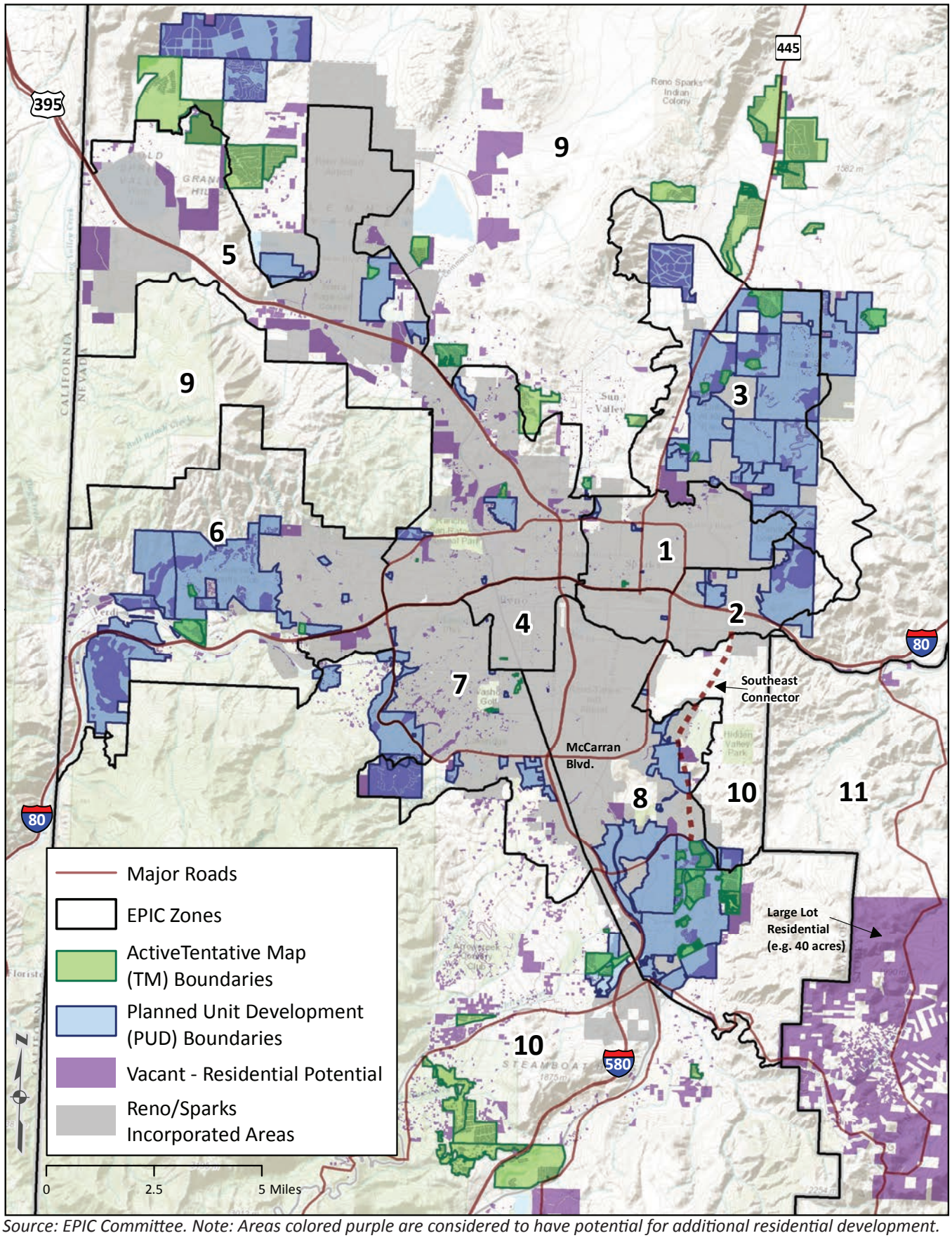
• EPIC Zones with over 10 percent forecasted household growth are likely to rely on new home construction sooner rather than later. EPIC Zone 3 (Sparks Suburban) and EPIC Zone 9 (North Washoe) should see this type of housing demand sooner than some other EPIC Zones. Sparks Suburban is projected to grow by 1,723 (13.1%) households, reaching 14,853 and North Washoe is expected to grow by 3,189 (13.0%) households, reaching 27,652 households.

• EPIC Zone 5 (North Reno), EPIC Zone 8 (Southeast Reno) and EPIC Zone 10 (South Washoe) are projected to experience significant household growth, but will not quite reach 10 percent. North Reno should grow by 2,473 (7.3%) new households, Southeast Reno should see 1,765 (7.7%) new households and South Washoe should expect 1,767 (9.9%) new households.

• EPIC Zone 7 (Southwest Reno) is expected to also experience a large increase in the number of households. It should see growth of 1,233 households, or 7.1 percent.

• Douglas County may not fare as well early on. EPIC Zone 14 (Douglas) is projected to lose four households, basically unchanged. However, as mentioned above, any downward trend should reverse as the Study Area continues to grow and prosper. EPIC Zone 15 (Douglas-Rural) is forecasted to lose 129 households between 2015 and 2019.

Exhibit III-11: Washoe County Residential Potential Map, 2015



Source: EPIC Committee. Note: Areas colored purple are considered to have potential for additional residential development.

IV. Public Revenue Analysis

The EPIC Team also developed Study Area forecasts (2015-2019) for a select group of taxes under the four scenarios: A, B, B2 and C. However, as noted previously, only Scenario B is detailed herein. (Scenarios A and C are detailed in the accompanying *Volume II: Northern Nevada Atlas*, while Scenario B2 is detailed both in Appendix B and the Atlas.) These taxes include:

1. Real property tax ("Property Tax"),
2. Sales and use tax ("Sales Tax"),
3. Modified business tax ("MBT") and
4. Motor vehicle fuel tax ("Gas Tax").

The specific governmental entities receiving the forecasted tax revenues include:

- Study Area school districts,
- Counties and other local governments,
- State of Nevada and
- County regional transportation commissions ("RTC").

Real property tax collections, as well as sales and use tax collections, were allocated to school districts, county and local governments and the State of Nevada. The projected MBT collections were allocated only to the State, per state law. Gas tax collections, on the other hand, were allocated to regional transportation commissions and county and local governments.

The tax revenue forecasts are directly associated with the anticipated socioeconomic growth discussed above for the four Scenarios.

It should be noted that the Tesla Gigafactory will not contribute to property tax, sales tax or the MBT collections for the duration of the five-year study period due to tax incentives passed by the Nevada Legislature in September 2014. However, Tesla workers will contribute their own spending to property and sales tax revenues. Also, jobs projected to be indirectly created by Tesla, along with those due to the Study Area's natural growth, will be taxed normally. Accordingly, they will contribute to the projected collections of the four selected taxes.

Property, Sales & MBT Taxes

RCG first focused on the property, sales and MBT taxes. These taxes are discussed separately from the gas tax, because they are distributed to different entities.

The tax revenues discussed herein (see Exhibit IV-1) are projected to grow throughout the 2015-19 study period. These increases are related to rises in direct and indirect job, as well as population growth, because of the Tesla Gigafactory and the general growth of the Study Area economy. General growth is defined as total growth minus growth due to Tesla jobs. It is somewhat different than "natural growth" in this general growth includes non-Tesla growth associated with the clustering effect.

These taxes will be part of the funding required to address the Study Area's socioeconomic and physical infrastructure growth-related needs under each growth scenario. Thoughtful and proactive planning will be key to ensuring responsible growth in the region for the remainder of the decade.

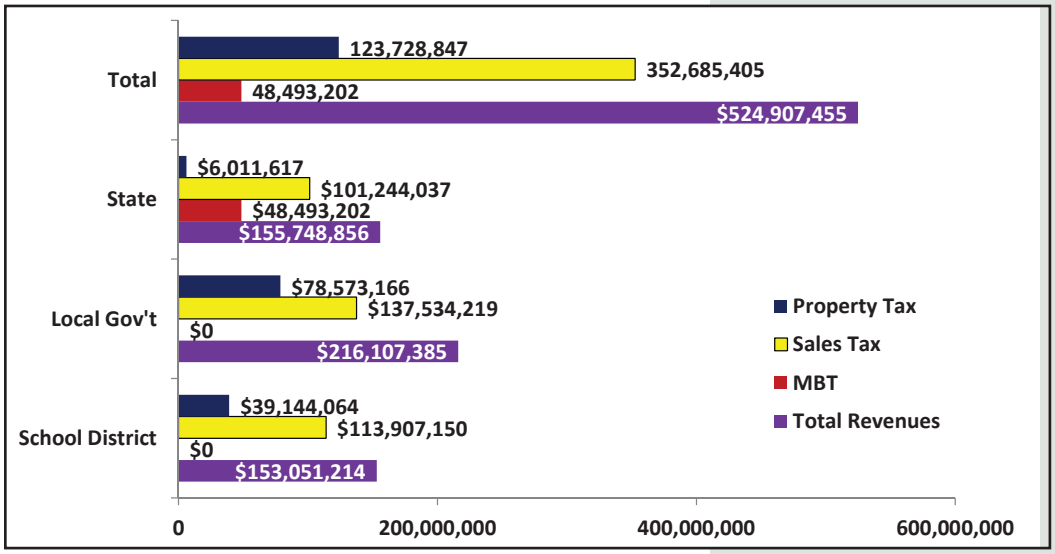
The following charts illustrate the projected total collections for the four selected taxes under Scenario B for the five-year study period (for individual study period years, see Exhibit IV-2 and the companion Atlas).

The MBT and sales tax revenues are based on projected new employment. Conversely, property tax revenues are based on new projected residents.

In Exhibit IV-2, percent changes in revenues are presented for total collections, relative to the actual and estimated collections for Fiscal Year 2014 as reported by the Nevada Department of Taxation.

Exhibit IV-1 shows tax revenue collections under Scenario B (percentages may not add to 100 due to rounding).

Exhibit IV-1: Scenario B Study Area Projected Tax Revenues, 5-Year Study Period*



*Sources: Nevada State Demographer, Woods & Poole. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

- $123,729,000 in property tax collections are projected under Scenario B over the five-year study period for the Study Area.

- $352,685,000 in total sales tax collections are forecasted.

- $48,493,000 in MBT tax collections are projected.

- These new tax revenues will result in an estimate of $524,907,000 in total collections for these three selected taxes by the end of 2019 due to growth.

- Of that total, the State of Nevada is expected to receive $155,749,000, or 30 percent.

- School districts are projected to take in $153,051,000 (29 percent) of total growth-related revenues.

- Subject Area county and local governments are forecasted to get the largest share of the total new revenues. This share accounts for 41 percent of the total, or $216,107,000.

- The largest share of State revenues is expected to come from the sales tax, accounting for $101,244,000 of its $155,749,000 (65 percent). The MBT is projected to make up 31 percent of its total, while property taxes are forecasted to bring in just four percent of new state revenues.

- County and local governments are expected to collect 64 percent of their total growth-related revenues from the sales tax, while the other 36 percent is projected to come from the property tax revenues.

- By end-of-year 2019, Study Area school districts are forecasted to receive the second largest share of property taxes, accounting for $39,144,000. This makes up 26 percent of the school districts revenue under Scenario B. Sales taxes account for the remaining 74 percent of revenues from growth.

Exhibit IV-2: Scenario B Tax Revenue Growth, by Type, 5-Year Study Period*

Property Tax	2014 Base	2015	2016	2017	2018	2019	Total	Total/Base % Change
School District	$196,698,928	$2,075,537	$4,530,280	$7,639,208	$10,905,055	$13,993,984	$39,144,064	19.9%
Local Gov't	$394,830,173	$4,166,188	$9,093,549	$15,334,043	$21,889,517	$28,089,870	$78,573,166	19.9%
State	$30,208,375	$318,754	$695,746	$1,173,204	$1,674,762	$2,149,150	$6,011,617	19.9%
Sales Tax	**2014 Base**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**	**Total/Base % Change**
School District	$178,132,400	$7,234,244	$15,090,307	$24,950,268	$32,107,217	$34,525,113	$113,907,150	63.9%
Local Gov't	$215,081,323	$8,734,800	$18,220,398	$30,125,551	$38,767,023	$41,686,448	$137,534,219	63.9%
State	$934,947,758	$6,430,010	$13,412,710	$22,176,535	$28,537,843	$30,686,940	$101,244,037	10.8%
MBT	**2014 Base**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**	**Total/Base % Change**
State	$384,991,919	$3,278,335	$6,755,874	$10,519,602	$13,381,557	$14,557,835	$48,493,202	12.6%
Total	**2014 Base**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**	**Total/Base % Change**
School District	$374,831,328	$9,309,781	$19,620,587	$32,589,476	$43,012,272	$48,519,097	$153,051,214	40.8%
Local Gov't	$609,911,496	$12,900,987	$27,313,947	$45,459,593	$60,656,540	$69,776,317	$216,107,385	35.4%
State	$1,350,148,052	$10,027,099	$20,864,330	$33,869,341	$43,594,162	$47,393,924	$155,748,856	11.5%
All Monies	**$2,334,890,876**	**$32,237,868**	**$67,798,864**	**$111,918,410**	**$147,262,974**	**$165,689,339**	**$524,907,455**	**22.5%**

*Sources: EPIC Committee, Nevada Department of Taxation. * The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Gas Tax

The gas tax is comprised of two basic components. For one part, the tax rates are fixed and can only be changed through legislative action. The other part of the tax is indexed to the Other Nonresidential Construction ("BONS") Producer Price Index ("PPI") developed by the Bureau of Labor Statistics. This portion of the tax rate changes every year, with the 10-year moving average of the BONS PPI. Within the Study Area, only Washoe County has enacted the indexed tax.

The EPIC Technical Committee forecasted the total increases in the gas tax due to the Study Area's projected economic growth under each scenario, as well as which public entities would be receiving these revenues and their associated shares. As noted previously, only the Scenario B gas forecasts will be discussed herein. The gas tax forecasts associated with Scenarios A and C are included in the Atlas, while those for Scenario B2 are included in both Appendix B and the Atlas.

Gas tax revenues are disbursed to the counties for the purpose of transportation projects. Each of the five counties within the Study Area is forecasted to receive a share of the anticipated incremental tax revenues. For Washoe and Lyon Counties, there are multiple recipients of the tax collections. Exhibit IV-3 shows the Scenario B anticipated revenues for each entity and each year.

The following public entities share the county revenues in Washoe County:

- Washoe County RTC
- City of Reno
- City of Sparks

The following public entities share the county revenues in Lyon County:

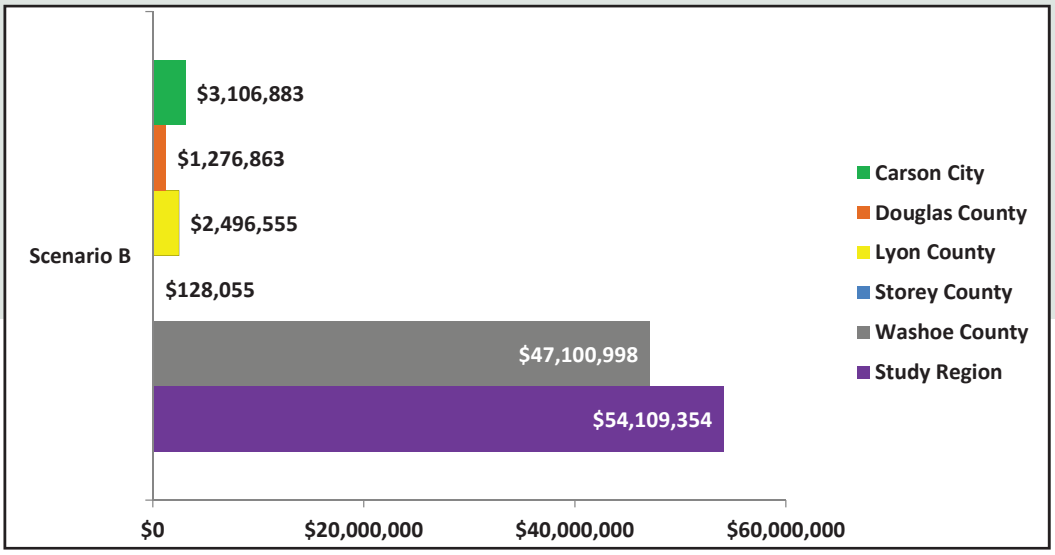
- Lyon County RTC
- City of Yerington
- City of Fernley

Exhibit IV-3: Scenario B Gas Tax County Distribution, 5-Year Study Period

	2014 Base	2015	2016	2017	2018	2019	Total	Total/Base % Change
Douglas	$1,875,674	$75,933	$163,490	$273,099	$363,292	$401,050	$1,276,863	68.1%
Lyon	$3,667,366	$148,466	$319,659	$533,970	$710,317	$784,143	$2,496,555	68.1%
Storey	$188,109	$7,615	$16,396	$27,389	$36,434	$40,221	$128,055	68.1%
Washoe	$69,189,965	$2,801,025	$6,030,811	$10,074,089	$13,401,116	$14,793,956	$47,100,998	68.1%
Carson	$4,563,919	$184,762	$397,805	$664,509	$883,966	$975,841	$3,106,883	68.1%
Study Area	**$79,485,032**	**$3,217,801**	**$6,928,161**	**$11,573,056**	**$15,395,125**	**$16,995,211**	**$54,109,354**	**68.1%**

*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Exhibit IV-4: Scenario B Study Area Projected Gas Tax Revenues, 5-Year Study Period*



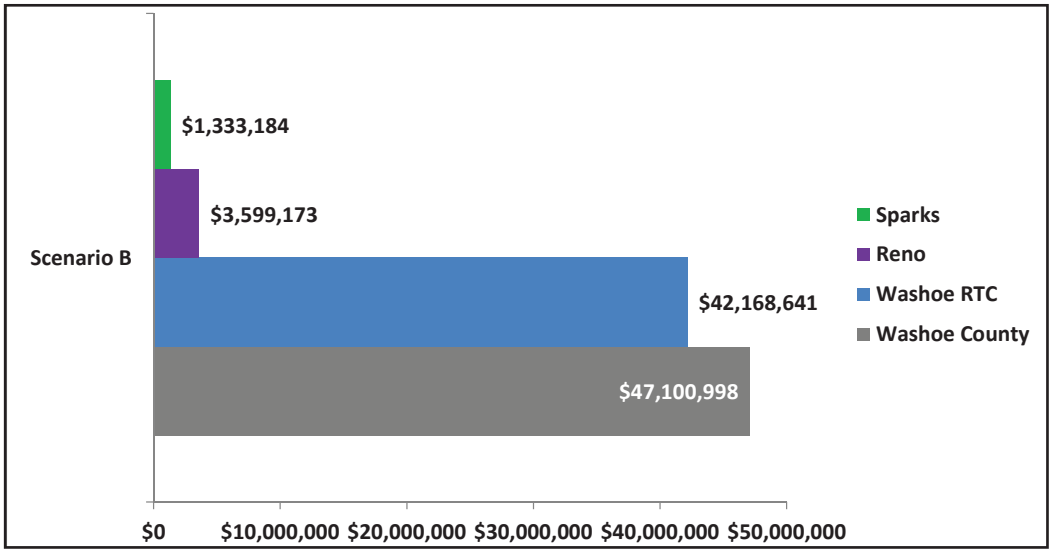
*Source: EPIC Committee. * The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

• $54,109,000 in gas tax collections are projected under Scenario B during the study period in the Study Area.

• As the most populated and urbanized county in the Study Area, Washoe County is forecasted to receive the lion's share (87 percent) of the gas tax revenues under Scenario B.

• As mentioned, Washoe County gas tax revenues are distributed among three entities – the Washoe RTC, City of Reno and City of Sparks.

Exhibit IV-5: Scenario B Washoe County Projected Gas Tax Revenues, 5-Year Study Period*

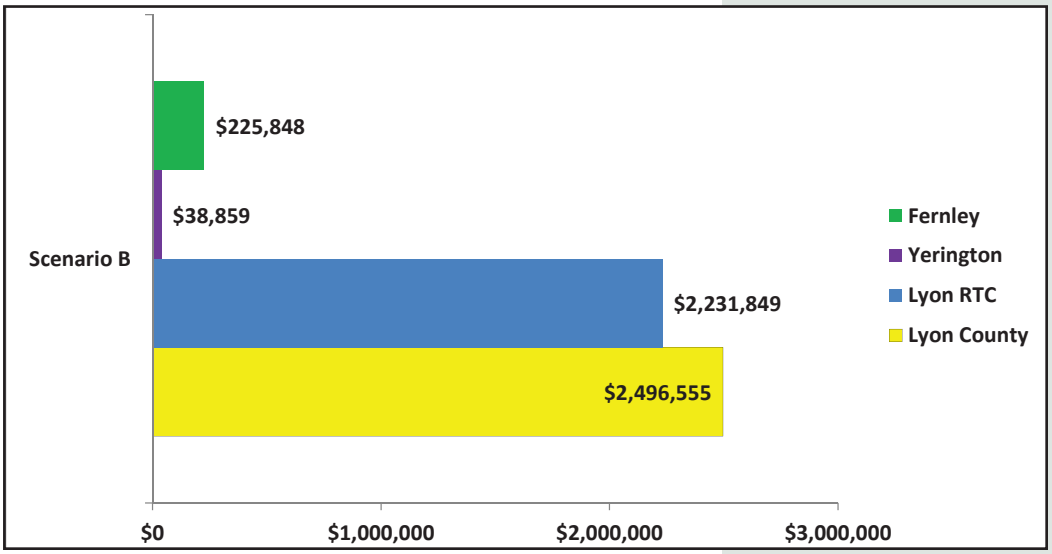


*Source: EPIC Committee. * The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

• Washoe County entities, combined, are projected to receive $47,101,000 in fuel taxes under Scenario B.

• Within Washoe County, the RTC is forecasted to receive 90 percent ($33.4 million) of the gas revenues generated under Scenario B. The Cities of Reno and Sparks are also allotted smaller shares.

Exhibit IV-6: Scenario B Lyon County Projected Gas Tax Revenues, 5-Year Study Period*



*Source: EPIC Committee. * The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

• Lyon County entities, combined, are projected to receive $2,497,000 in fuel taxes, or five percent of Study Area collections under Scenario B.

• The Lyon RTC is forecasted to collect the highest share (89 percent) with the Cities of Fernley and Yerington receiving smaller shares. ■

Appendix A: Methodology

Methodology for Demographics

EPIC Scenario A is the "baseline projection" used in this Growth Forecast. It is based on the work that was done for the Governor's Office of Economic Development ("GOED") for the 28th (2014) Special Session by the State Demographer. This scenario involved reviewing and evaluating the potential impact of Tesla compared to the baseline employment projections for Nevada's counties. It also includes a component for the "natural growth" of the Study Area that would potentially occur in a without-Tesla situation. It was prepared using a 23-industrial sector Regional Economic Models, Inc. ("REMI") model for Nevada's 17 counties.

While, the focus of this report is the study period from 2015-2019, below follows a discussion of demographic figures from 2013-2019, as well. The reason for this is explained below and leads to the use of the report's study period.

The REMI model (http://www.remi.com/) has been in existence for more than 30 years and is used by a wide-range of government agencies and private sector organizations. It evaluates the economic and demographic dynamics of a region or set of regions as they interact with each other and the nation as a whole. The Nevada State Demographer's office has used REMI for more than 14 years and is part of a licensing agreement that goes back to the late 1990s for the Nevada Commission on Economic Development.

The model that was used in the Study employs historical data from 2000 to 2011. The REMI model's national forecast was reviewed and compared to data from Moody's Economy.com. Both models show a rapid increase in health care employment from 2018 to 2033, but REMI had the higher ratio of health care employment-to-population. In 2012, the ratio was 63 health care workers per 1,000 persons; by 2033, the REMI model had it at 91 per 1,000. Reviewing the Moody data and REMI historic data, the model used herein was adjusted to be 73 health care workers per 1,000 persons. That national forecast was adjusted to reflect the still robust growth in that sector shown in the Moody data.

This was done because in the REMI 1.5x model, REMI had a fairly agressive national forecast compared to Moodys various forecasts, especially in the latter years. In the various industrial sectors between the two models, heathcare jumped out. The changes impact in 2018.

REMI's data are based on the U.S. Bureau of Economic Analysis ("BEA") employment and income data and cover a broader range of employment than Nevada's Department of Employment, Training and Rehabilitation ("DETR") data. However, BEA data lag beyond the current calendar year at the county-level and the model contains 2011 as the last year of historical data. Accordingly, detailed data were updated for all counties through 2012, using DETR employment data.

Total employment in 2013 was reviewed and the model was updated for that year. In some smaller counties, where local data is suppressed, updating the model by industrial sector is problematic so total employment was reviewed for near-term trends as a validity test. Accordingly, 2013 adjustments were limited to counties where the adjustments were neither too high nor too low. Other updates included for Scenario A looked at Census Bureau population estimates and updating through 2013, as appropriate.

Each county in the Study Area was reviewed for the baseline forecast. In the case of migration, adjustments were made to reflect historical averages, especially for international migrants. Natural increase (births minus deaths) was also adjusted as needed.

News articles and other reports are also reviewed for new firms coming into a Study Area county. That information was included if it was likely to be a "shock" or exceed historical trends. In preparing the

baseline forecast for Washoe County, this was considered to be the case for Amazon.com with 1,000 employees and Ashima Devices with 400 employees. Both these firms exceed average firm size for their respective sectors at this time. Where needed, adjustments were also made regarding mining along with hotel and recreational employment in Clark County.
These adjustments are further discussed in the Nevada County Population Projections 2014 to 2033 report prepared by the State Demographer (http://nvdemography.org/data-and-publications/), which also contains the baseline forecast for the State.

Detailed Tesla-specific information provided by GOED was also used and inserted into the model as policy variables. These included: construction and production employment, investment in both the plant and equipment, and adjustments to manufacturing wage rates.

Adjustments were also made to Storey County to account for commuting and birth rates. The REMI model showed a significant amount of natural increase in the population for Storey County, and that was adjusted to reflect historical levels. Adjustments were also made to government employment because REMI calculates changes in government employment based on a county's gross regional product ("GRP") and population changes. Tesla drives up the GRP, but given current policies, not necessarily the population increase that would significantly increase government employment for Storey County. These adjustments resulted in the growth of approximately 64,200 (rounded) jobs in the Study Area under Scenario A between 2013 and 2019.

RCG received employment and demographic estimates from the Nevada State Demographer. RCG used these estimates as the basis for its three job forecasts for Scenarios A, B (and B2) and C. Working with the Technical Committee of the Economic Planning Indicator Committee ("EPIC") Board, RCG developed a 2013-2019 growth forecast of 60,000 jobs for Scenario B and 55,000 jobs for Scenario C.

All data up to and including 2014 was historical, and was, therefore, the same for all scenarios. For 2015 and beyond, RCG used the Study Area and county totals provided by the state demographer for Scenario A to calculate the job totals in the other two scenarios.

The job estimates for Scenarios B and C were calculated in two parts. This was done to make sure that the total change in Scenarios B and C conformed to the growth totals determined by EPIC. The first part was to calculate the annual totals for employment in the Study Area. This was done independently of the county figures. The second step was to adjust the county figures to coincide with the Study Area totals for each year.

First, RCG calculated the annual totals for Scenario B. As noted above, Scenario A resulted in the projected creation of 64,194 new jobs between 2013 and 2019; and, Scenario B was forecasted to grow by 60,000 jobs during the same period. Therefore, Scenario B was assigned a pro-rata share of the growth that occurred in Scenario A, with 2013 as the base-year (while 2013 was the base-year, 2014 figures were not changed). This pro-rata share was 93.5 percent of Scenario A's growth (60,000/64,194 = 93.5 percent). RCG applied this percentage to the change in the other scenarios' employment from 2015 through 2019. For example, in 2016, total growth as of 2013 in Scenario A was 32,470 jobs. RCG multiplied this estimate by .935. This yielded total job growth for the period under Scenario B of approximately 30,620 jobs. This job estimate was then added to the total jobs in 2013 (340,869) to come up with 2016's total employment (371,486) for both B Scenarios. RCG used this method to calculate the total jobs each year for Scenarios B, B2 and C. This ensured that the growth in each scenario conformed to its forecasted total from 2013 to 2019.

The second part of the calculation was to adjust the county figures to match with the Study Area annual totals. In these calculations, RCG used "natural growth" figures as a baseline to set the Study Area's lower limit on employment and population growth under Scenarios B, B2 and C. These estimates excluded Tesla-related growth. The reason for this is discussed below.

To begin, RCG applied the difference between the high (Scenario A) and low ("natural growth") forecasts. For example, Washoe County employment in 2016 under Scenario A (with Tesla), from the State Demographer, was forecasted to be 274,620, while under the "natural growth" scenario (without Tesla) that number was projected to be 272,292. The job growth figure for Scenario B should be somewhere between those estimates. We know this to be true because, first, Scenario B was defined to have lower employment growth than Scenario A; and second, because natural growth is growth that would have occurred anyway in any scenario. Therefore, natural growth plus the Tesla and Tesla-associated growth would be higher than the natural growth employment alone. The question was how much of the difference should be included in Scenario B?

The difference between the Scenario A estimate in 2016 and the "natural growth" estimate was 2,328 jobs. RCG used the difference between the total job growth between 2013 and 2019 (64,194 minus 50,760 new jobs from 2013 to 2019 equals 13,434 jobs) and compared it to the difference in total forecasted jobs for Scenarios B (60,000 - 50,760 new jobs = 9,240).

Dividing these differences provided the Scenario B share of total Scenario A growth (9,240 divided by 13,434 equals 68.8 percent) relative to the "natural growth" scenario. Therefore, 68.8 percent of the 2,328 new jobs difference between Scenario A and the "natural growth" scenario for Washoe County in 2016 (2,328 * 68.8% = 1,601) was added to the "natural growth" scenario to yield the corresponding Scenario B figure.

RCG then applied this method to all counties for each year to create the employment, population and household calculations. Doing this caused the county-level figures to deviate from the Study Area totals slightly. This was due to the varying rates of growth in each county. Therefore, RCG normalized the county totals in order to precisely match the Study Area totals.

It should be noted that RCG expects the labor force participation rate to rise during the study period because of the Study Area's improving economy. Accordingly, RCG recognizes that a notable share the job growth during the study period could come from currently unemployed residents and local residents as they age into the labor force; while other jobs, especially in the last two years (2018 and 2019) may very well be taken by economic migrants to the region. RCG further recognized that the Study Area population might not grow at the same rate as employment during the first three years of the study period, because of the total unemployment rate in the Study Area today. This unemployment means that a notable share of jobs generated in the Study Area under Scenarios A, B and C could potentially be taken by currently unemployed workers living in the region today. Therefore, under the three scenarios, there may not be a commensurate increase in the population until the last two years of the study period and beyond as the Study Area's unemployment rate moves to full employment.

However, based on the consensus of the EPIC, RCG also included an additional scenario - B2. Because of the very technical nature of some the jobs that are projected to be generated in the Study Area between 2015 and 2019, it is possible that some these jobs may not be able to be filled using existing local workers alone. If this happens, companies may need to hire a greater than expected share of workers from outside of the Study Area. Should this happen, population growth would be higher than the REMI model predicts under Scenario B (see Appendix B).

Under Scenario B2, RCG considered a 1:1 employment growth-to-population growth ratio (52,370/52,370 = 1.0) as a midpoint, meaning that for every one new job created, one new resident will be added. The percent difference between the 1:1 ratio and the Scenario B population growth (52,370/42,395 - 1 = 0.235) was 23.5 percent. Accordingly, RCG added 23.5 percent to 52,370 jobs to develop Scenario B2's population growth forecast of 64,692 for the study period.

Next, RCG considered employment growth in all of the scenarios in the context of the "natural growth" in the Study Area economy. This allowed a comparison of the differences between scenarios in both the employment scenarios and the other demographics.

Natural economic growth is defined herein as the growth expected to occur with or without the Tesla Gigafactory or any other large, one-of-kind employer entering the Study Area. Therefore, natural growth can be seen as an ongoing expansion in the number of new companies in the region because of population growth, economic development efforts, business conditions and locational advantages.

This is an important issue. Large, new and established companies surely are the foundation of additional economic growth. As they expand, or become more industrious, or produce new initiatives, the Study Area will benefit. That said, it is the formation of small organically grown firms, which act as "natural engines" for developing and growing a region's economy. New innovations, products, services and technologies are the nuclei of new businesses. When they expand from a single worker, to 10, to 30 and beyond, they spawn an extra-large share of employment. Moreover, this is what often drives the growth of a region's labor force to expand faster than the region's population. New firms produce new jobs that produce new wages and incomes, which are expended, generating a cycle of continual growth. This is why it is considered natural. ■

Methodology for Revenue Scenarios

The purpose of this section is to present the methodology that RCG used in developing forecasts (2015-2019, "the Study Period") of tax revenues for a select group of taxes. These taxes include: the real property tax, sales and use tax, modified business tax and motor vehicle fuel tax.

The specific governmental entities receiving the forecasted tax revenues include: Study Area school districts, county and other local governments, the State of Nevada and the regional transportation commissions. Forecasted real property tax collections, as well as sales and use tax collections, went to school districts, county and local government and the State. Projected modified business tax collections are only allocated to the State of Nevada. The forecasted motor vehicle fuel tax collections, on the other hand, were allocated to regional transportation commissions and county and local governments.

The tax revenue forecasts are directly associated with the anticipated socioeconomic growth discussed above for Scenarios A, B, B2 and C.

RCG also used the tax revenue forecasts included in the "*Economic Impact of Tesla On Washoe and Storey Counties*" report, provided to RCG by the GOED.

From the economic benefits analysis included in the GOED report, RCG used total direct and indirect/induced jobs created by the Tesla gigafactory to develop the expected natural growth in the Study Area through 2019. RCG subtracted the Tesla-associated direct, indirect and induced workers from the total projected jobs for the region through 2019 for Scenarios A, B, B2 and C. For example, under Scenario A, 2016 is projected to see a growth of 12,789 jobs. To estimate the "natural share" of this growth, RCG removed Tesla-associated jobs. For example, Tesla is expected to create 1,000 direct jobs and 1,035 indirect/induced jobs in 2016. RCG subtracted these estimates from the total of 12,789 for the year to arrive at the natural growth of 10,754 jobs.

Using the general/natural growth estimates allowed RCG to calculate the tax revenue benefits due to each group of new workers in the Study Area: Direct Tesla workers, indirect/induced Tesla workers and general/natural growth workers under each scenario. RCG then calculated property tax, sales tax and modified business tax figures in the four scenarios.

Real Property Taxes

First, consider property taxes. To calculate total growth-related property tax revenues, RCG used the incremental population change in the Study Area during the study period to calculate the amount of new property tax revenues. For example, in Scenario A, there are 46,235 new residents forecasted

between 2015 and 2019. Only these residents should contribute to new property tax revenues because persons that already live in the Study Area already pay property taxes by way of homeownership or as renters.

RCG then used actual Department of Taxation figures to find the per capita revenues associated with property taxes in the Study Area in 2014. Using these two indicators allowed for a calculation of the property tax for each year.

This result provided the estimates for property taxes to be collected each year during the study period in the Study Area, and for all revenue recipients for all Tesla-associated jobs under all scenarios.

For example, for all scenarios, there are projected to be 3,460 direct, indirect and induced jobs in 2016. These jobs are expected to lead to a population change of 1,997 persons under Scenario B, using a pro-rata share of the Study Area's total population change. This was then multiplied by the per capita property tax contribution of $330.08, which RCG developed from the revenue data provided by the Department of Taxation for 2014.

To calculate revenues due to general growth (general growth is total growth minus Tesla growth), RCG multiplied the general growth population change under each scenario by the $330.08, as recommended by the EPIC.

Sales & Use Taxes

A similar tactic was used to calculate sales and use tax revenues. However, rather than use new persons in the Study Area, RCG used new workers because it is workers who generate the earnings that generate the retail spending that result in sales tax revenue collections.

To calculate sales and use tax revenues due to general growth and from indirect/induced Tesla workers, RCG started with the $655.52/worker for all workers in the Study Area for 2014. (In 2014, there were 271,743 workers in the Study Area, and that the Department of Taxation reported $178,132,400 in collections; thus, $178,132,406 / 271,743 = $655.52.)

According to GOED's calculations for the Tesla project, while direct Tesla workers (operational phase) are projected to earn 20 percent more than Tesla indirect and induced workers, GOED also estimated that these workers would only generate eight percent more in tax collections. In order to be conservative, RCG used the eight percent difference. RCG applied this assumption to the Study Area figure above. This brought the Tesla worker contribution to $707.81 and reduced the indirect/induced worker contribution to $652.37. Using this method, the contribution per each worker due to growth will be close to the previously discussed $655.52/worker.

For example, for Scenarios B and B2, it is assumed that Tesla indirect/induced jobs are projected to produce $652.37 in sales and use tax revenues per worker for Study Area school districts in 2015. RCG assumed that natural growth jobs and indirect and induced Tesla jobs have a similar income profile and, in turn, similar purchasing preferences and power. Accordingly, RCG multiplied this amount by 2015's 9,605 estimated natural-growth jobs to produce the associated $6.3 million in sales and use tax revenues in the Study Area for the year.

Modified Business Taxes ("MBT")

First, the payroll tax, also known as the Modified Business Tax ("MBT"), was the only tax considered in the analysis that is totally allocated to the State of Nevada. Second, per the tax incentive package passed by the Nevada Legislature, Tesla is exempt from the MBT during the study period, so there are no MBT revenues associated with direct Tesla jobs. Therefore, RCG only calculated the MBT for indirect/induced jobs and general/natural growth jobs.

RCG calculated these revenues by using the average per worker contribution due to the MBT, according to the Department of Taxation. This was then applied to this study's new job figures. The per job collections of the MBT was then applied to the corresponding general growth figure.

It should be noted that the 2015 Nevada legislature, as part of comprehensive tax package called SB 483, recently changed the MBT maximum tax rate on payrolls above $200,000 per year to 1.475 percent from the pre-legislative session rate of 1.17 percent for the non-mining entities (financial institutions and mining entities are now at 2.0 percent). However, employers may apply a tax credit of 50 percent of the commerce tax portion of the tax package they pay to reduce their MBT liability to a minimum of 1.17 percent. Therefore, to be conservative, RCG used the Department of Taxation 2014 revenue estimates that were based on the 1.17 percent rate.

Motor Vehicle Fuel Tax ("Gas Tax")

RCG was supplied with one year (2014) of motor vehicle fuel tax collection data by the Washoe Regional Transportation Commission ("RTC"). RCG segmented the data, by county, and, if applicable, by sub-county body (RTC and municipalities receiving these funds).

Two counties had sub-county breakdowns. Washoe distributes funds to its RTC, Reno and Sparks. Lyon distributes funds to its RTC, Yerington and Fernley.

First, RCG had only one year of data for total fuel tax collections. Thus, RCG used the total 2014 gas tax collections as the basis for all years in the study period.

RCG separated the portion of the gas tax that rises with the producer price index ("PPI") from the portion that does not. RCG assumed that the non-PPI gas revenues do not change over the study period. That is, what is collected in 2015 is what is collected in 2019. To the PPI-indexed component, RCG applied the historical (1997-2014) 10-year moving average rate of growth for the "Other nonresidential construction" ("BONS") PPI. This is the PPI used by the State of Nevada to distribute gas revenues. Adding the two components together (PPI-indexed and non-PPI indexed) provided the annual and total forecast of fuel tax revenues to be disbursed to the Study Area entities for the study period.

Using this figure, RCG calculated the per job gas tax estimates by dividing the annual collections for the Study Area by the Study Area's total employment from the BLS' Local Area Unemployment Statistics ("LAUS") survey.

RCG multiplied the per-job fuel taxes by the number of jobs projected under each scenario. For example, fuel taxes per job were calculated to be $298.91 (Study Area Average). This was then multiplied by the 10,765 total new jobs expected in 2015 under Scenarios B and B2, yielding gas tax revenues of $3,218,000.

These estimates contained various applicable assumptions (e.g., the commuting rate, etc.).

We used the 2014 gas tax collections divided by the 2014 LAUS workers. RCG used the job numbers to drive the gas tax revenues under the assumption that the worker(s) in households pay for gas for both themselves and any non-working family members. Therefore, the "non-working travel patterns" are covered.

This calculation provided the total new gas tax revenues generated by Study Area growth for each scenario in the study period. Using this, RCG calculated the disbursements to each county and sub-county area.

The State distributes gas tax funds to counties according to a complex formula that accounts for population, length of roads, its area, as well as other considerations, such as comparing new funding to FY2003 levels. To decrease the complexity of the model, RCG based its distribution levels on those

of 2014. For example, in 2014 Washoe County received 87 percent of gas tax monies distributed to the five counties in the Study Area. Therefore, RCG assigned Washoe county 87 percent of the new tax revenues. The same method was used on sub-county bodies. ■

Methodology for GIS

This section of the report describes the methodology and assumptions used by the Truckee Meadows Regional Planning Agency ("TMRPA") as they relate to the geographic information systems ("GIS") data collection and analysis efforts undertaken to support the Northern Nevada Regional Growth Study.

GIS data and an associated rule-based allocation model were used to disaggregate projected growth in population and employment across the 5-county Study Area. Census tracts were chosen as the appropriate spatial unit for the allocation owing to a wide range of data availability and to ensure compatibility with future monitoring and re-analysis. Groups of census tracts were coalesced into larger zones, referred to as "EPIC zones," to enable easier communication of final results in map format. Significant efforts were made to match the delineation of EPIC zones with municipal boundaries, urban vs. rural areas and MLS zones.

Given the spatial variability among these boundaries and with census tracts, some spatial mismatch was unavoidably accepted. In all cases, GIS modeled results were constrained by the original county-level predictions (3 scenarios) provided by the Nevada State Demographer and RCG Economics. In other words, adding up the forecasted growth at year 2019 by tract for any given county will equal the county-wide prediction at year 2019 for that scenario.

The delineation of zones and the selection of relevant datasets used in the model were discussed among the EPIC Technical Committee members. The approach was also communicated to the full group of EPIC members. This study benefits from the participation of several regional partner organizations and their comments were incorporated into the GIS modeling and mapping whenever possible. All GIS work was undertaken by the TMRPA.

In recent years, TMRPA has been building a digital warehouse of geospatial information and has engaged in several geographic modeling projects for various regional partners. These projects include the creation of spatial forecasts of population and employment to support transportation demand modeling and a significant effort to model the demand for and the development potential of future industrial lands (See http://www.tmrpa.org/files/reports/Truckee_Industrial_Land_Report+Appendices_Dec_2013_HiRes.pdf). This study benefits from techniques and data accumulated through these efforts as well the combined expertise of the EPIC Technical Committee.

Data Acquisition and Analysis

In advance of the modeling work and in coordination with the EPIC Technical Committee, TMRPA staff began compiling relevant spatial data for use in the tract-level disaggregation model. Of particular importance was the acquisi-

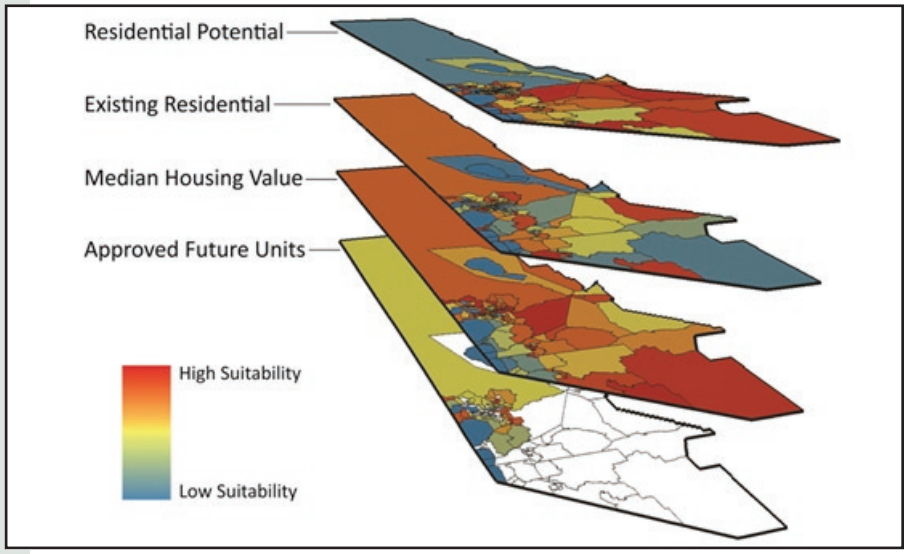
Exhibit A-1: Suitability Factor Assumptions

Projection Type	Suitability Factor	Assumption
Population	Residential Potential	Tracts with a large capacity to expand residential development are more suitable
Population	Existing Residential	Tracts containing a high percentage of built residential lands are more suitable
Population	Median Housing Value	Tracts become more suitable as median housing values increase toward an optimal value and then suitability decreases as median housing value increases
Population	Approved Future Units (Washoe County Only)	Tracts with a greater number of approved future units are more suitable for residential growth
Employment	Employment Potential	Tracts with a large capacity to expand non-residential development are more suitable
Employment	Existing Employment	Tracts containing a high percentage of built non-residential lands are more suitable
Employment	EDAWN Primary Jobs	EDAWN expert opinion describing where forecasted primary jobs will locate (ca. 25,000 total primary jobs over 5 years)

Source: EPIC Committee

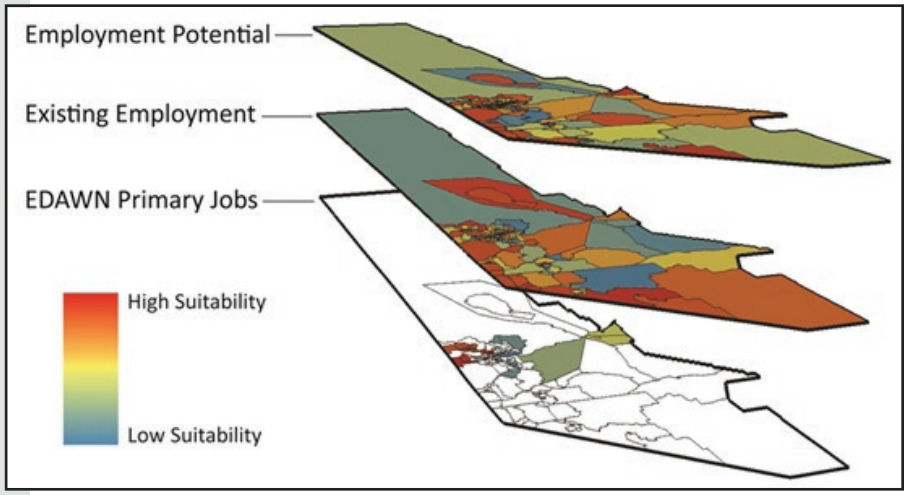
tion of parcel data with existing land use on built parcels and approved zoning on vacant parcels for all tracts within the Study Area. This level of data allowed comparison among tracts with regard to the existing (i.e. built) distribution of residential and non-residential acreages and future capacity of vacant land. Furthermore, TMRPA acquired several tract-level data tables from the U.S. Census, which included population, median housing value, households by income and earnings. These data were supplemented by business point data from January of 2015 acquired through the third-party vendor Infogroup and by jobs and wage information from the Nevada State Demographer. Finally, data which predicted the arrival and probable siting locations of approximately 25,000 primary jobs was provided by EDAWN.

Exhibit A-2: Residential Suitability Factor Surfaces



Source: EPIC Committee

Exhibit A-3: Employment Suitability Factor Surfaces



Source: EPIC Committee

Parcel Categorization

In order to categorize and evaluate the potential for residential and non-residential land uses across the Study Area, TMRPA interrogated parcel data with current land use and zoning information for the entire Study Area. While significant validation work on parcels within Washoe County had been previously accomplished by TMRPA, familiarity with parcels from Carson City, Lyon, Douglas and Storey Counties was limited. In order to create a land use categorization scheme that could be appropriately applied to all five counties in the same manner, TMRPA took a high-level approach to land use categorization. Thus, all parcels in the Study Area were categorized into one of the following four categories: 1 - Residential, 2 - Industrial, 3 - Commercial and 4 - Other.

When considering the built environment (i.e. parcels that had been developed), it was generally an easy task to assign a parcel to one of the three main categories – residential, industrial or commercial. Similarly, the existing zoning provided a reasonable path forward for categorizing vacant land. The 'Other' category was used to denote open space, federal lands and large rural parcels.

One of the more difficult aspects of the parcel categorization scheme was dealing with very large parcels that can support residential development, but at extremely low densities (e.g. ranches). Since our method of disaggregation was designed to rely on parcel acreages to inform tract suitability and capacity TMRPA endeavored to avoid skewing our predictions toward rural areas. Therefore, large parcels with low-density residential zoning (e.g. one dwelling unit per 20 acres) that were located far

from population and employment centers were categorized into the 'Other' category.

Likewise, TMPRA limited the impact to population growth for large parcels that were nearby more urbanized areas (e.g. the Virginia Highlands) by artificially setting a one-acre cap on residentially-zoned, vacant parcels over one acre in size. Both these steps were important to ensure TMRPA did not over-allocate population to census tracts with many large, vacant parcels zoned for low-density residential.

Suitability Analysis and Disaggregation of Projections

The first step in the disaggregation process was to align current attribute values of the census tracts with the 2014 estimates for population and jobs as provided by the Nevada State Demographer and Infogroup 2015 data, respectively. This essentially meant TMRPA increased or decreased each tract by a percentage such that the sum of population and employment by tract for a given county would match the estimated county total in 2014. TMRPA ensured that the relationship among tracts stayed constant since the same percent increase or decrease was applied to all tracts simultaneously. This effectively normalized finer resolution spatial data, in the form of census tracts, to the county-level predictions provided in the study for population and jobs.

Exhibit A-4: Land Use Capacity Factors for Vacant Acres

Land Use	Persons/Jobs per Acre
Residential	10
Industrial	15
Commercial	35

Source: EPIC Committee

After normalizing tract-level data to the 2014 estimates, TMRPA next grew the number of people and jobs in each tract such that they met the 2019 projections, keeping the initial distribution of population and jobs by tract that existed in 2014. Knowing that this distribution was likely to change and that the availability of vacant land in any given tract would be a limiting factor, TMRPA increased or decreased the expected population and employment for each tract using a suitability and capacity analysis.

Exhibit A-5: List of Map Deliverables

Maps
Study Area
EPIC Zone Index
Census Tract Index
Scenario A: Zone-level Employment Growth
Scenario B: Zone-level Employment Growth
Scenario C: Zone-level Employment Growth
Scenario A: Zone-level Population Growth
Scenario B: Zone-level Population Growth
Scenario B2: Zone-level Population Growth
Scenario C: Zone-level Population Growth
Scenario A: Tract-level Employment Growth
Scenario B: Tract-level Employment Growth
Scenario C: Tract-level Employment Growth
Scenario A: Tract-level Population Growth
Scenario B: Tract-level Population Growth
Scenario B2: Tract-level Population Growth
Scenario C: Tract-level Population Growth
Approved Future Units (Washoe County Only)

Source: EPIC Committee

The suitability factors used to manipulate the 2019 tract-level projections are described in Exhibit A-1 and shown visually in Exhibit A-2 (population) and Exhibit A-3 (employment).

For each projection type (i.e. population or employment), TMRPA averaged the suitability scores, by tract, to create an overall suitability score for each tract. The distribution of overall suitability, by tract, determined to what extent TMRPA increased or decreased a tract's five-year growth increment. In other words, tracts with high overall suitability were projected to realize more growth than what would be expected by holding the current distribution constant. The reverse was true for tracts with lower overall suitability scores.

TMRPA applied a straight average to achieve overall suitability, but future research may indicate disproportional importance among suitability factors and a weighted average approach may be developed. Similarly, further research will likely indicate that other tract-level suitability factors may have an effect on development. Incorporating these new factors may be useful as the EPIC Technical Committee validates and reassesses the tract-level predic-

tions in the future.

Once the tract-level projections were modified by overall suitability, TMPRA performed a capacity check to ensure people or jobs were not being over-allocated to tracts that could not realistically absorb them. This was done using the vacant acres for residential and non-residential as identified in our parcel categorization scheme described above, where vacant acreages were transformed to population and employment capacities using the factors listed in Exhibit A-4. Once TMRPA controlled the tract-level predictions for any capacity constraints, the remainders of population and jobs were re-allocated to tracts with remaining capacity per their overall suitability scores.

Mapping and Deliverables

Given that this study contemplates three growth scenarios for both population and employment and for both census tracts and the aggregated EPIC zones, several maps were produced to communicate each scenario's results. This included an overall Study Area map, index maps for both EPIC zones and census tracts and the individual choropleth maps indicating the change in population or employment projected for each scenario. See Exhibit A-5 for the full list of map deliverables.

GIS data ("shapefiles") and associated attribute tables listing the start-of-study-period normalized values, 2019 disaggregated projections and the start- to end-of-study-period growth increment for each tract and zone were also provided. Furthermore, these data have been fit to the Washoe County Regional Transportation Commission's ("RTC") traffic analysis zone ("TAZ") shapefile to enable transportation demand model runs that will shed light on potential traffic impacts resultant from the enhanced growth projected in this study.

Future Work

Future work will be focused on monitoring the success of these tract-level predictions over the five-year projection timeline. Validating the predictions will require subsequent extracts of the Study Area parcel data, such that parcel vacancy status and land use can be re-determined. The monitoring effort will also benefit from county-level population estimates from the Nevada State Demographer, updates to the Infogroup employment data, and updated tract-level data from the U.S. Census American Community Survey. Furthermore, TMRPA will continue to work with the EPIC Technical Committee to facilitate and oversee the monitoring and update process.

In addition, TMRPA has commenced an in-depth study of residential growth within Washoe County (primarily within the Truckee Meadows Service Area or "TMSA") that will take advantage of more detailed spatial data layers. These detailed layers will quantify the relationship of infrastructure (e.g. water, roads, wastewater, etc.) and other spatially-enabled variables to the potential for residential growth at the parcel level. This *Residential Housing Study* ("RHS") will engage several regional partners in examining different spatiotemporal growth scenarios and their potential impacts to water and wastewater infrastructure, transportation and schools. Extra attention will be paid to how these more detailed parcel-level predictions over the next 20 years will align with the census tract-level predictions presented here in the EPIC study. The RHS is scheduled for completion prior to the end of the 2015 calendar year. ■

Appendix B: Scenario B2 Overview

Introduction

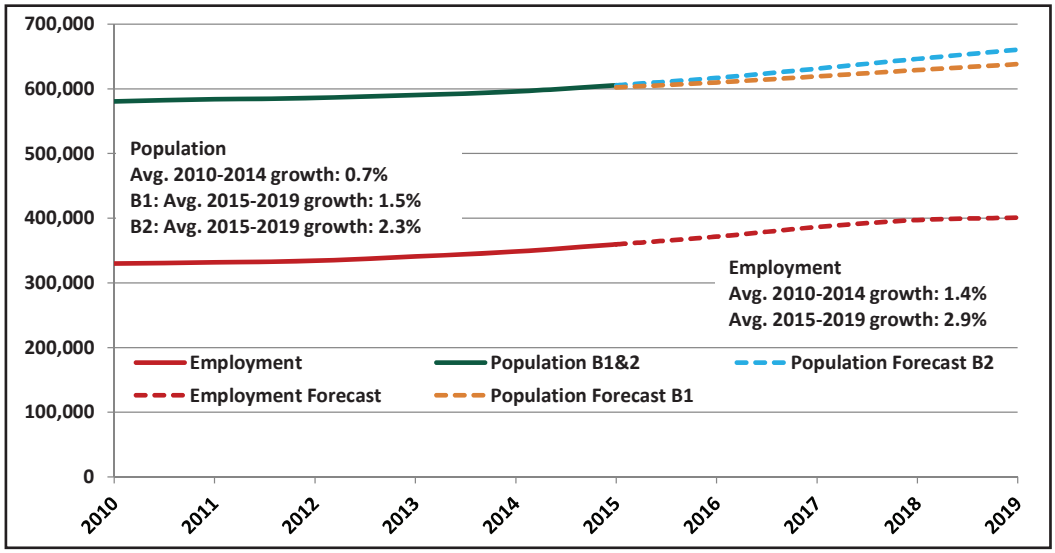
As described above, the EPIC board developed Scenario B2 to complement Scenario B and to be the upper-range of the population forecast for the Study Area during the study period. Under this scenario, it was assumed that the economic growth and development that is projected to occur in the Study Area during the period will require a greater number of economic migrants to absorb the jobs that will be produced by this growth. Scenario B2 assumes that there could be an insufficient supply of existing skilled workers available to fill some of the new positions that will be created with this growth.

Under Scenario B2, the Study Area is projected to experience growth of:

- 52,370 full- and part-time jobs, from 348,499 to 400,869
- 64,692 residents, from 595,907 to 660,590
- 25,612 households, from 235,958 to 261,570

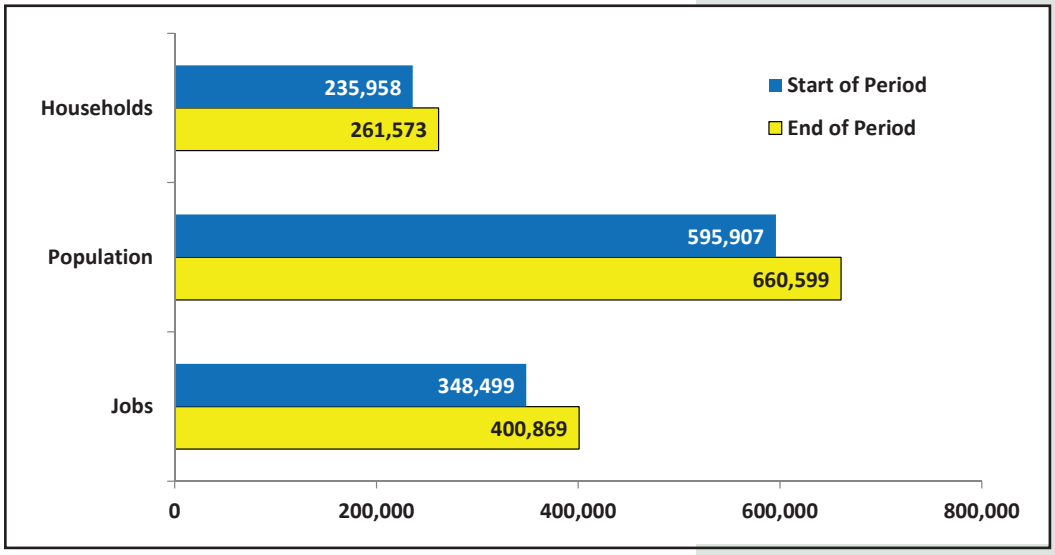
- In Scenario B2, the Study Area population is projected to grow by 10.9 percent over the five-year study period, as will the number of households.

Exhibit B-1: Scenario B & B2 Study Area Employment & Population Growth, 2010-2019



Source: EPIC Committee

Exhibit B-2: Scenario B2 Total Study Area Employment, Population & Household Forecast, 5-Year Study Period*



*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

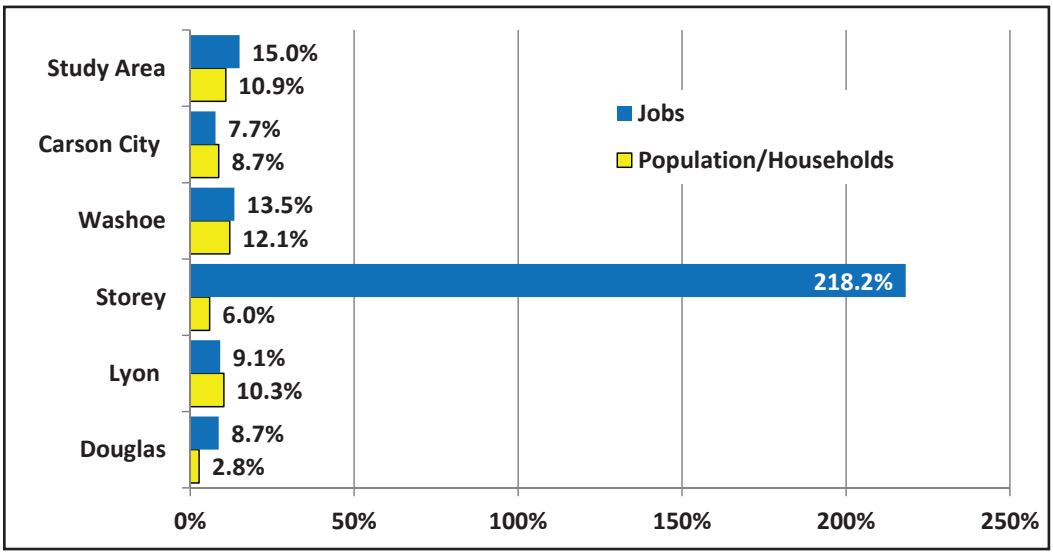
• Scenario B2 is expected to experience the same job growth as Scenario B; however, the population and household forecasts are higher.

• As noted, in Scenario B2, by 2019, the Study Area is forecasted to have 64,692 new residents for a total 660,599. This is a 10.8 percent increase during the five-year study period, an average of 2.2 percent per year. Over the same period, Scenario B will gain 42,395 new residents, reaching a total of 638,302 persons in 2019, an increase of 7.1 percent.

• Under both Scenarios B and B2, the Study Area is projected to have 400,870 workers by 2019, an additional 52,371 workers above the 2014 estimate (See Exhibit B-1).

• The percent increase in the number of households is the same as is projected for population.

Exhibit B-3: Scenario B2 Percent Job & Population/Household Growth, by County, 5-Year Study Period*



*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

- The rate of job growth by county, similarly, does not change from Scenario B to B2.
- The population and household growth rates are different between the two scenarios, however.
- The most noticeable difference is that Douglas County experiences population growth in Scenario B2, instead of the small decrease seen in Scenario B and the other two scenarios.

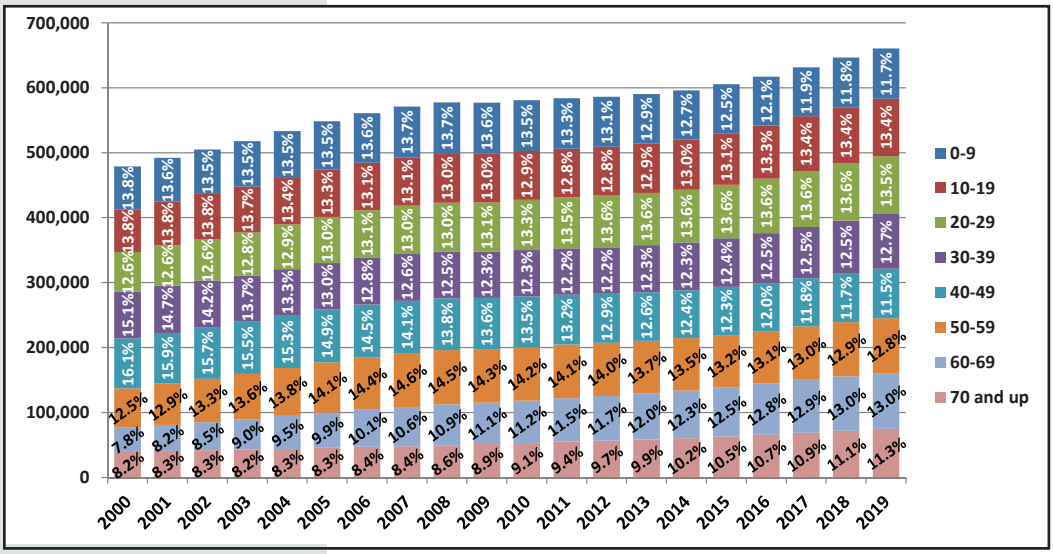
Exhibit B-4: Scenario B2 Population Forecasts, Selected Western US Combined Statistical Areas, 5-Year Study Period*

Combined Statistical Area	Start of Period	End of Period	# Change	% Change
Reno-Carson City-Fernley, NV	**595,907**	**660,599**	**64,692**	**10.9%**
Boise City-Mountain Home-Ontario, ID-OR	738,991	791,529	52,538	7.1%
Spokane-Spokane Valley-Coeur d'Alene, WA-ID	686,947	725,943	38,996	5.7%
Modesto-Merced, CA	796,160	838,030	41,870	5.3%
Visalia-Porterville-Hanford, CA	610,057	638,212	28,155	4.6%

*Sources: Nevada State Demographer, Woods & Poole. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

- When comparing population growth in Scenario B2 to other similarily-sized Western U.S. CSAs, one notices that the Study Area experiences a large surge of growth, outpacing the other CSAs in percent change as well as in absolute terms.
- Under Scenario B2, the Study Area would go from being the smallest of the five comparable western CSAs to the fourth largest, jumping over the Visalia, CA area by a significant margin.

Exhibit B-5: Scenario B2 Study Area Population Growth & Share, by Age Group, 2000-2019



Source: EPIC Committee

- Between 2000 and 2019, residents aged 60+ are expected to grow from 76,180 to 160,750, or by 111 percent, under Scenario B2. These residents are projected to grow from 16.1 to 24.3 percent of the Study Area population.

- Under Scenario B2, the number of persons under 20 years of age in the Study Area is forecasted to increase from 130,656 in 2000 to 165,698 in 2019 (26.8 percent,) but their share of the total population is expected to decline from 27.6 to 25.1 percent.

Demographic Characteristics and Growth

As discussed before, the EPIC decided to add a second Scenario B option. Named Scenario B2, it was added as a companion higher-population forecast to Scenario B. Under B2, the population of the Study Area is projected to grow by approximately 65,000 persons between 2015 and the end of 2019. Both B scenarios share the same employment forecast (see Exhibit B-6). Two population growth forecasts were created only for Scenario B.

The tables herein, and in the Atlas, provide county-level, zone-level and census tract-level results. Within the current text, only county- and zone-level results are shown. As noted, the study period encompasses job and population growth from the beginning of 2015 through the end of 2019.

Under Scenario B2, the Study Area is projected to experience growth of:

- 52,370 full- and part-time jobs, from 348,499 to 400,869
- 64,692 residents, from 595,907 to 660,599
- 25,616 households, from 235,958 to 261,573

Exhibit B-6: Scenario B2 Study Area & County
Employment, Population & Household Growth, 5-Year Study Period*

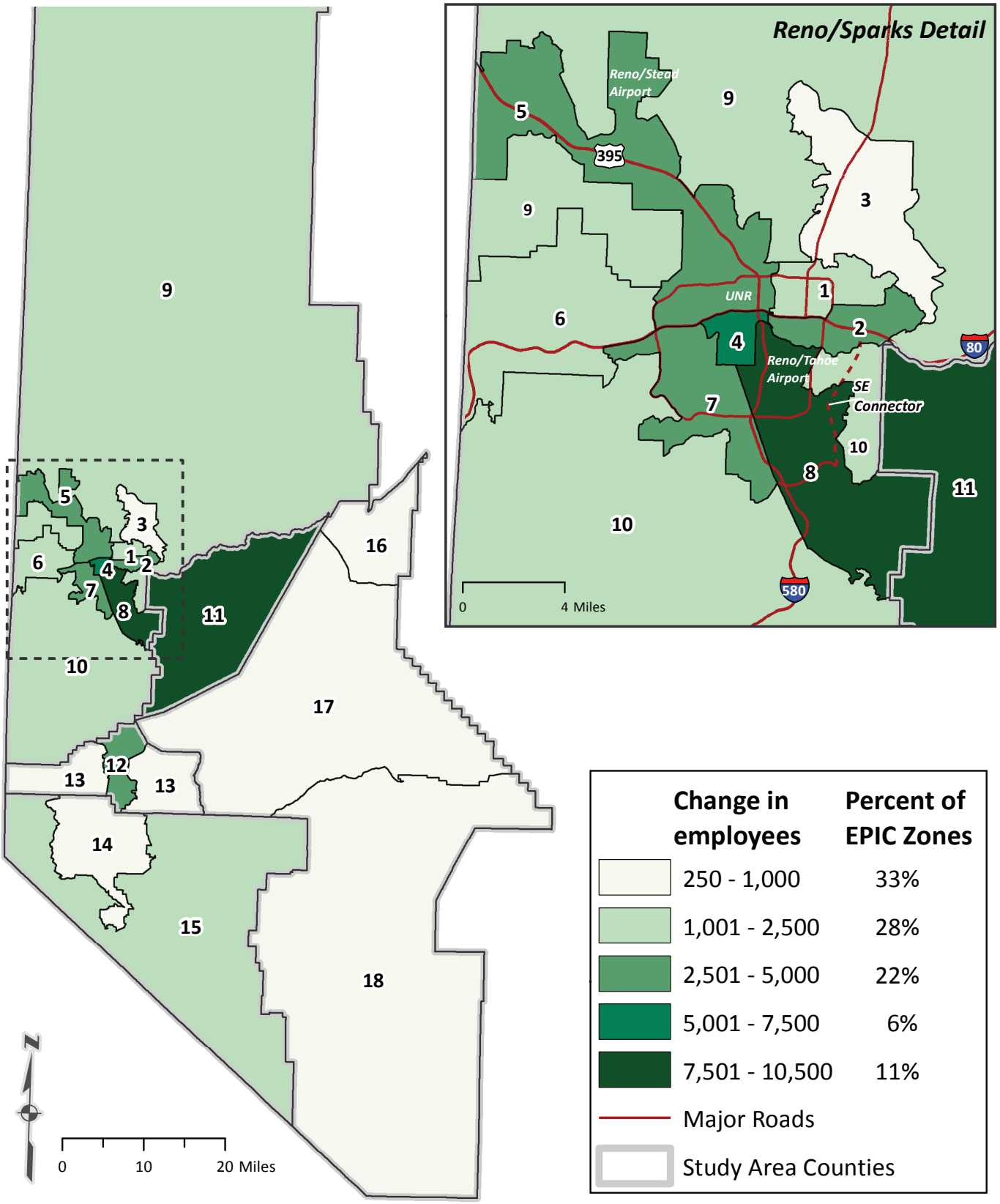
Employment	Start of Period	End of Period	Total Growth	% Change	Avg. Growth
Douglas	29,741	32,322	**2,581**	8.7%	1.7%
Lyon	17,230	18,802	**1,572**	9.1%	1.8%
Storey	4,813	15,315	**10,502**	218.2%	43.6%
Washoe	258,158	292,899	**34,741**	13.5%	2.7%
Carson	38,557	41,531	**2,974**	7.7%	1.5%
Total	**348,499**	**400,869**	**52,370**	15.0%	3.0%

Population	Start of Period	End of Period	Total Growth	% Change	Avg. Growth
Douglas	46,855	48,145	**1,290**	2.8%	0.6%
Lyon	51,918	57,246	**5,328**	10.3%	2.1%
Storey	3,947	4,183	**236**	6.0%	1.2%
Washoe	439,004	492,121	**53,117**	12.1%	2.4%
Carson	54,183	58,904	**4,721**	8.7%	1.7%
Total	**595,907**	**660,599**	**64,692**	10.9%	2.2%

Households	Start of Period	End of Period	Total Growth	% Change	Avg. Growth
Douglas	18,553	19,064	**511**	2.8%	0.6%
Lyon	20,558	22,667	**2,110**	10.3%	2.1%
Storey	1,563	1,656	**93**	6.0%	1.2%
Washoe	173,830	194,862	**21,033**	12.1%	2.4%
Carson	21,455	23,324	**1,869**	8.7%	1.7%
Total	**235,958**	**261,573**	**25,616**	10.9%	2.2%

*Source: Nevada State Demographer. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Exhibit B-7: Scenario B2 Study Area Employment Growth, 5-Year Study Period*



*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Exhibit B-8: Scenario B2 Study Area Employment Growth, by Zone, 5-Year Study Period*

Zone #	Epic Zone	Start of Period	End of Period	Emp. Growth	Emp. % Growth
1	Sparks	12,806	14,167	1,361	10.6%
2	Sparks Industrial	33,046	37,474	4,428	13.4%
3	Sparks Suburban	6,039	6,849	810	13.4%
4	Downtown Reno	51,008	56,322	5,313	10.4%
5	North Reno	25,982	30,914	4,932	19.0%
6	West Reno	8,010	9,190	1,180	14.7%
7	Southwest Reno	25,076	27,949	2,873	11.5%
8	Southeast Reno	68,514	78,831	10,318	15.1%
9	North Washoe	7,357	8,440	1,083	14.7%
10	South Washoe	20,320	22,763	2,444	12.0%
11	Storey	4,813	15,315	10,502	218.2%
12	Carson City	35,185	37,907	2,723	7.7%
13	Carson City - Rural	3,372	3,623	251	7.4%
14	Douglas	12,013	12,542	529	4.4%
15	Douglas - Rural	17,728	19,780	2,052	11.6%
16	Fernley Area	6,262	7,066	803	12.8%
17	Central Lyon	6,378	6,856	477	7.5%
18	South Lyon	4,589	4,880	291	6.3%
Total	Study Area	348,499	400,869	52,370	15.0%

*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

- EPIC Zones 8 and 11 (Southeast Reno and Storey County) are projected to see the most job growth between 2015 and 2019 (10,318 and 10,502 jobs, respectively).

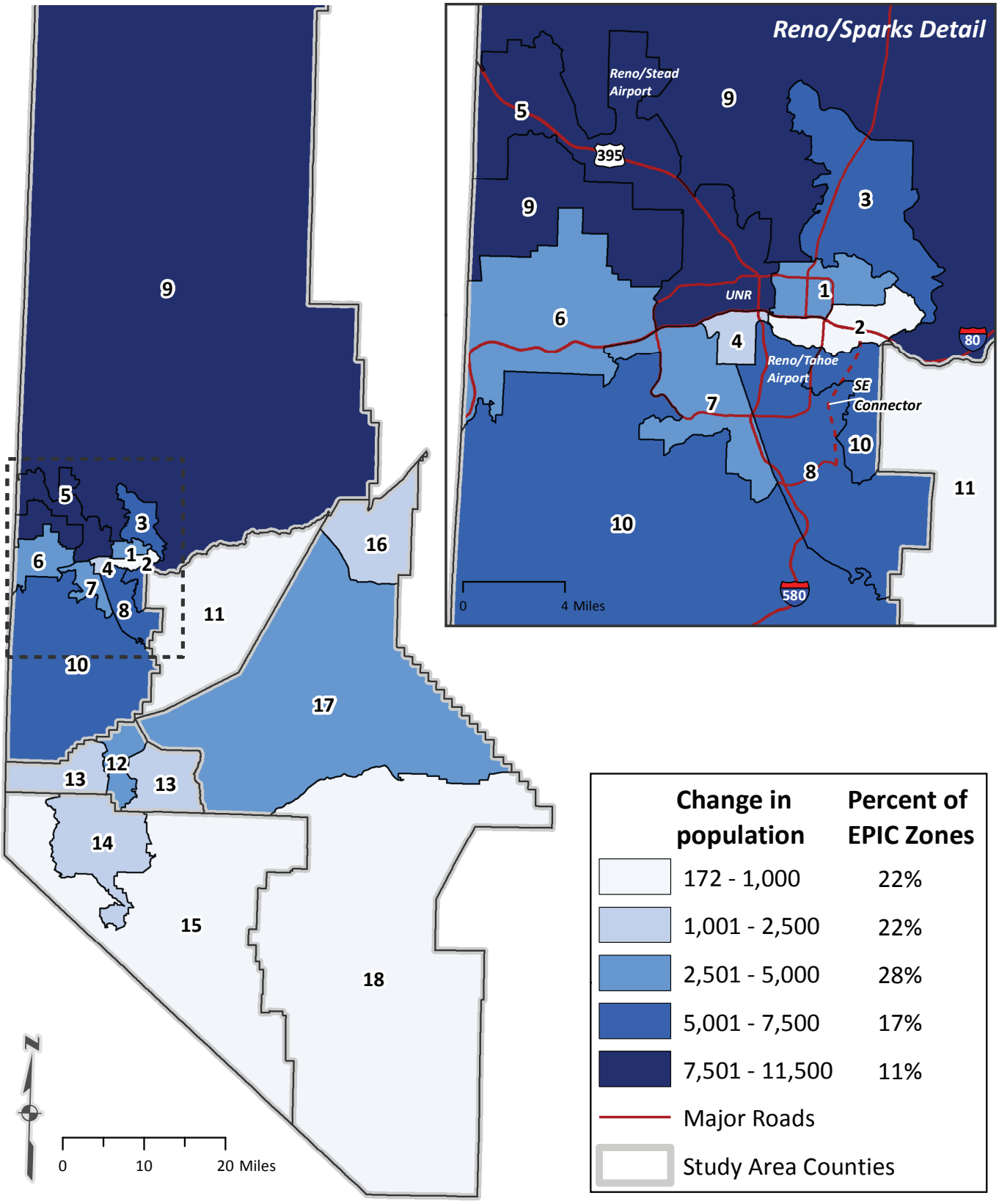
- EPIC Zone 2 (Sparks Industrial) and EPIC Zone 5 (North Reno), which also encompass industrial land, are expected to see significant job growth, as well (4,428 and 4,932 jobs, respectively).

- The smallest amounts of job growth in the Study Area are forecasted to occur in EPIC Zone 13 (Carson City-Rural) and EPIC Zone 18 (South Lyon), which are projected to see just 251 and 291 new jobs.

- Meanwhile, EPIC Zone 4 (Downtown Reno) is expected to experience strong (10 percent or 5,313 jobs) growth.

For a more in-depth view of employment data at the census tract level, see the *Volume II: Northern Nevada Atlas*.

Exhibit B-9: Scenario B2 Study Area Population Growth, 5-Year Study Period*



*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Exhibit B-10: Scenario B2 Study Area Population Growth, by Zone, 5-Year Study Period*

Zone #	Epic Zone	Start of Period	End of Period	Pop. Growth	Pop. % Growth
1	Sparks	55,851	59,499	3,648	6.5%
2	Sparks Industrial	4,234	4,550	315	7.4%
3	Sparks Suburban	33,157	38,982	5,824	17.6%
4	Downtown Reno	21,330	22,611	1,280	6.0%
5	North Reno	85,642	94,479	8,837	10.3%
6	West Reno	30,447	33,890	3,443	11.3%
7	Southwest Reno	43,865	48,728	4,863	11.1%
8	Southeast Reno	57,610	63,891	6,281	10.9%
9	North Washoe	61,781	73,280	11,498	18.6%
10	South Washoe	45,086	52,212	7,126	15.8%
11	Storey	3,947	4,180	233	5.9%
12	Carson City	46,291	49,898	3,607	7.8%
13	Carson City - Rural	7,892	9,002	1,110	14.1%
14	Douglas	33,748	34,861	1,112	3.3%
15	Douglas - Rural	13,107	13,279	173	1.3%
16	Fernley Area	19,303	21,178	1,874	9.7%
17	Central Lyon	22,867	25,493	2,626	11.5%
18	South Lyon	9,748	10,579	831	8.5%
Total	Study Area	595,907	660,590	64,683	10.9%

*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

• Scenario B2 population growth for the overall Study Area is projected to be greater than under Scenario B.

• EPIC Zone 5 (North Reno) and EPIC Zone 9 (North Washoe) are forecasted to experience the greatest population growth (8,837 and 11,498 persons, respectively) through 2019 compared to the other EPIC Zones under Scenario B2.

• EPIC Zone 10 (South Washoe) is projected to expand by 7,126 persons during the study period.

• EPIC Zone 3 (Suburban Sparks) is expected to gain 5,824 persons.

• EPIC Zone 1 (Sparks) and EPIC Zone 4 (Downtown Reno) is forecasted to see population increases of approximately 3,648 and 1,280 persons, respectively.

• EPIC Zone 11 (Storey) and EPIC Zone 15 (Douglas-Rural) are projected to see the least amount of growth through 2019 under Scenario B2, with 233 and 173 persons, respectively.

Exhibit B-11: Scenario B2 Study Area Household Growth, by Zone, 5-Year Study Period*

Zone #	Epic Zone	Start of Period	End of Period	HH Growth	HH % Growth
1	Sparks	22,115	23,559	1,444	6.5%
2	Sparks Industrial	1,677	1,802	125	7.4%
3	Sparks Suburban	13,129	15,435	2,306	17.6%
4	Downtown Reno	8,446	8,953	507	6.0%
5	North Reno	33,911	37,410	3,499	10.3%
6	West Reno	12,056	13,419	1,363	11.3%
7	Southwest Reno	17,369	19,294	1,926	11.1%
8	Southeast Reno	22,811	25,299	2,487	10.9%
9	North Washoe	24,463	29,016	4,553	18.6%
10	South Washoe	17,853	20,674	2,821	15.8%
11	Storey	1,563	1,655	92	5.9%
12	Carson City	18,330	19,758	1,428	7.8%
13	Carson City - Rural	3,125	3,564	439	14.1%
14	Douglas	13,363	13,804	440	3.3%
15	Douglas - Rural	5,190	5,258	68	1.3%
16	Fernley Area	7,643	8,386	742	9.7%
17	Central Lyon	9,054	10,094	1,040	11.5%
18	South Lyon	3,860	4,189	329	8.5%
Total	Study Area	235,958	261,570	25,612	10.9%

*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

• Under Scenario B2, significantly more household growth is projected - 10.9 percent increase during the 5-year study period. Under this scenario, there would be a greater need for new housing throughout the Study Area in the short-term.

• Half of the EPIC zones are projected to have over 10-percent growth. On a percentage basis, EPIC Zone 3 (Sparks Suburban) and EPIC Zone 9 (North Washoe) should still see the greatest growth. Sparks Suburban is forecasted to grow by 2,306 (17.6%) households and North Washoe is expected to grow by 4,553 (18.6%) households, reaching 29,016 households.

• EPIC Zone 7 (Southwest Reno) is also projected to experience a large rise in the number of households, at 1,926 households, (11.1 percent).

• In Scenario B2, EPIC Zone 14 (Douglas) is expected to gain 440 households; even EPIC Zone 15 (Douglas-Rural) is projected to gain households under this scenario, with an additional 68 new households between 2015 and 2019. ■

Tax Revenues Due to Increased Collection of Taxes for Scenario B2

While the EPIC Team also developed Study Area forecasts (2015-2019) for a select group of taxes under the four scenarios (A, B, B2 and C), only Scenario B2 is detailed in this section. These taxes include:

1. Real property tax ("Property Tax"),
2. Sales and use tax ("Sales Tax"),
3. Modified business tax ("MBT") and
4. Motor vehicle fuel tax ("Gas Tax").

The specific governmental entities receiving the forecasted tax revenues include:

- Study Area school districts,
- Counties and other local governments,
- State of Nevada and
- County regional transportation commissions ("RTC").

Real property tax collections, as well as sales and use tax collections, were allocated to school districts, county and local governments and the State of Nevada. The projected modified business tax collections were allocated only to the State, per state law. Motor vehicle fuel tax collections, on the other hand, were allocated to regional transportation commissions and county and local governments.

The tax revenue forecasts are directly associated with the anticipated socioeconomic growth discussed above for the four Scenarios.

It should be noted that the Tesla Gigafactory will not contribute to property tax, sales tax or the MBT collections for the duration of the five-year study period due to tax incentives passed by the Nevada Legislature in September 2014. However, Tesla workers will contribute their own spending to property and sales tax revenues. Also, jobs projected to be indirectly created by Tesla, along with those due to the Study Area's natural growth, will be taxed normally. Accordingly, they will contribute to the projected collections of the four selected taxes.

Property, Sales & MBT Taxes

RCG first focused on property and sales taxes, and the MBT. The tax revenues discussed herein are projected to grow (see Exhibit B-12) throughout the 2015-19 study period. These increases are related to rises in direct and indirect jobs, as well as population growth, due to the Tesla Gigafactory and the general growth of the Study Area economy.

These taxes will be part of the funding required to address the Study Area's socioeconomic and physical infrastructure growth-related needs under each growth scenario. Thoughtful and proactive planning will be key to ensuring responsible growth in the region for the remainder of the decade.

The following charts illustrate the projected total collections for the four selected taxes under Scenario B2 for the five-year study period (for individual study period years, see Exhibit B-13 and the companion Atlas).

The MBT and sales tax revenues are based on projected new employment. Conversely, property tax revenues are based on new projected residents.

In Exhibit B-12, percent changes in revenues are presented only for total collections. The percent changes are relative to the actual and estimated collections for Fiscal Year 2014 as reported by the Nevada Department of Taxation.

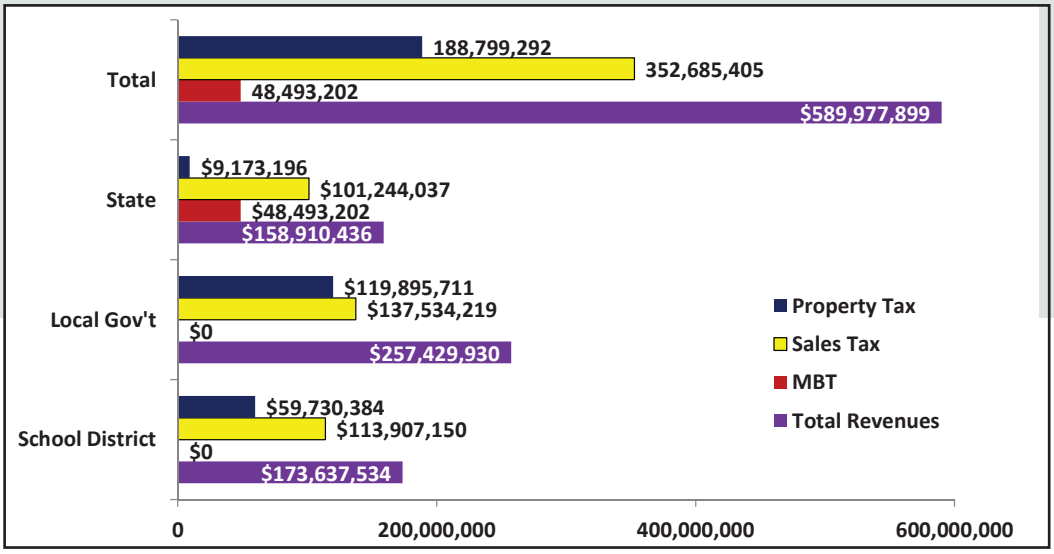
Exhibit B-13 shows tax revenue collections under Scenario B2 (percentages may not add to 100 due to rounding).

Exhibit B-12: Scenario B2 Tax Revenue Growth, by Type, 5-Year Study Period*

Property Tax	2014 Base	2015	2016	2017	2018	2019	Total	Total/Base % Change
School District	$196,698,928	$3,167,086	$6,912,808	$11,656,756	$16,640,150	$21,353,584	$59,730,384	30.4%
Local Gov't	$394,830,173	$6,357,234	$13,875,953	$23,398,395	$33,401,470	$42,862,660	$119,895,711	30.4%
State	$30,208,375	$486,391	$1,061,646	$1,790,206	$2,555,540	$3,279,413	$9,173,196	30.4%
Sales Tax	**2014 Base**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**	**Total/Base % Change**
School District	$178,132,400	$7,234,244	$15,090,307	$24,950,268	$32,107,217	$34,525,113	$113,907,150	63.9%
Local Gov't	$215,081,323	$8,734,800	$18,220,398	$30,125,551	$38,767,023	$41,686,448	$137,534,219	63.9%
State	$934,947,758	$6,430,010	$13,412,710	$22,176,535	$28,537,843	$30,686,940	$101,244,037	10.8%
MBT	**2014 Base**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**	**Total/Base % Change**
State	$384,991,919	$3,278,335	$6,755,874	$10,519,602	$13,381,557	$14,557,835	$48,493,202	12.6%
Total	**2014 Base**	**2015**	**2016**	**2017**	**2018**	**2019**	**Total**	**Total/Base % Change**
School District	$374,831,328	$10,401,331	$22,003,114	$36,607,024	$48,747,367	$55,878,697	$173,637,534	46.3%
Local Gov't	$609,911,496	$15,092,034	$32,096,350	$53,523,945	$72,168,493	$84,549,108	$257,429,930	42.2%
State	$1,350,148,052	$10,194,735	$21,230,231	$34,486,343	$44,474,939	$48,524,188	$158,910,436	11.8%
All Monies	**$2,334,890,876**	**$35,688,100**	**$75,329,695**	**$124,617,313**	**$165,390,799**	**$188,951,992**	**$589,977,899**	**25.3%**

*Source: EPIC Committee, Nevada Department of Taxation. * The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Exhibit B-13: Scenario B2 Study Area Projected Tax Revenues, 5-Year Study Period*



*Sources: Nevada State Demographer, Woods & Poole. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

• $188,799,000 in property tax collections are projected under Scenario B2 over the study period for the Study Area.

• $352,685,000 in total sales tax collections are projected.

• $48,493,000 in MBT tax collections are projected under Scenario B2.

• These projected new tax revenues will result in an estimated $589,978,000 in total collections for these three taxes by the end of 2019 due to growth.

• Of that total, the State of Nevada is expected to receive $158,910,000, or 27 percent.

• School districts are projected to take in $173,638,000 (29 percent) of total growth-related revenues.

• Subject Area county and local governments should account for 44 percent of the total, or $257,430,000.

• The largest share of State revenues is expected to come from the sales tax, accounting for $101,244,000 of its $158,910,000 (64 percent). The MBT is projected to make up 31 percent of its total, while property taxes are forecasted to bring in just six percent of revenues in Scenario B2.

• County and local governments are expected to collect 53 percent of their total growth-related revenues from the sales tax, while the other 47 percent is projected to come from the property tax revenues.

• By end-of-2019, Study Area school districts are forecasted to receive the second largest share of property taxes, a total of $59,730,000. This makes up 34 percent of the school districts' revenue under Scenario B2. Sales taxes account for the remaining 66 percent of revenues from growth. ■

Gas Tax

The gas tax is comprised of two basic components. For one part, the tax rates are fixed and can only be changed through legislative action. The other part of the tax is indexed to the Other Nonresidential Construction ("BONS") Producer Price Index ("PPI") developed by the Bureau of Labor Statistics. This portion of the tax rate changes every year, with the 10-year moving average of the BONS PPI. Within the Study Area, only Washoe County has enacted the indexed tax.

The EPIC Technical Committee forecasted the total increases in the gas tax due to the Study Area's projected economic growth under each scenario, as well as which public entities would be receiving these revenues and their associated shares. The gas tax forecasts for Scenario B are the same as for Scenario B2. This is because the gas tax figures were based on income generated by new jobs rather than population growth. The gas tax forecasts associated with Scenarios A and C are included in the Atlas.

Gas tax revenues are disbursed to the counties for the purpose of transportation projects. Each of the five counties within the Study Area is forecasted to receive a share of the anticipated incremental tax revenues. For Washoe and Lyon Counties, there are multiple recipients of the tax collections. Exhibit IV-5 shows the Scenario B anticipated revenues for each entity and each year.

The following public entities share the county revenues in Washoe County:

- Washoe County RTC
- City of Reno
- City of Sparks

The following public entities share the county revenues in Lyon County:

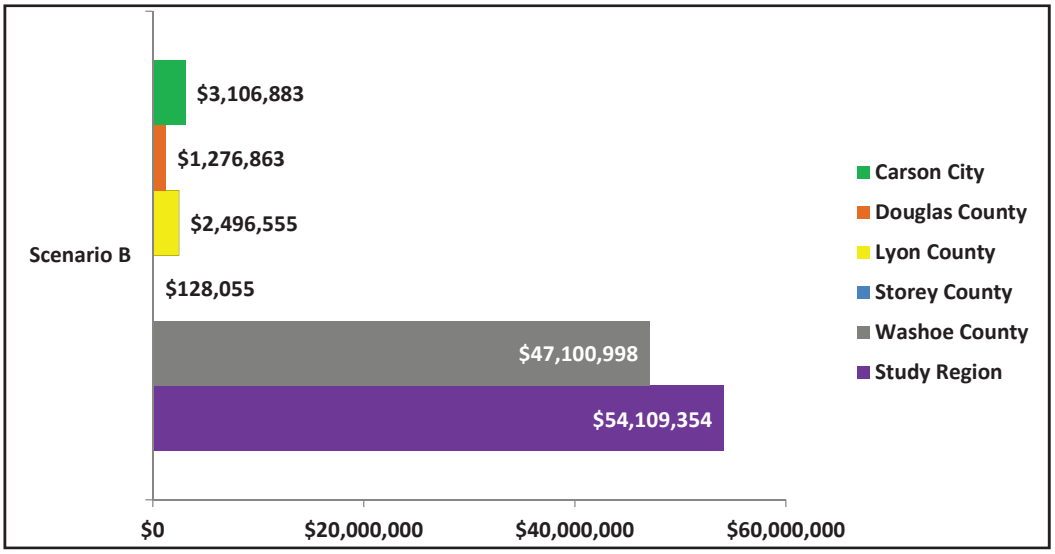
- Lyon County RTC
- City of Yerington
- City of Fernley

Exhibit B-14: Scenario B2 Gas Tax County Distribution, 5-Year Study Period

	2014 Base	2015	2016	2017	2018	2019	Total	Total/Base % Change
Douglas	$1,875,674	$75,933	$163,490	$273,099	$363,292	$401,050	$1,276,863	68.1%
Lyon	$3,667,366	$148,466	$319,659	$533,970	$710,317	$784,143	$2,496,555	68.1%
Storey	$188,109	$7,615	$16,396	$27,389	$36,434	$40,221	$128,055	68.1%
Washoe	$69,189,965	$2,801,025	$6,030,811	$10,074,089	$13,401,116	$14,793,956	$47,100,998	68.1%
Carson	$4,563,919	$184,762	$397,805	$664,509	$883,966	$975,841	$3,106,883	68.1%
Study Area	**$79,485,032**	**$3,217,801**	**$6,928,161**	**$11,573,056**	**$15,395,125**	**$16,995,211**	**$54,109,354**	**68.1%**

*Source: EPIC Committee. *The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

Exhibit B-15: Scenario B2 Study Area Projected Gas Tax Revenues, 5-Year Study Period*



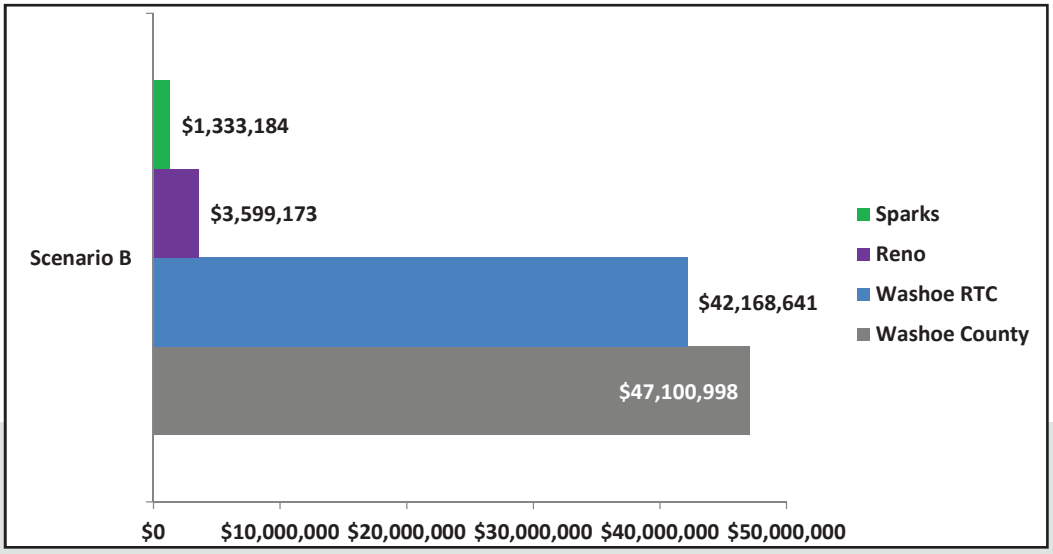
*Source: EPIC Committee. * The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

• $54,109,000 in gas tax collections are projected under Scenario B2 during the study period in the Study Area.

• As the most populated and urbanized county in the Study Area, Washoe County is projected to receive the lion's share (87 percent) of the gas tax revenues under Scenario B2.

• As mentioned, Washoe County gas tax revenues are distributed among three entities – the Washoe RTC, City of Reno and City of Sparks.

Exhibit B-16: Scenario B2 Washoe County Projected Gas Tax Revenues, 5-Year Study Period*

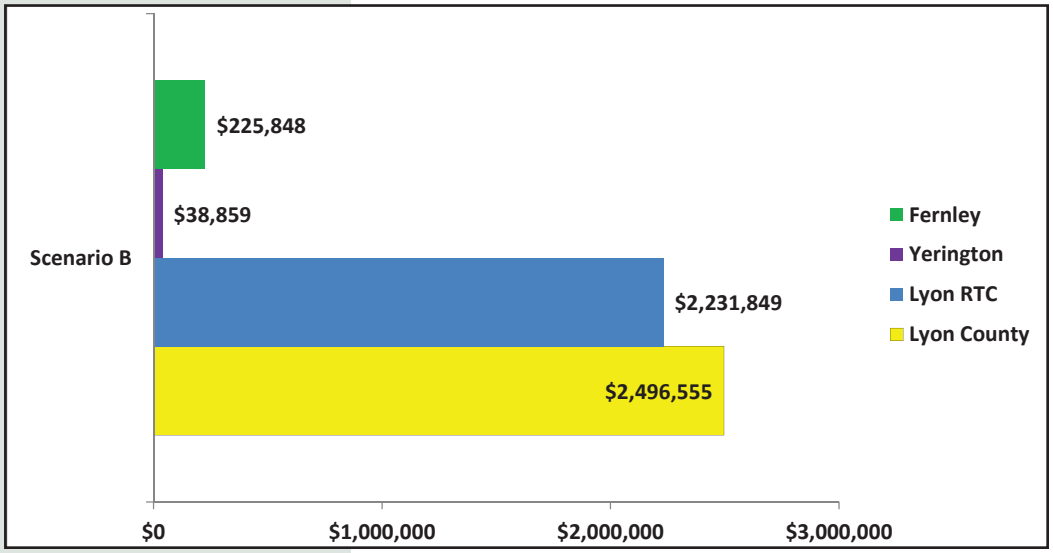


*Source: EPIC Committee. * The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

• Washoe County entities, combined, are projected to receive $47,101,000 in gas taxes under Scenario B2.

• Within Washoe County, the RTC is forecasted to receive 90 percent ($33.4 million) of the gas revenues generated under Scenario B2. The Cities of Reno and Sparks are also allotted smaller shares.

Exhibit B-17: Scenario B2 Lyon County Projected Gas Tax Revenues, 5-Year Study Period*



*Source: EPIC Committee. * The Study Period covers 2015, 2016, 2017, 2018 & 2019.*

• Lyon County entities, combined, are projected to receive $2,497,000 in gas taxes, or five percent of Study Area collections under Scenario B2.

• The Lyon RTC is forecasted to collect the highest share (89 percent) with the Cities of Fernley and Yerington receiving smaller shares. ■