

SOUTHERN NEVADA REGIONAL INDUSTRIAL STUDY

PREPARED FOR:

NEVADA GOVERNOR'S OFFICE OF
ECONOMIC DEVELOPMENT

PREPARED BY:

BROOKINGS MOUNTAIN WEST

CENTER FOR BUSINESS
AND ECONOMIC RESEARCH

TRANSPORTATION RESEARCH CENTER



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Executive Summary

In 2011, as the effects of the Great Recession lingered in the Silver State, particularly in Southern Nevada, the State of Nevada responded by reforming its approach to economic development. These changes included the creation of a new governance and administrative structure led by the Nevada Governor’s Office of Economic Development (GOED), the establishment of regional development authorities, and direct state investments to attract out-of-state businesses and support job growth in regionally targeted industries.

Since these reforms were implemented, Southern Nevada’s economy has seen growth in several target industries including Tourism, Gaming, and Entertainment, Health and Medical Services, Business Information Technology Ecosystems, and Logistics and Operations.

Despite these gains, Southern Nevada’s economy remains much less diversified compared to other Mountain West metros. Moreover, much of the job growth that has occurred during the prior decade has been concentrated in low-skill and low-productivity occupations that offer limited opportunities for upward or lateral mobility. As the COVID-19 recession again demonstrated, the lack of a diverse and resilient economy leaves the region and by extension the State of Nevada vulnerable to macroeconomic downturns.

Recognizing the ongoing need to diversify the Southern Nevada economy, in 2023 GOED commissioned Brookings Mountain West, the UNLV Center for Business and Economic Research, and the UNLV Transportation Research Center to evaluate how Southern Nevada can leverage its geography and connectivity to neighboring states and metros at the megapolitan level to pursue industrial opportunities in the face of shifting global supply chains, diminishing developable land, the need for efficient management of the regional water supply, and the availability of unprecedented federal resources to support clean energy development, manufacturing, electrification of transportation systems, and supply-chain resiliency.

The study builds on previous economic development reports, analyzes a wide range of economic data from Las Vegas and adjacent metros, and incorporates insights gleaned from background interviews with representatives from state and local governments, utilities, transportation agencies, and economic development organizations to identify industrial opportunities the region should pursue, infrastructure investments that are needed to support these opportunities, and policy and governance interventions to facilitate and fund regional industrial-based economic diversification.

The study finds that:

- Although Southern Nevada had limited governance fragmentation, economic development is siloed across jurisdictions, and unlike neighboring metros, the region lacks a governance structure, such as a council of governments, to facilitate the planning and coordination needed to realize regional economic and infrastructure priorities.
- Relative to adjacent metropolitan regions, gaps in job creation, labor productivity, and wages have persisted due to Southern Nevada's continued overconcentration of employment in low-wage and low-productivity occupations.
- The region has a substantially lower share of manufacturing employment compared to other metros in the Southwest Triangle Megapolitan Cluster and the Mountain Megapolitan Cluster. Additionally, the manufacturing jobs that are in Southern Nevada pay lower wages.
- The lack of a robust regional manufacturing sector limits economic diversification and resilience, constrains transportation infrastructure and undercuts the region's ability to compete for federal resources available through the CHIPS and Science Act, the Inflation Reduction Act, and the Infrastructure Investment and Jobs Act.
- As a highly consummative market, Southern Nevada is overly dependent on I-15 for the movement of goods by semi-truck and because much of the freight traffic that enters the region passes through to serve out-of-state markets, Southern Nevada absorbs the costs (e.g., pollution, traffic, and road deterioration) but receives little benefit from these exchanges.
- Compared to proximate metros, Southern Nevada has a dearth of research facilities, generates significantly fewer advanced degrees, and secures substantially less research and development funding to support the regional economy.
- While scaled industrialization is challenged by limited developable land and the need for efficient water use, there are opportunities to locate industrial activity in the South County (i.e., Primm, Jean, Sloan, and the Eldorado Valley) and North County (i.e., Apex and UNLV North) areas of Clark County.

The study's recommendations provide a framework to develop, fund, and govern regional industrial development that include:

- Concentrating warehousing and logistics activity in the South County area to complement the development of the Southern Nevada Supplemental Airport, leverage the area's proximity to the Southern California ports and I-15, and capture the increasing flow of goods originating from Mexico and Latin America via I-11.
- Focusing manufacturing and research and development in the North County area to utilize the Apex Industrial Park for large-scale industrial initiatives and to develop the UNLV North Campus through public and private partnerships to strengthen the region's research capacity and create centers of excellence supporting targeted industries.
- Pursuing industries that align with federal funding streams and that can grow the regional export economy including supply chains supporting electric batteries and clean energy and capturing the flow of commodities related to mining, critical minerals, and metals that can be processed and redistributed in Clark County and beyond.
- Fortifying the regional rail and highway transportation infrastructure to improve the outbound, inbound, through, and intraregional movement of freight.
- Implementing governance reforms to coordinate regional industrial development including establishing a council of governments, integrating a regional planning body into the existing metropolitan planning organization, and creating an inland port authority to develop and administer large-scale industrial infrastructure projects.
- Fortifying local and state funding streams dedicated to industrial development including tax-increment financing, industrial park grants, and targeted tax abatements, as well as strengthening grant administration capacity to better position the region to compete for federal resources.
- Coordinating at the local, state, and federal levels to implement a unified, regional economic vision.

Post-COVID 19, Southern Nevada is at a crossroads. Continued population growth in the face of diminishing land available for development and the need for increased water efficiency is placing additional stress on the region's narrow economic base that is struggling to generate the high-paying jobs and revenue needed to support a robust and resilient metro.

As this study highlights, geographically, Southern Nevada is well positioned to integrate its economic development efforts with those of its better-performing and more economically diverse neighbors in a manner that provides greater value than the region currently receives from these exchanges. The resetting of national manufacturing and energy priorities, the availability of large tranches of federal funding, and shifts in global supply chains offer industrial opportunities that align with Southern Nevada's megapolitan geographic advantage.

To date, however, economic development in Southern Nevada has been driven by local governments pursuing their own priorities, often in competition with each other. Alone, none of these entities have the resources to compete with the regionally coordinated economic development regimes that exist in Southern California, Utah's Wasatch Range, and Arizona's Sun Corridor.

Regional efforts such as the creation of the Southern Nevada Water Authority, the continuing support for Southern Nevada Strong, and the cooperation that was a hallmark of the region's response to COVID-19 offer a pathway for a regional approach to industrial development that will better position Southern Nevada to compete against neighboring metros for the investments and opportunities that are needed to create a more diverse and resilient regional economy.

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List of Abbreviations, Acronyms, and Initialisms

AADT	annual average daily traffic
AB	Assembly Bill
ASU	Arizona State University
BIG	Barstow International Gateway
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
BNSF	Burlington Northern Santa Fe
CBA	combined statistical area
CBSA	core-based statistical area
CCSD	Clark County School District
CO	carbon monoxide
COG	council of governments
Co2	carbon dioxide
CHIPS and Science Act	Creating Helpful Incentives to Produce Semiconductors and Science Act
DETR	Department of Employment, Training, and Rehabilitation
DRCOG	Denver Regional Council of Governments
DRI	Desert Research Institute
EA	Economic Area
EDA	Economic Development Administration
EID	enhanced infrastructure financing district
EV	electric vehicle
GDP	gross domestic product
GOED	Governor's Office of Economic Development
gWh	gigawatt hours

HC	hydrocarbon
IB	inbound
IFD	infrastructure finance district
IJA	Infrastructure Investment and Jobs Act
Intr	intra
IRA	Inflation Reduction Act
LOS	level of service
LVCVA	Las Vegas Convention and Visitors Authority
LVCC	Las Vegas Convention Center
LVGEA	Las Vegas Global Economic Alliance
MAG	Maricopa Association of Governments
MPO	metropolitan planning organization
MSA	metropolitan statistical area
Micro	micropolitan statistical area
NAICS	North American Industry Classification System
NDOT	Nevada Department of Transportation
NIMBY	not-in-my-backyard
NO _x	nitrogen oxide
NRS	Nevada Revised Statutes
NSF	National Science Foundation
OB	outbound
QCEW	Quarterly Census of Employment and Wages
RDA	regional development authority
RTC	regional transportation commission
SAD	special assessment district
SB	Senate Bill

SNRPC	Southern Nevada Regional Planning Coalition
SNS	Southern Nevada Strong
SNSA	Southern Nevada Supplemental Airport
SNWA	Southern Nevada Water Authority
STCC	Standard Transportation Commodity Code
TIF	tax increment finance
Thr	through
UIPA	Utah Inland Port Authority
UNLV	University of Nevada, Las Vegas
UNR	University of Nevada, Reno
UP	Union Pacific
WFEDD	Wasatch Front Economic Development District
WFRC	Wasatch Front Regional Council

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Part 1: Introduction

The Great Recession (2007-2009) laid to rest any notion that the Southern Nevada economy was recession proof or even recession resistant.¹ Despite a historical overconcentration in tourism and related sectors, this long-held view created little urgency to diversify the economy.² Reinforcing the narrowness of the region's economy are the continued investment in infrastructure focused primarily on supporting population growth and the tourist-based economy. The lack of economic diversification has limited the development of skills in the local labor market to such a degree that the region struggles to produce the high-skilled workers needed to fill available high-paying jobs.³

Even as other Mountain West states and metros were well on their way to a full recovery, the effects of the Great Recession lingered in Nevada, particularly in the Las Vegas-Henderson-Paradise metropolitan statistical area (MSA), prompting the state to rethink its approach to economic development. The passage of Assembly Bill (AB) 449 during the 76th Session of the Nevada Legislature (2011) and the release of *Unify, Regionalize, Diversify: An Economic Development Agenda for Nevada* written by researchers at the Brookings Institution, Brookings Mountain West, and SRI International restructured Nevada's economic development framework.⁴

Primary among this new economic development framework was the creation of the Nevada Governor's Office of Economic Development (GOED) and the regional development authority (RDA) structure linking local economic development efforts with state oversight and resources. The plan identified industries — Aerospace and Defense, Health and Medical Service, Business Information and Technology Ecosystems, Logistics and Operations, Manufacturing, Mining, Natural Resource Technologies, and Tourism, Gaming, and

¹ Throughout the report, Southern Nevada is used interchangeably with the Las Vegas metro, greater Las Vegas, the Las Vegas MSA, and Clark County as shorthand for the Las Vegas-Henderson-Paradise metropolitan statistical area (MSA) that is commensurate with Clark County. The Las Vegas Valley refers to Southern Nevada's urban core that contains Clark County's three largest incorporated cities — Henderson, Las Vegas, and North Las Vegas — and its largest census designated places such as Enterprise, Paradise, Summerlin South, Sunrise Manor, Whitney, and Winchester that, along with other census designated places, constitute unincorporated Clark County. As is detailed in Part 2, the Las Vegas-Henderson-Paradise MSA combines with Nye County, Nevada, and Mohave County, Arizona, to constitute the Las-Vegas-Henderson, NV-AZ combined statistical area.

² For instance, a 1970 report by Arthur D. Little Company prepared for the then Greater Las Vegas Chamber of Commerce and the Southern Nevada Industrial Foundation, the predecessor to the Las Vegas Global Economic Alliance, titled *Business Opportunities in Southern Nevada* suggested that the region should not seek to attract any large-scale "non-gambling industries." See "Investment Study Holds Surprises," *Las Vegas Sun*, November 10, 1970.

³ Katie M. Gilbertson, "Strengthening the Southern Nevada Workforce Pipeline," The Lincy Institute Research Brief, November 2022, https://digitalscholarship.unlv.edu/lincy_policybriefs_reports/6/.

⁴ Mark Muro, Robert E. Lang, and Ophelia Young, *Unify, Regionalize, Diversify: An Economic Development Agenda for Nevada*, The Brookings Institution, Brookings Mountain West, and SRI International, 2011, <https://www.brookings.edu/articles/unify-regionalize-diversify-an-economic-development-agenda-for-nevada/>.

Entertainment — that provided opportunities for regional economic development. The plan also recommended direct state investments in economic development including tax abatements to induce private investment; the launch of the Knowledge Fund to support commercial applications of research at the University of Nevada, Las Vegas (UNLV), the University of Nevada, Reno (UNR), and the Desert Research Institute (DRI); and the creation of the Catalyst Fund to incentivize business relocations and expansions.

Post-Great Recession Economic Development in Southern Nevada

These reforms spurred several economic development successes in Southern Nevada that yielded some diversification to the regional economy.

Growth in the region’s events and sports economy, now anchored by three professional sports franchises (the NHL’s Vegas Golden Knights, the WNBA’s Las Vegas Aces, and the NFL’s Las Vegas Raiders) and infrastructure investments (e.g., T-Mobile Arena, Allegiant Stadium, and a proposed baseball stadium) backed by private and public resources, fostered diversification in the region’s core economy. At the same time, since 2011 employment in Tourism, Gaming, and Entertainment, where annual earnings until recently average less than \$50,000, has been flat.⁵ This is a consequence of the fact that the events economy relies primarily on part-time workers and staffing on The Strip only recently returned to pre-pandemic levels despite fully reopening two years ago.

The establishment of the Kirk Kerkorian School of Medicine at UNLV supported by state operating funds and a medical education building funded primarily by philanthropy has facilitated an increase in employment in Health and Medical Services. From 2011 to 2022, sector employment increased by 56 percent (36,033 jobs), with average annual earnings per job of \$80,115.⁶

Private investments supported by Nevada’s Data Center Tax Abatements (Nevada Revised Statutes (NRS) 360.754) have led to extensive job growth in Business Information Technology Ecosystems. The sector added more than 26,000 jobs (74.2 percent increase) between 2011 and 2022 with average annual wages of \$82,420.⁷

⁵ Nevada Governor’s Office of Economic Development, “Industry Summary for Tourism, Gaming, and Entertainment,” 2023, <https://goed.nv.gov/key-industries/tourism-gaming/>.

⁶ Nevada Governor’s Office of Economic Development, “Industry Summary for Health and Medical Services,” 2023, <https://goed.nv.gov/key-industries/health/>.

⁷ Nevada Governor’s Office of Economic Development, “Industry Summary for Business Information Technology Ecosystems,” 2023, <https://goed.nv.gov/key-industries/information-technology>.

The largest increase in employment since the Great Recession has been in Logistics and Operations. Between 2011 and 2022, employment in the Southern Nevada Logistic and Operations sector increased by more than 107 percent (42,305 jobs) with an average annual wage of \$77,191.⁸ Growth in the sector is a consequence of Nevada’s proximity to the Southern California ports and its long-standing freeport status.⁹

Why this Study?

Still, these successes fall well short of what is required to diversify Southern Nevada’s economy and compete with its Mountain West peers. Table 1.1 presents Hachman Index scores for the four largest Mountain West MSAs – Denver-Aurora-Centennial, CO, Phoenix-Mesa-Chandler, AZ, Las Vegas-Henderson-Paradise, NV, and Salt Lake City-Murray, UT¹⁰ – for 2020 calculated using data from U.S. Census Bureau by the Center for Business and Economic Research. Hachman Index scores range from zero to 100 with higher values indicating a more diverse economy. In addition to having the least diverse economy among the Mountain West’s four largest metros, the Las Vegas MSA has the highest unemployment rate of any million-plus metro.¹¹

Table 1.1: Economic Diversification by Employment in Major Mountain West Metros, 2020

	Denver MSA	Phoenix MSA	Las Vegas MSA	Salt Lake City MSA
Hachman Index*	93.1	94.5	68.6	93.5

* Hachman Index scores range from zero to 100.
 Note: MSA is the initialism for a metropolitan statistical area
 Source: U.S. Census.

The effects of the region’s limited economic diversity and lower labor market participation can be seen in Table 1.2. The table summarizes data from the Brookings Institution’s Metro Monitor assessing economic performance in the four largest Mountain West MSAs from 2011 to 2021. The rankings for each of the five categories (Growth, Prosperity, Inclusion, Racial Inclusion, and Geographic Inclusion) are out of 56 such metros nationwide. Below each category are the indicators that factor into the category indices.

⁸ Nevada Governor’s Office of Economic Development, “Industry Summary for Logistics and Operations,” 2023, <https://goed.nv.gov/key-industries/manufacturing-logistics/>.

⁹ For historical perspective on Nevada’s warehouse economy, see Glen D. Weaver, “NEVADA: An Emerging Warehouse Center for the Far Western States,” *Yearbook of the Association of Pacific Coast Geographers* 27 (1965), pp. 17-26.

¹⁰ To streamline the presentation, MSAs are subsequently identified in the text, tables, and figures by their principal or largest cities rather than by their formal MSA titles.

¹¹ The Orlando-Kissimmee-Sanford, FL MSA, which also features a tourist-based economy, had a 2020 Hachman Index score of 80.7. The Tucson MSA, with a 2023 population just above a million residents, is the only other metro area in the Mountain West with a population of a million residents or more.

Table 1.2: Economic Performance in Major Mountain West Metros, 2011-2021

Indicator*	Denver MSA	Phoenix MSA	Las Vegas MSA	Salt Lake City MSA
Growth	6th	13th	23rd	5th
Change in jobs (%)	+24.5	+27.7	+22.3	+29.4
Change in Gross Metropolitan Product (%)	+38.1	+34.0	+19.7	+39.7
Change in jobs at young firms (%)	+36	+18.9	+17.7	+28.5
Prosperity	9th	25th	50th	10th
Change in productivity	+10.9	+5.0	-2.1	+7.9
Change in average annual wage (%)	+22.7	+17.7	+14.6	+22.9
Change in standard of living (%)	+20.9	+15.3	+2.4	+22.4
Inclusion	18th	11th	55th	1st
Change in employment rate (% points)	+4.7	+6.6	+2.1	+5.0
Change in median earnings (%)	+25.4	+15.5	+6.1	+28.8
Change in relative poverty rate (% points)	-1.9	-3.3	+0.8	-4.7
Racial inclusion	42nd	7th	35th	13th
Change in white/people of color employment rate gap (% points)	-2.3	-6.2	-2.2	-1.4
Change in white/people of color median earnings gap (\$)	+\$2,997	+\$763	\$3,587	\$82
Change in white/people of color relative poverty rate gap (% points)	+0.2	-3.4	-1.8	-4.1
Geographic inclusion	7th	8th	21st	41st
Change in top/bottom neighborhoods employment rate gap (% points)	-0.7	-2.6	-1.1	+0.5
Change in top/bottom median household income gap (\$)	+\$1,638	+\$3,115	+\$5,601	+\$7,715
Change in top/bottom neighborhoods relative poverty rate gap (% points)	-6.5	-4.8	-4.2	-2.5

*Ranking out of 56 metropolitan statistical areas with populations of at least one million residents

Note: MSA is the initialism for metropolitan statistical area.

Source: Brookings Institution Metro Monitor 2023.

These data suggest that Las Vegas's middling economic growth between 2011 and 2021 did little to raise the standard of living, stimulate economic inclusion – particularly among people of color – or reduce the income gap between the wealthiest and poorest neighborhoods and households. Productivity (measured as the Gross Metropolitan Product divided by the number of jobs) decreased and the poverty rate increased. Being the only major Mountain West MSA where this occurred, it is a telling indicator, along with weak growth in

median earnings, of the quality of jobs that have been added in Southern Nevada since the Great Recession (see Appendix B).

Tables 1.1 and 1.2 present stark differences between Southern Nevada and the other major Mountain West metros. It also is important to note the implications that the narrowness of Southern Nevada's economy has for the state. Given the region's scale – more than 73 percent of state population and 70 percent of state gross domestic product (GDP) – and growth projections¹² relative to the rest of the Nevada, the narrower Southern Nevada's economy, the more vulnerable the state is to macroeconomic shocks.

The COVID-19 pandemic again demonstrated the dangers of such a limited economic base. In addition to the massive public health challenges, COVID-19 decimated the Southern Nevada economy. The shuttering of The Strip and the tourist economy more generally led to an unemployment rate of 30 percent in April 2020 – the highest in the nation. The ensuing downfalls in state revenue forced deep budgets cuts that were not alleviated until the infusion of federal resources through the American Rescue Plan Act.

Institutional factors also constrain the coordination needed to diversify the economy. Foremost is the siloed nature of economic development agencies. In addition to the state-designated RDA, the Las Vegas Global Economic Alliance (LVGEA), each municipality and Clark County have their own economic development offices that report to their own governing boards. The Las Vegas Convention and Visitors Authority (LVCVA) is tasked with supporting and growing economic activity related to tourism, events, and conventions.

This arrangement of interests encourages competition for talent and firms and disincentivizes regional-level planning and coordination. This lack of coordination has consequences. For instance, while Southern Nevada's application for the U.S. Economic Development Administration's (EDA) Build Back Better Regional Challenge grant offering millions of dollars in funding to support regional economic development initiatives was selected as one of 60 semi-finalists nationally, the application failed to secure funding. One reason why may have been the application's "Christmas-tree" structure that proposed to use funds to support individual projects for specific entities instead of supporting a comprehensive and unified regional plan. The lack of coordination also makes it more difficult to respond to new economic opportunities. The pandemic ushered in a lasting shift in purchasing patterns that created additional demand in logistics and manufacturing that the region was unable to absorb let alone leverage.

¹² The region is projected to grow to 3.4 million residents by 2060. See Center for Business and Economic Research, "2022-2060 Population Forecasts: Long-Term Projections for Clark County, Nevada," June 2022, <https://cber.unlv.edu/wp-content/uploads/2022/07/2022-CBER-Population-Forecasts.pdf>.

To understand the importance of planning, coordination, and infrastructure for economic development, one only has to look at the neighboring states of Utah and Arizona. Like Nevada, Utah's economic development efforts are based upon attracting targeted industries. Unlike Nevada, Utah prioritized the sectors through a deliberate coordination of incentives, workforce initiatives, and infrastructure investments. Today, Utah is a leader in biotechnology and nanotechnology and is attracting billions in venture capital.¹³

Arizona, specifically Phoenix, is another example. Decades ago, Phoenix prioritized investments in solar panel and microchip manufacturing. Supporting these initiatives is an integrated regional governance structure, the Maricopa Association of Governments, and nimble, locally controlled community colleges that feature curriculum and facilities aligned with workforce priorities. These efforts fueled Phoenix's economic diversification and position greater Phoenix to take advantage of the Creating Helpful Incentives to Produce Semiconductor (CHIPS) and Science Act and federal reshoring initiatives.

Within Nevada, there are examples of how long-term planning and infrastructure investments can facilitate economic development and diversification.

During the late 1990s and 2000s work commenced on planning and acquiring the land and infrastructure for the Tahoe Regional Industrial Center in Storey County. When the 2011 economic development reforms were implemented, the industrial park was positioned to use the state's tax abatement programs¹⁴ to attract manufacturing, technology, warehousing, and distribution firms to northern Nevada. The resulting growth in manufacturing jobs is particularly notable. Since 2011, regional employment in the sector increased by 148 percent (65,582 jobs with average annual earnings of nearly \$90,000).¹⁵ Today, the number of manufacturing jobs in greater Reno is the same as in Southern Nevada despite having less than a quarter of the population.

The Apex Industrial Park in North Las Vegas demonstrates how planning can promote industrial development. During a 2015 special session of the Nevada Legislature, the passage of Senate Bill (SB) 1

¹³ Peter Grema, Caitlin J. Saladino, and William E. Brown, Jr., "Venture Capital in Nevada," Economic Development & Workforce Fact Sheet No. 29, The Data Hub at Brookings Mountain West & The Lincy Institute, January 2021, https://digitalscholarship.unlv.edu/bmw_lincy_econdev/30/.

¹⁴ See David F. Damore, William E. Brown, Jr. Karen A. Danielsen, Robert E. Lang, Jaewon Lim, Magdalena Martinez, Fatma Nasoz, Arthur C. Nelson, and Caitlin J. Saladino, *Nevada Economic Development and Public Policy 2022-2026: A Sustainable Future for All Nevadans*, The Lincy Institute and Brookings Mountain West, May 2022, https://digitalscholarship.unlv.edu/brookings_policybriefs_reports/10.

¹⁵ Nevada Governor's Office of Economic Development, "Industry Summary for Manufacturing," 2023, <https://goed.nv.gov/key-industries/manufacturing-logistics/>.

created the authority to develop Apex. The following year, a technical assistance panel report by researchers from the Urban Land Institute,¹⁶ augmented by analysis conducted by Brookings Mountain West,¹⁷ created a multi-year framework for the park's build out. As is discussed in Part 2, this vision is now being realized.

The development of a cohesive plan to guide decisions about infrastructure investments takes on greater importance due to the dearth of land suitable for industrial use and the need for efficient water management. The confluence of these factors demands a regional-based approach to diversify the Southern Nevada economy and create sustainable industrial jobs in the coming decades.

A recent analysis conducted by RCG Economics for GOED reports that there are around 16,400 acres of land in Clark County that can be developed to support employment. The report suggests that by 2030 the failure to add additional developable land will reduce the regional annual GDP by \$9.3 to \$15.5 billion and growth in jobs by 82,000 to 137,000.¹⁸ To increase the land available for economic development and to attract businesses that require large parcels the Southern Nevada Economic Development and Conservation Act carried by Sen Cortez Masto in the 117th Congress (2021-2022) included language to extend the current disposal boundary established by the Southern Nevada Public Management Act (1998) by roughly 42,000 acres to facilitate housing and business development. The legislation failed to advance.

Climate change and the aridification of the American West are straining the already over-allocated Colorado River. Southern Nevada is dependent on the river for 90 percent of its water. The Southern Nevada Water Authority (SNWA) is a global leader in water conservation and the agency has made critical investments such as the "third straw" that draws water from the bottom of Lake Mead. Nonetheless, in the near term the state's Colorado River allocation has been reduced with larger cuts likely to occur in the second half of the decade.

The passage of the Infrastructure Investment and Jobs Act (IIJA), the Inflation Reduction Act (IRA), and the CHIPS and Science Act backed by hundreds of billions of dollars is resetting the country's industrial policy to reduce dependency upon imports with trading partners like China. The consulting firm Deloitte forecasts that the federal government will spend \$2 trillion (see Figure 1.1) over the next 10 years on initiatives that create opportunities for Southern Nevada such as broadband expansion, supply chains resiliency, critical

¹⁶ Urban Land Institute, *A Way Forward For APEX: A ULI Technical Assistance Panel Report* (Washington, D.C.: Urban Land Institute, 2017), https://nevada.uli.org/tap/attachment/ulitap_apexreport/.

¹⁷ Conor Shine, "Report: Apex Industrial Report could create 57,960 jobs," *Las Vegas Sun*, October 23, 2014, <https://lasvegassun.com/news/2014/oct/23/report-apex-industrial-park-could-create-57960-job/>

¹⁸ RCG Economics, "Policy Brief No. 2: Southern Nevada Employment Land Analysis," May 2023, <https://rcgecon.com/reports/major-studies/>.

metals and minerals, critical technology, manufacturing in areas such as electric vehicles (EVs) and batteries, and the development of clean energy.¹⁹ This legislation also funds the development of a modern workforce, commercialization opportunities, and education programs to support these programs.²⁰

Figure 1.1: Infrastructure Investment and Jobs Act, Inflation Reduction Act, and CHIPS and Science Act Funding Breakdown



* Center for Business and Economic Research estimates.

** Includes electric buses and ferries.

*** Original IRS funding provision was for \$80 billion over 10 years, that was estimated to yield \$180 billion in revenue for a net savings of \$100 billion. This expenditure was adjusted to \$60 billion under the Fiscal Responsibility Act of 2023.

Notes: Values are presented in billions. CHIPS is the acronym for the CHIPS and Science Act, IRA is the initialism for the Inflation Reduction Act, and IIRA is the initialism for the Infrastructure Investment and Jobs Act. IJA funding includes reauthorization funding of \$650 billion.

Source: Deloitte Insights.

¹⁹ William D. Eggers, John O’Leary, and Kevin Pollari, “Executing on the \$2 trillion investment to boost American competitiveness.” Deloitte Insights. March 16, 2023, www2.deloitte.com/us/en/insights/industry/public-sector/infrastructure-bill-projects-agency-execution.html.

²⁰ Federal funding through the Inflation Reduction Act, Infrastructure Investment Act, and the CHIPS and Science Act have the potential to increase the share of infrastructure jobs from 11 to 14 percent of all jobs in the coming decade. Peck, Joseph, “New US Industrial Policy Creates Incentives for High-quality Jobs,” RouteFifty.com, November 14, 2022, www.route-fifty.com/management/2022/11/new-federal-industrial-policy-creates-incentives-high-quality-jobs/379702/.

The funding totals for the three acts that were passed in 2021 and 2022 are \$1.2 trillion for IIJA;²¹ \$579 billion for IRA;²² and \$280 billion for the CHIPS and Science Act. These dollars will fund priorities such as broadband internet, roads, and bridges (IIJA); clean manufacturing tax credits and healthcare (IRA); energy research and development and semiconductor manufacturing (CHIPS and Science Act). To date and in contrast to the Denver, Phoenix, and Salt Lake City metros, greater Las Vegas has not attracted a significant industrial investment funded through these programs.²³

Study Goals and Organization

The goals of this study are fourfold.

First, the study provides an evaluation of how Southern Nevada can leverage its geography and connectivity to neighboring states and metros at the megapolitan level to identify economic opportunities and inform industrial and infrastructure prioritization. Included here is an understanding of how the region's proximity to the Mexican border, the Southern California ports, the Barstow International Gateway, and Utah's inland ports position Southern Nevada to provide added value to supply chains that flow through California from the Pacific Rim and increasingly from Mexico and Latin America.

Second, the study delineates Southern Nevada micro-regions that are or in the near-term will be available for industrial development and identifies strategies to coordinate their complementary development. Here, the focus is on the South County (Primm and Jean in the Ivanpah Valley, Sloan, and the Eldorado Valley) and North County (Apex and the UNLV North Campus) areas of Clark County.

Third, the study offers recommendations for infrastructure investments and governance interventions to achieve these goals and better position the region to pursue federal resources (see Figure 1.1).

²¹ Infrastructure Investment Act funding includes reauthorization funding of \$650 billion.

²² Funding for the Inflation Reduction Act does not include recent reductions to the portion to the IRS and other amendments under the Fiscal Responsibility Act of 2023.

²³ Invest.gov, "Investing in America," 2023 (www.whitehouse.gov/invest/).

Fourth, the study incorporates relevant recommendations and concepts from previous economic development and infrastructure reports. Appendix A provides a summary of these reports and notes how each complements this effort.

It is also important to highlight topics that are outside the study's purview.

These include the barriers to economic development that are a consequence of the region's limited stock of affordable housing, underdeveloped healthcare infrastructure, below average labor-force participation, K-12 educational deficits, and lack of alignment between economic development priorities and workforce pipelines.

The study does not address how infill or other urban-based land use reforms can increase the inventory of available land within the Las Vegas Valley. The report does not directly consider economic development in the outlying portions of Clark County (e.g., Cal-Nev-Ari, Indian Springs, Laughlin, and Mesquite).

Also not directly covered are economic development initiatives that are concentrated in Southern Nevada's urban core such as Health and Medical Services, Tourism, Gaming, and Entertainment, and Business Information and Technology Ecosystems.

The remainder of the study is organized into four parts.

Part 2 places Southern Nevada in its megapolitan geography, explores the region's connections to the Southwest Triangle Megapolitan Cluster and the Mountain Megapolitan Cluster, summarizes current economic and industrial trends, and details economic development opportunities in the South County and North County areas of Clark County. Part 3 offers an overview of the region's governing structures, compares these efforts to those of neighboring metros and states, and assesses their consequences for regional-based economic development. Part 4 considers the transportation infrastructure investments needed to support economic opportunities stemming from Southern Nevada's megapolitan connectivity. Part 5 presents recommendations for industry targets, infrastructure investments, and policy and governance interventions. The main body is augmented by several appendices.

Part 2: Southern Nevada’s Megapolitan Geography

Part 2 uses the megapolitan framework to place Southern Nevada in its broader economic geography and examine the region’s linkages to neighboring megapolitan areas and clusters. Also presented are economic comparisons between Las Vegas and adjacent metros and assessments of manufacturing and warehousing and logistics opportunities. The final section considers current and planned development in the South County and North County areas of Clark County that inform the infrastructure analysis and the recommendations presented in Parts 4 and 5 respectively.

Megapolitan Geography and Economic Development

In *Megapolitan America* Arthur C. Nelson and Robert E. Lang introduce the concepts of megapolitan areas and clusters to frame how the country’s rapidly densifying urban regions function as their own economic engines. Nelson and Lang use U.S. Census core-based statistical areas²⁴ (CBSAs) and combined statistical areas²⁵ (CSAs) to define megapolitan areas such that a megapolitan area is a geographic space with:

projected [2040] populations of more than four million people anchored by at least one metropolitan area of more than one million people that is connected through current or projected commuting patterns with at least two and often several other metropolitan areas of more than about a quarter million people. Megapolitan areas are big, but not so large that they cannot be traversed by cars in a day – about 200 miles in distance.²⁷

²⁴ Arthur C. Nelson and Robert E. Lang, *Megapolitan America: A New Vision for Understanding America’s Metropolitan Geography* (Philadelphia: Routledge, 2011).

²⁵ The U.S. Census core-based statistical areas (CBSAs) are county or counties (or their equivalents) with an urban population core of at least 10,000 people, plus adjacent counties that have social and economic integration with the core as measured through commuting patterns. Micropolitan statistical areas have at least one urban population cluster between 10,000 and 50,000 people. A metropolitan statistical area has at least one urban population cluster greater than 50,000. The largest incorporated place with a population of 10,000 or more is designated as the principal city of a CBSA. Commuting patterns are determined by the Employment Interchange Measure: the total percentage of people living in the larger or smaller entity commuting to or from the larger or smaller entity. See U.S. Census Bureau, “Metropolitan and Micropolitan Glossary,” 2022 (www.census.gov/programs-surveys/metro-micro/about/glossary.html).

²⁶ Combined statistical areas (CSAs) consist of two or more adjacent core-based statistical areas with an employment interchange measure of at least 15 percent. See U.S. Census Bureau, “Metropolitan and Micropolitan Glossary.” The difference between a CSA and a megapolitan area is one of a scale. While CSAs can be as small as two micropolitan statistical areas, megapolitan areas are anchored by one or more metropolitan statistical area (MSA) with a population of at least one million people to at least two MSAs with populations of at least 250,000 that are no more than 200 miles apart and have a projected employment interchange measure of 15 percent by 2040. See Nelson and Lang, *Megapolitan America*, pg. 24, Table 3.1.

²⁷ Nelson and Lang, *Megapolitan America*, pg. 3.

By extension, megapolitan clusters are groups of megapolitan areas that are separated by less than 500 miles. The concept of megapolitan geography recognizes that economic integration, especially for economies at the scale of large metropolitan regions, transcends jurisdictional boundaries. If big metros fail to coordinate, then their economic efficiency and productivity suffer.

In recognition of this dynamic, in 1991 Congress included a provision in the Intermodal Surface Transportation Efficiency Act enhancing the authority of metropolitan planning organizations (MPOs) serving populations greater than 200,000. Among these enhancements was a greater role for MPOs in project selection, more flexibility in how federal surface transportation funding is used, and priority in the distribution of federal planning resources. If an MPO serves a region that does not meet federal air quality standards, then the MPO can compete for funds to support projects to improve air quality.

In many contexts these enhancements led to more engagement between cities, suburbs, and counties and more importantly, the creation of regional-based governance structures with authority that extends well beyond regional transportation policy (see Part 3). The next phase in regional development is to coordinate planning and coordination to the megapolitan level. To this end, Arizona recently created the Sun Corridor Metropolitan Planning Organization in Pinal County to coordinate development and planning between Phoenix and Tucson, the state's two largest CSAs (see Table 2.1).

At the federal level, the value of regionalism is evident in multi-million dollar regional-based funding opportunities available through programs such as the Build Back Better Regional Challenge grants and other federal initiatives. These funding streams support place-based industrial policy designed “to advance national goals such as strengthening domestic supply chains, promoting international economic competitiveness, and mitigating the impacts of climate change” by targeting locations for investment.²⁸

In addition to accessing and scaling federal resources, megapolitan areas and clusters that can cooperate economically, feature efficient infrastructure, and have substantial research and manufacturing capacity are well positioned to engage in the global economy. The global reach of these spaces is enhanced by the fact that they contain all the nation's major land, sea, and air connections, including international airport hubs.²⁹ These

²⁸ See Mark Muro, Robert Maxim, Joseph Parilla, and Xavier de Souza Briggs, “Breaking down an \$80 billion surge in place-based industrial policy,” *The Avenue*, Brookings Institution, December 15, 2022, www.brookings.edu/blog/the-avenue/2022/12/15/breaking-down-an-80-billion-surge-in-place-based-industrial-policy/.

²⁹ Nelson and Lang, *Megapolitan America*, pg. 16.

megapolitan areas are also home to most of the nation’s major corporate headquarters, tech hubs, and large-scale logistics and supply chain networks. Supporting these dense business linkages are an extensive exchange of goods, workers, and services. Lastly, given the vastness of their footprints, megapolitan areas create the potential for jurisdictions to coordinate the management of land use and natural resources.

Southern Nevada’s Megapolitan Connections

In *Megapolitan America*, Nelson and Lang identified 23 megapolitan areas and 10 megapolitan clusters in the lower 48 states.³⁰ This report is concerned with the integration between four megapolitan areas: Southern California, stretching from Santa Barbara to San Diego; Arizona’s Sun Corridor, comprised of the Phoenix and Tucson CSAs; Las Vegas, encompassing Clark and Nye counties, Utah’s Washington County, and Mojave County in northwest Arizona; and Utah’s Wasatch Range, composed of the Salt Lake City CSA and the Logan, UT-ID MSA. These four megapolitan areas constitute the core of two megapolitan clusters: the Southwest Triangle Megapolitan Cluster (Las Vegas, Southern California, and the Sun Corridor) and the Mountain Megapolitan Cluster (Wasatch Range and Colorado’s Front Range).³¹

Figure 2.1 from Damore et. al illustrates this space.³² The figure also highlights how Nevada’s other two economic regions, Metro Reno-Carson City in northwest Nevada and the Central Great Basin in northeast Nevada, link to the Sierra Pacific Megapolitan Cluster and the Mountain Megapolitan Cluster respectively. From a megapolitan perspective, each of Nevada’s three regions has clear linkages to neighboring states and metros that facilitate the movement of people, goods, and services to create multistate economic zones.

Also note from Figure 2.1 that within Nevada there are north/south interstates. This is a telling indicator of Nevada’s limited intrastate economic and social integration. The dearth of these connections reflects Nevada’s development and economic orientation along east/west corridors that run to and from California.³³ This lack of intrastate integration is exacerbated by the large swaths of federal land holdings that isolate Nevada’s population and economic centers from each other and constrain the state’s growth patterns.

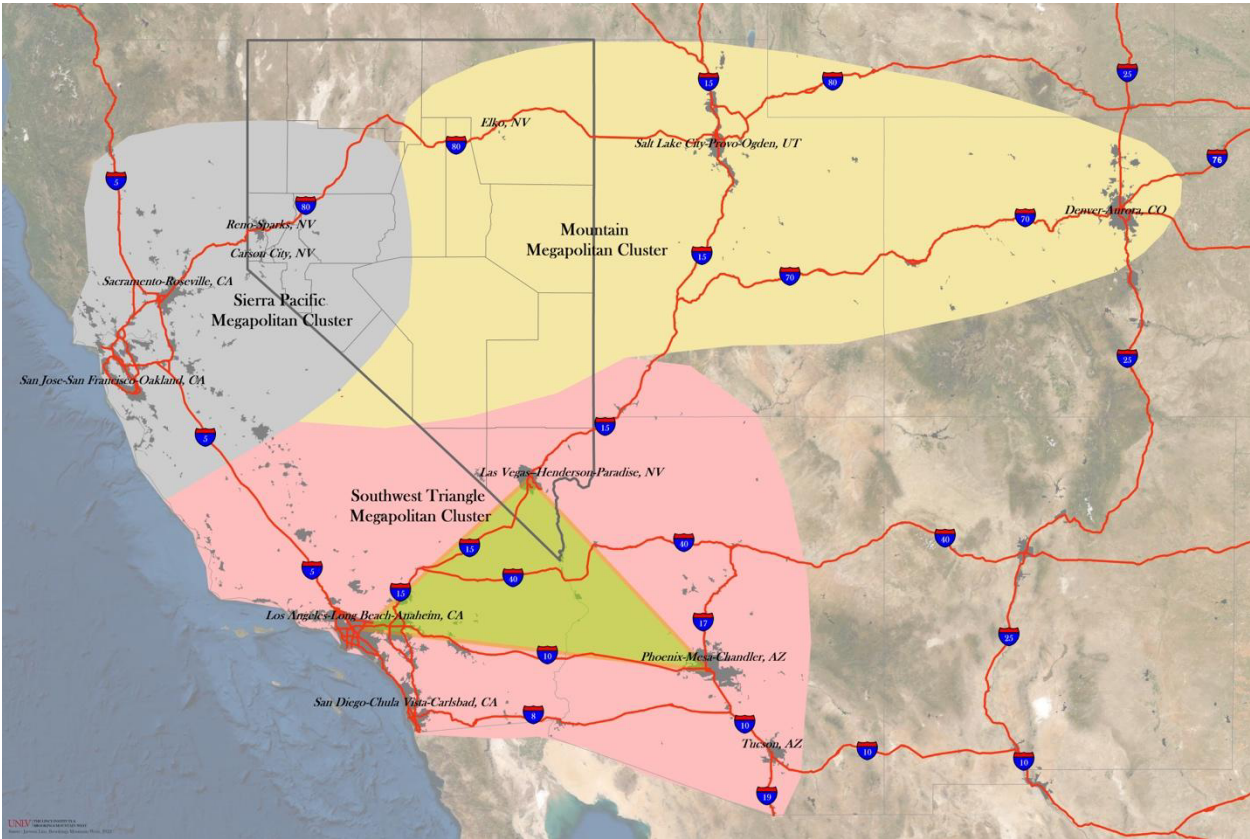
³⁰ Also see Robert E. Lang and Dawn Dhavale, “Beyond Megalopolis: Exploring America’s New ‘Megapolitan’ Geography,” Venus Report 05:01, Metropolitan Institute at Virginia Tech, May 2005, https://digitalscholarship.unlv.edu/brookings_pubs/38.

³¹ Because it is outside the scope of this study, the Colorado Front Range Megapolitan Area component of the Mountain Megapolitan Cluster is omitted from the study’s analysis.

³² Damore et. al, *Nevada Economic Development and Public Policy 2022-2026*, pg. 19.

³³ RCG Economics and Spatial Economic Concepts, “Nevada COVID-19 Coordinated Economic Response Plan: Supply Chain Analysis,” December 2020, <https://rcgecon.com/reports/major-studies/>.

Figure 2.1: Nevada's Megapolitan Geography



Source: Damore et. al, Nevada Economic Development and Public Policy 2022-2026.

Tables 2.1 (Southwest Triangle Megapolitan Cluster) and 2.2 (Mountain Megapolitan Cluster) present the U.S. Census core-based and combined statistical areas that operationalize these spaces. The tables also report the counties' 2022 populations and 2021 real GDP to provide a sense of each county's relative contributions to the clusters. The counties that are used for comparison throughout the report and in the appendices are italicized. Combined, the Southwest Triangle Megapolitan Cluster and the Utah share of the Mountain Megapolitan Cluster account for 9.4 percent of the nation's population and 10.2 percent of its GDP.

These data and Figure 2.1 suggest how Southern Nevada is geographically well positioned to engage with neighboring megapolitan areas in Southern California, Arizona, and Utah on a number of dimensions. The most obvious of these is the exchange of people. Figure 2.2 summarizes the top ten counties that exchange population with Clark County ordered by total net migration.

Table 2.1: Southwest Triangle Megapolitan Cluser Components and Economic Output

Megapolitan		Core-Based and Combined Census Statistical Areas		County	Population (2022)	Real GDP (2021)*
Cluster	Area					
Southwest Triangle	Las Vegas	Las Vegas-Henderson, NV CSA	Las Vegas-Henderson Paradise, NV MSA	<i>Clark, NV</i>	2,292,476	\$111,288,530
			Pahrump, NV Micro	Nye, NV	50,096	\$1,955,940
		Lake Havasu City-Kingman, AZ MSA		<i>Mojave, AZ</i>	217,692	\$5,634,375
		St. George, UT MSA		Washington, UT	191,226	\$6,730,012
	Southern California	Los Angeles-Long Beach CA, CSA	Los Angeles-Long Beach-Anaheim, CA MSA	<i>Los Angeles, CA</i>	9,829,544	\$711,874,201
				Orange, CA	3,167,809	\$238,228,949
			Riverside-San Bernardino, CA MSA	<i>Riverside, CA</i>	317,257	\$83,850,304
				<i>San Bernardino, CA</i>	2,194,710	\$87,551,000
		Oxnard-Thousand Oaks-Ventura, CA MSA	Ventura, CA	843,843	\$48,642,160	
		San Diego-Chula Vista-Carlsbad, CA MSA		San Diego, CA	1,381,600	\$224,954,460
		Bakersfield, CA MSA		Kern, CA	917,673	\$47,528,806
		Santa Maria-Santa Barbara, CA MSA		Santa Barbara, CA	446,475	\$28,531,154
		San Luis Obispo-Paso Robles, CA MSA		San Luis Obispo, CA	283,159	\$224,954,460
	Sun Corridor	Phoenix-Mesa, AZ CSA	Phoenix-Mesa-Chandler, AZ MSA	<i>Maricopa, AZ</i>	4,496,588	\$252,098,319
				Pinal, AZ	449,557	\$9,613,026
		Payson, AZ Micro	Gila County, AZ	53,211	\$1,879,863	
		Tucson-Nogales, AZ CSA	Tucson, AZ MSA	Pima, AZ	1,052,030	\$41,618,243
	Nogales, AZ Micro		Santa Cruz, AZ	47,463	\$1,838,905	
	Total	-	-	-	28,232,409	\$1,919,718,239

* Thousands of chained (2012) dollars.

Notes: CSA is the initialism for a combined statistical area; MSA is the initialism for a metropolitan statistical area; and Micro is the abbreviation for micropolitan statistical area. Comparison counties are italicized.

Sources: Arthur C. Nelson and Robert E. Lang, *Megapolitan America*, U.S. Census, and U.S. Bureau of Economic Analysis.

Table 2.2: Mountain Megapolitan Cluster Components and Economic Output

Megapolitan		Core-Based and Combined Census Statistical Areas	County	Population (2022)	Real GDP (2021)**		
Cluster*	Area						
Mountain	Wasatch Range	Salt Lake City-Provo- Orem, UT CSA	Salt Lake City, UT MSA	<i>Salt Lake, UT</i>	1,186,431	\$144,645	
			Tooele, UT		76,640	\$2,148,356	
			Ogden- Clearfield, UT MSA	Davis, UT		367,285	\$14,849,447
				Weber, UT		267,066	\$11,597,454
				Box Elder, UT		56,891	\$2,469,337
			Morgan		12,162	\$316,630	
				Provo-Orem, UT MSA	<i>Utah, UT</i>	684,886	\$30,573,196
			Juab, UT		11,648	\$561,830	
			Heber, UT Micro	Summit, UT		42,156	\$2,469,337
				Wasatch, UT		34,028	\$1,032,576
		Logan, UT-ID MSA	Cache, UT		137,417	\$1,032,576	
			Franklin, ID		14,036	\$5,775,817	
Total	-	-	-	2,879,010	\$66,672,111		

* Colorado component omitted.

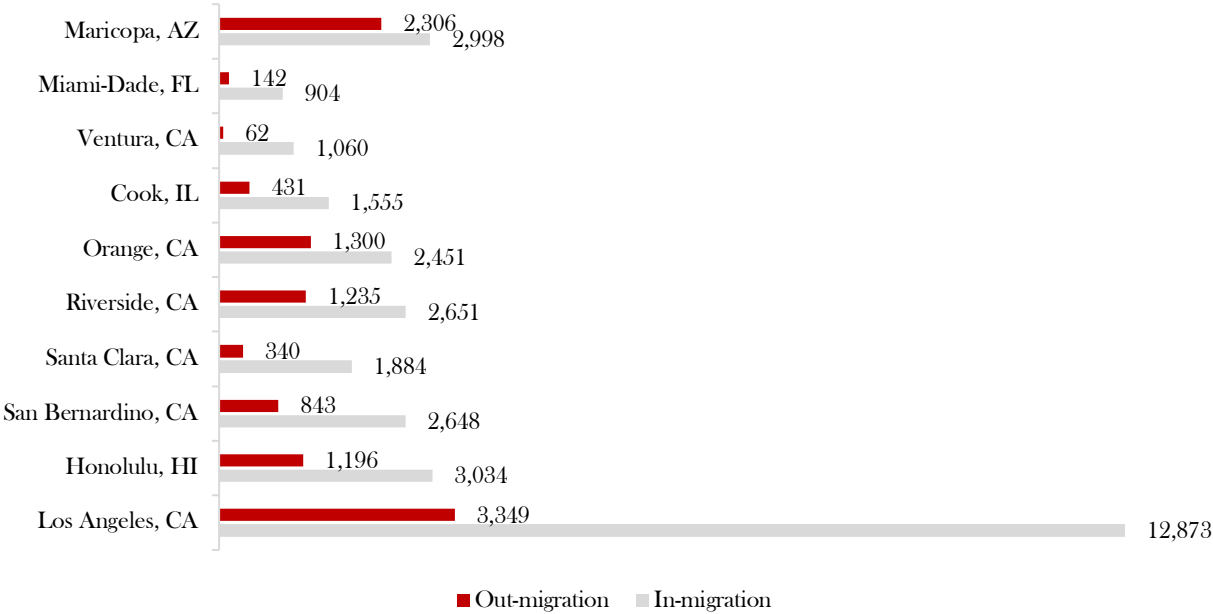
** Thousands of chained (2012) dollars.

Notes: CSA is the initialism for a combined statistical are; MSA is the initialism for a metropolitan statistical area; and Micro is the abbreviation for micropolitan statistical area. Comparison counties are italicized.

Sources: Arthur C. Nelson and Robert E. Lang, *Megapolitan America*, U.S. Census, and U.S. Bureau of Economic Analysis.

As Figure 2.2 makes clear, by far, the greatest population exchanges are between Clark and Los Angeles counties. Given the counties' population differences, Southern Nevada receives a much larger share of migrants from Los Angeles than it sends to Southern California's most populous county. Consistent with Las Vegas's "Ninth Island" moniker, Honolulu County in Hawaii ranks second. Four other counties in Southern California – San Bernardino, Riverside, Orange, and Ventura – and one county in Northern California – Santa Clara – are in the top ten. Arizona's Maricopa County (home to Phoenix) ranks tenth with about 20 percent more migration into Clark County compared to out-migration to Maricopa County. Counties in the South and Midwest – Florida's Miami-Dade County and Illinois's Cook County – round out the top ten counties exchanging residents with Clark County.

Figure 2.2: Top Ten Counties Exchanging Population with Clark County, 2016-2020



Source: U.S. Census.

The region’s geography also stimulates economic exchanges. For example, a significant share of Southern Nevada’s healthcare need is met in Phoenix and Southern California. California also provides expert labor to Las Vegas, including skilled labor in sectors such as information technology. The growth in Southern Nevada’s Business Information Technology Ecosystems noted in Part 1 would not be possible without the importation of workers from neighboring metros; a point consistent with the influx of residents from California counties including Santa Clara in the heart of the Silicon Valley.

Thus, one advantage that Southern Nevada’s geography provides is proximity to hundreds of thousands of skilled workers and a proven market attractiveness for their relocation that was only enhanced during the COVID-19 pandemic.³⁴ In return, Las Vegas is the single largest destination for Southern California tourism with more than 70 commercial flights a day from Southern California airports landing at Reid International Airport in Las Vegas.

Indeed, the vast majority of Southern Nevada’s economic exports are tied to travel and tourism and the business service economy supporting those industries.³⁵ Southern Nevada is the headquarters for six Fortune

³⁴ See Damore et al., *Nevada Economic Development and Public Policy 2022-2026*, pg. 19.

³⁵ Although now dated, a 2010 analysis reports that travel and tourism generated 45 percent and business, professional, and technical services generated 8.7 percent of the Las Vegas MSA’s \$7.3 billion export economy. See Mark Muro, Emilia Istrate, and Jonathan

1000 firms that concentrate in the resort, entertainment, and gaming sectors: Las Vegas Sands (#235); MGM Resorts (#249); Caesars Entertainment (#363); Wynn Resorts (#454); Scientific Games (#711); and Boyd Gaming (#723).³⁶ With holdings that are increasingly outside of Nevada, these companies' reaches extend across the country and the globe. Their scale demands advanced producer services in areas such as architectural and engineering; patent, intellectual property, and international regulatory law; business support services; and advertising and public relations.

At the same time, the concentration of the region's export economy supporting the Tourism, Gaming, and Entertainment sector is indicative of the narrowness of the regional economy. A consequence of this can be seen in Table 2.1 by comparing the scaled differences between Southern Nevada and its Southwest Triangle neighbors. The population of Los Angeles County is four times greater, and its GDP is nearly six and half times larger. Maricopa County with twice the population of Clark County has a GDP that is 2.3 times greater.

Economic Comparisons Between Las Vegas and Adjacent Metropolitan Areas

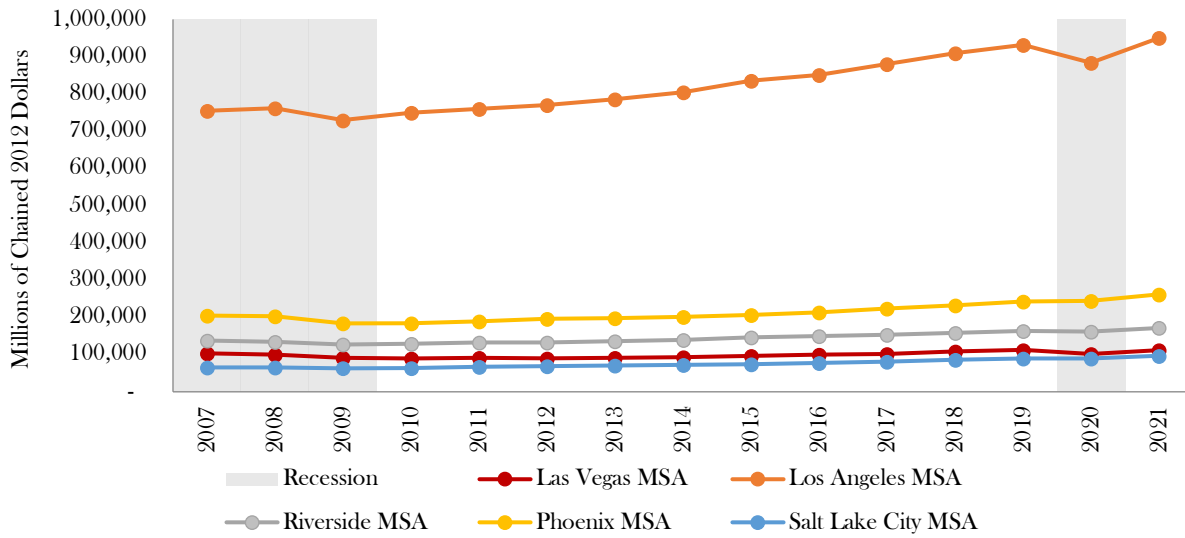
In this section, we provide extensive, over time economic comparisons of the Las Vegas MSA to MSAs in the neighboring states of Arizona (Phoenix MSA), California (Los Angeles and Riverside MSAs), and Utah (Salt Lake City MSA) to assess how well Las Vegas fares relative to adjacent metros. Data for the Riverside MSA is included due to its geographic proximity and similar population size as Las Vegas (see Table 2.1). Like Las Vegas, the Riverside MSA has a substantial warehousing and logistics ecosystem that is enhanced by direct rail service from the Southern California ports. By including data from 2007 through 2021 we are able to evaluate the impacts of the Great Recession and the COVID-19 recession on the MSAs' economic resiliency.

Figure 2.3 provides comparisons of economic productivity in the five MSAs by comparing the real GDPs in millions of chained 2012 dollars. Throughout the period, the real GDP for the Las Vegas MSA was smaller than the other metros except for Salt Lake City (which has a population that is roughly half as large). While this ordering has not changed since, the gaps between Las Vegas and Los Angeles, Riverside, and Phoenix have widened between 2007 and 2021. The gap with Salt Lake City has narrowed.

Rockwell, "Export West: How Mountain West Metros Can Lead National Export Growth and Boost Competitiveness," Brookings Mountain West, July 2010, https://digitalscholarship.unlv.edu/brookings_pubs/7/.

³⁶ Sushma Singh, "Fortune 1000 companies list in 2022," Moneymint, June 8, 2023, <https://moneymint.com/fortune-1000-companies-list/>.

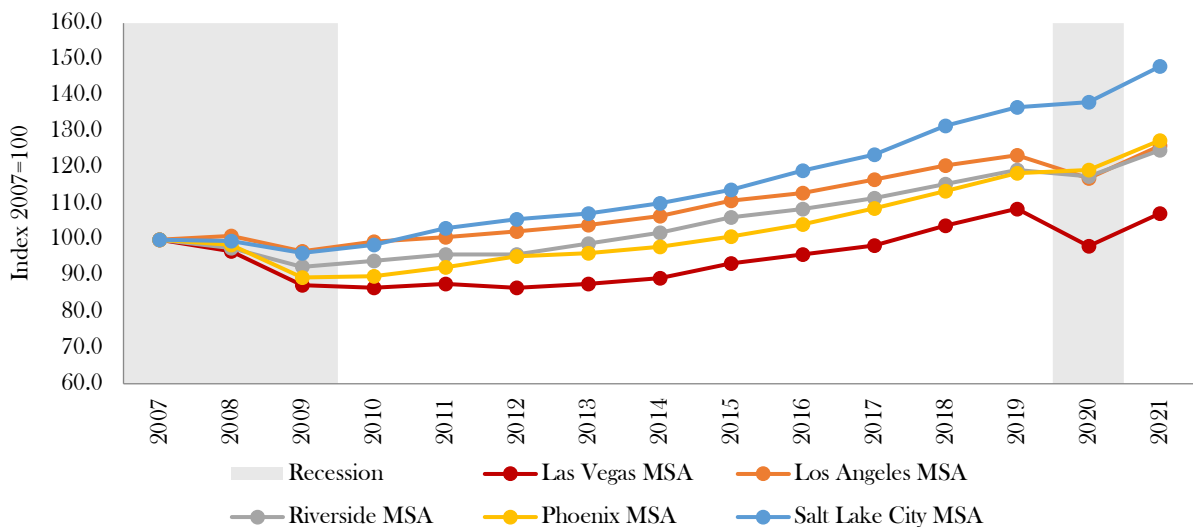
Figure 2.3: Comparison of Real GDP Between Las Vegas and Adjacent Metros, 2007-2021



Note: GDP is the initialism for gross domestic product and MSA is the initialism for metropolitan statistical area. Source: U.S. Bureau of Economic Analysis.

To control for differences in total real GDP, we indexed real GDP growth rates from 2007 to 2021. Figure 2.4 indicates that indexed real GDP in Las Vegas grew at the slowest rate, expanding by 8.5 percent from 2007 to 2019, compared to 23.4, 19.3, 18.3, and 36.7 percent for Los Angeles, Riverside, Phoenix, and Salt Lake City, respectively. Note that Salt Lake City did not experience a downturn during COVID-19, while Las Vegas was the only MSA not to have recovered its real GDP by 2021, a year after the pandemic recession.

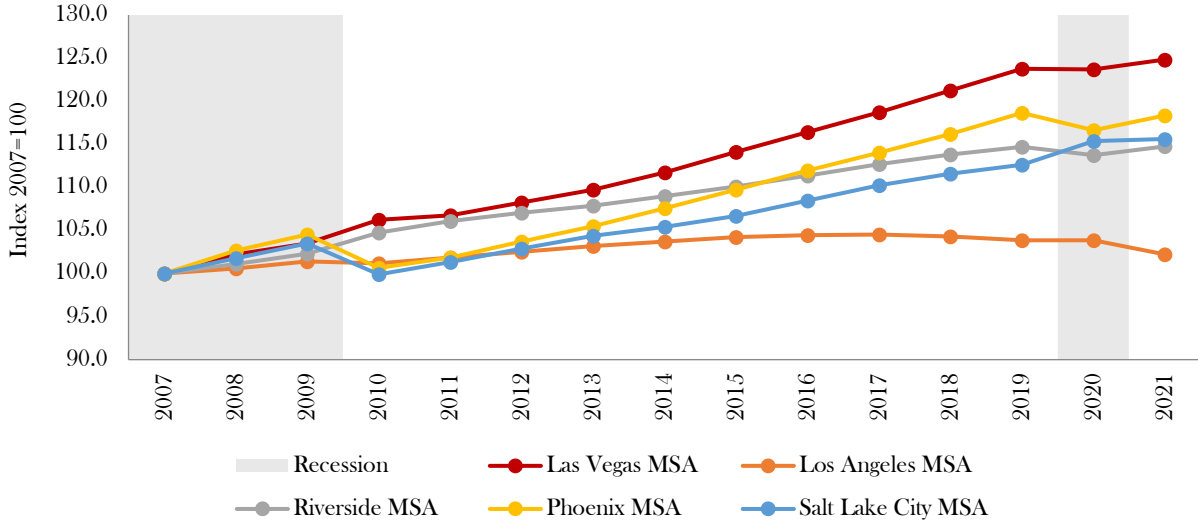
Figure 2.4: Comparison of Real GDP Indexes Between Las Vegas and Adjacent Metros, 2007-2021



Notes: Values indexed to 2007; GDP is the initialism for gross domestic product and MSA is the initialism for metropolitan statistical area. Source: U.S. Bureau of Economic Analysis.

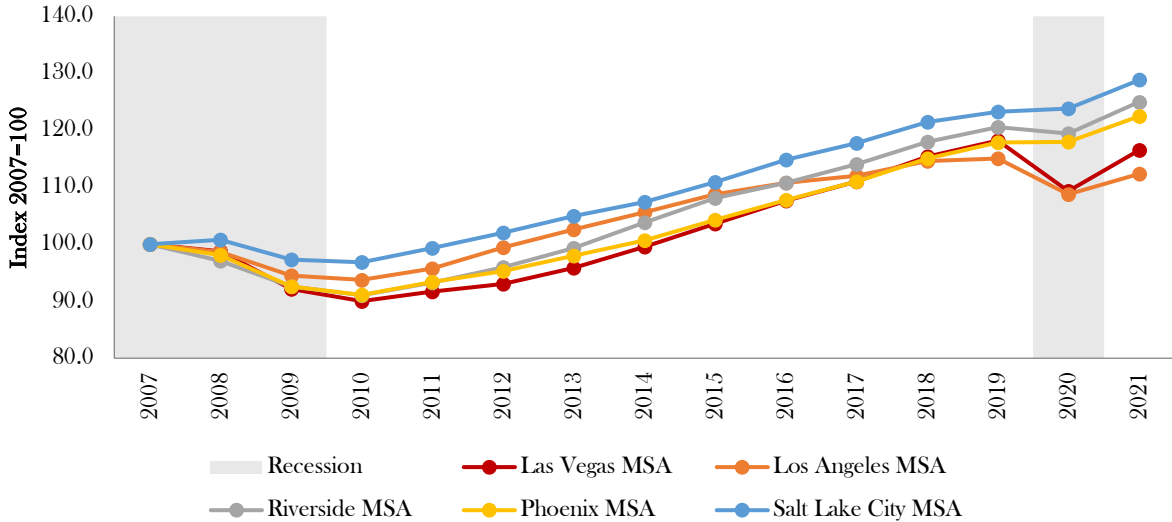
Among the five metros, Las Vegas had the fastest indexed population growth (24.8 percent between 2007 to 2021, see Figure 2.5). Las Vegas’s mix of low real GDP and high population growth led to a decline in per capita real GDP (-14.1 percent). Moreover, except for Los Angeles, Las Vegas’s employment growth has not kept pace with population growth or with employment growth in the other MSAs (see Figure 2.6). From 2007 to 2021 employment growth in Las Vegas lagged over eight percentage points behind population growth.

Figure 2.5: Comparison of Population Indexes Between Las Vegas and Adjacent Metros, 2007-2021



Notes: Values indexed to 2007. MSA is the initialism for metropolitan statistical area. Source: U.S. Census Bureau.

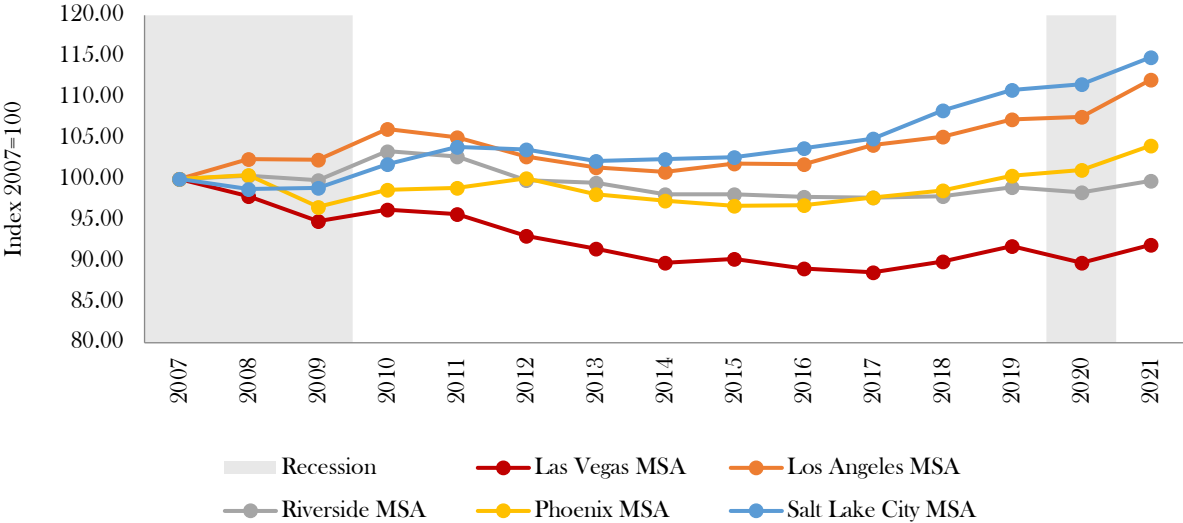
Figure 2.6: Comparison of Employment Indexes Between Las Vegas and Adjacent Metros, 2007-2021



Notes: Values indexed to 2007. MSA is the initialism for metropolitan statistical area. Source: U.S. Census Bureau.

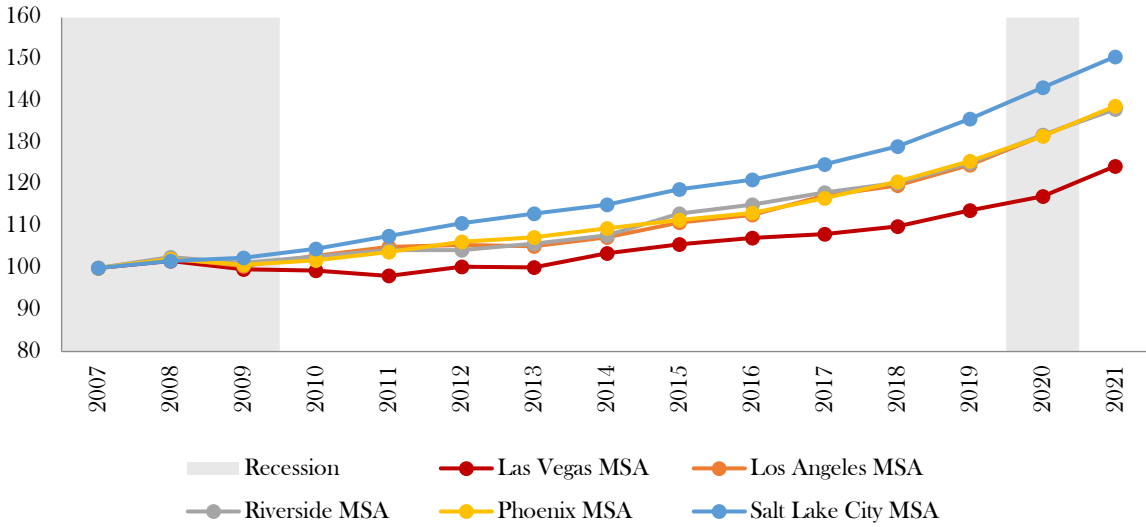
To assess labor productivity, real GDP was divided by the total number of employees and indexed (see Figure 2.7). Labor productivity for Las Vegas declined by 8.0 percent, while Los Angeles, Phoenix, and Salt Lake City saw gains of 12.1, 4.1, and 14.9 percent, respectively. Labor productivity in Riverside was mostly flat. The data presented in Figure 2.8 comparing the indexed compensation per worker suggests that the economy in Las Vegas has expanded proportionally in lower-paying sectors compared to adjacent MSAs. Average compensation per worker increased at the lowest rate compared to adjacent metros from 2007 to 2021.

Figure 2.7: Comparison of Labor Productivity Between Las Vegas and Adjacent Metros, 2007-2021



Notes Values indexed to 2007. MSA is the initialism for metropolitan statistical area. Source: U.S. Census Bureau.

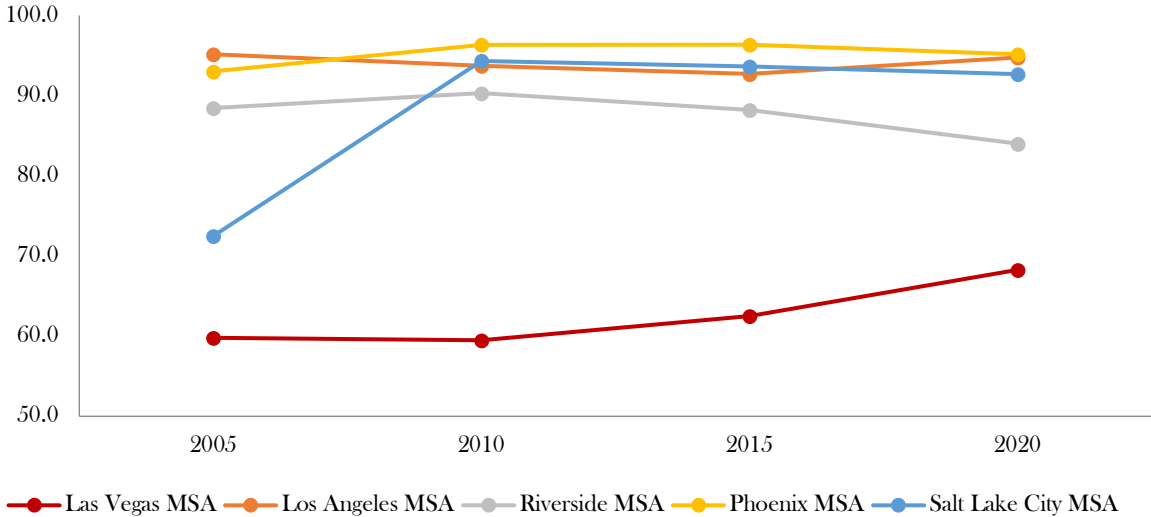
Figure 2.8: Comparison of Compensation Indexes Between Las Vegas and Adjacent Metros, 2007-2021



Notes Values indexed to 2007. MSA is the initialism for metropolitan statistical area. Source: U.S. Bureau of Economic Analysis.

Since the mid-2000s, Las Vegas’s economy has experienced some diversification and improved resilience. Figure 2.9 compares Hachman Index scores for Las Vegas and nearby metros. In 2005, Las Vegas’s score was 59.8, compared to 95.2, 88.5, 93.0, and 72.5 for Los Angeles, Riverside, Phoenix, and Salt Lake City. In 2020, Las Vegas stood at 68.3, while Salt Lake’s increased dramatically, and Riverside’s dipped slightly.

Figure 2.9: Comparison of Hachman Index Scores Between Las Vegas and Adjacent Metros, 2005-2020



Notes Values indexed to 2007. MSA is the initialism for metropolitan statistical area. *Source:* U.S. Census.

Comparisons of real GDP, labor productivity, and average compensation per worker demonstrate the growth gaps between Las Vegas and other major metros in the Southwest Triangle Megapolitan Cluster and the Mountain Megapolitan Cluster. This suggests that the economic diversification gains in the Las Vegas MSA have been driven by lower-productivity and lower-wage sectors. The decline in the share of leisure and hospitality jobs was mostly replaced by other industries with lower productivity and wages because of Las Vegas’s limitations in training and attracting highly educated workers. The analysis presented in Appendix B comparing the concentration of low-labor productivity and low-wage jobs is consistent with this point.

To build a more resilient economy, Southern Nevada needs to pivot towards industries with higher productivity and wages. Prioritizing manufacturing is crucial to this. Warehousing already accounts for a higher proportion of total employment in the Las Vegas MSA compared to the other metros considered here except for Riverside.³⁷ As the analysis presented in Appendix C suggests, this trend will continue but needs to

³⁷ Analysis of U.S. Bureau of Economic Analysis data indicates that the transportation and warehousing sector represented about 7.6 percent of total employment compared to 5.4, 6.0, and 5.7 percent, respectively, for Los Angeles, Phoenix, and Salt Lake City MSAs.

be offset by strengthening the manufacturing sector. In the next section we examine manufacturing trends and opportunities for Southern Nevada.

Manufacturing Employment Trends and Opportunities

In this section we evaluate employment trends to identify manufacturing sectors in which Southern Nevada may have a competitive advantage. Because these data are aggregated at the county level, we examine Clark County and selected counties in neighboring states (Los Angeles, Riverside, and San Bernadino counties in California, Maricopa County in Arizona, and Salt Lake and Utah counties in Utah).⁸⁸

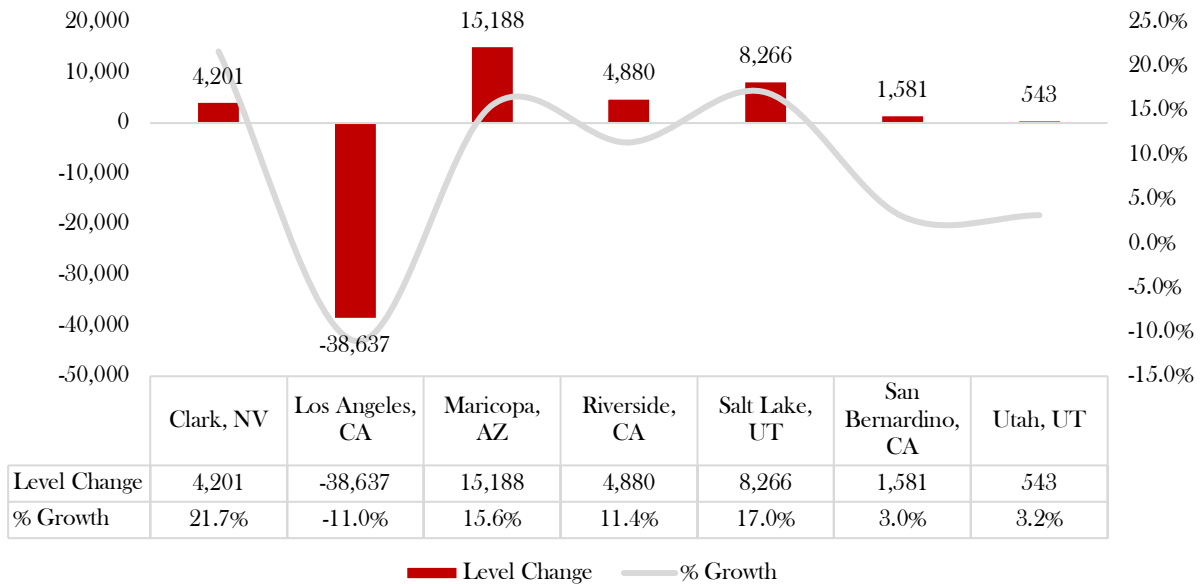
After the boom in offshoring manufacturing before the Great Recession, U.S. manufacturing companies have been reshoring or considering reshoring production lines and services from overseas. Consequently, manufacturing employment in June 2023 increased by 13.5 percent nationally from its lowest level in March 2010, excluding April 2020 when the economy was largely shuttered due to COVID-19. Much of this increase can be attributed to reshoring and foreign direct investment.⁸⁹

Clark County and the selected counties except for Los Angeles County experienced an increase in manufacturing employment between 2015 to 2020 (see Figure 2.10). Maricopa County had the largest increase in manufacturing jobs, adding 15,188 from 2015 to 2020. It is notable that Salt Lake County added 8,266 manufacturing jobs, which accounts for 11.5 percent of total private job additions from 2015 and 2020. Manufacturing was the second-fastest growing sector in Salt Lake County. Los Angeles County, however, experienced a loss of 38,637 manufacturing jobs from 2015 to 2020. The decrease in manufacturing employment represents about 42 percent of total private job losses that occurred from 2015 to 2020 in Los Angeles County. Given the region's prioritization of the knowledge economy and blue tech, the exodus of manufacturing jobs from Southern California is likely to continue in the coming years.

⁸⁸ The U.S. Census's County Business Patterns provides county level private employment estimates that use the more detailed North American Industry Classification System codes compared to other sources such as the Bureau of Labor Statistics Quarterly Census of Employment and Wages or the Current Employment Statistics.

⁸⁹ Reshoring has been accelerated by several factors including increased awareness of the routine logistics costs of offshoring, COVID-19, global uncertainty caused by the Russian invasion of the Ukraine, and federal legislation such as the Inflation Reduction Act and the CHIPS and Science Act that encourage more companies to reshore or increase investment in manufacturing capacity. Arizona's economy, for example, was boosted by increased reshoring and FDI. In 2021, 11,273 manufacturing jobs were added in Arizona, ranking it 4th in new manufacturing jobs after Michigan (+17,299), Texas (+15,026), and Tennessee (+13,649). See Harry Moser, "The Reshoring Trend is Rapidly Accelerating," *Industrial Heating*, October 12, 2022, www.industrialheating.com/articles/97254-the-reshoring-trend-is-rapidly-accelerating, and Jack Rogers, "Reshoring Brining 400K Manufacturing Jobs to US in 2022," *GLOBEST.COM*, July 14, 2022, www.globest.com/2022/07/14/reshoring-bringing-400k-manufacturing-jobs-to-us-in-2022/?slreturn=20230208162623.

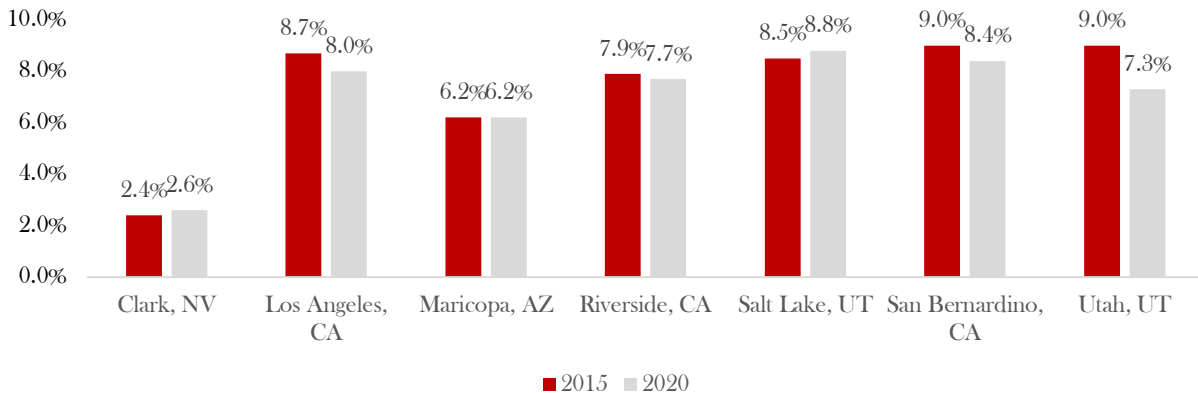
Figure 2.10: Manufacturing Employment Growth for Clark and Selected Counties, 2015 to 2020



Source: U.S. Census.

In Clark County, manufacturing employment grew by 21.7 percent from 2015 to 2020, the fastest growth rate among the seven counties. The additional manufacturing employment, however, created only 4,201 jobs due to a low initial base of 2.4 percent of total private employment in 2015 compared to 7.9 and 8.5 percent, respectively for Riverside and Salt Lake counties (see Figure 2.11). Clark County still shows a substantially lower manufacturing share of total employment (2.6 percent in 2020), compared to the selected counties. Moreover, manufacturing jobs in Clark County are compensated at a lower rate compared to manufacturing jobs in neighboring counties (see Table C.2).

Figure 2.11: Manufacturing Share of Employment for Clark and Select Counties, 2015 and 2020



Source: U.S. Census.

Manufacturing subsectors suggesting promising growth were evaluated. These sectors concentrate in essential product industries that support manufacturing related to EV batteries, microchips, pharmaceuticals, chemicals for batteries, personal protective equipment, and medical devices and include: chemical manufacturing; plastics and rubber product manufacturing; fabricated metal product manufacturing; computer and electric product manufacturing; electric equipment, appliance, and component manufacturing; transportation equipment manufacturing; and medical equipment and supplies manufacturing.⁴⁰

Appendix C provides an extensive analysis of each of these sectors and their respective subsectors. Table 2.3 summarizes manufacturing opportunities for Southern Nevada suggested by this analysis. Particularly notable are opportunities in industries supporting semiconductor chips, motor vehicle, and electrical equipment manufacturing. Within the Southwest Triangle, these sectors connect to supply-chains that are receiving significant federal and private investments in areas such as battery and semiconductor chip manufacturing. There also may be opportunities in medical equipment manufacturing as more of these products are reshored to domestic locations.

Table 2.3: Manufacturing Opportunities for Southern Nevada

Sector	Subsector
Chemical manufacturing	Pharmaceutical and medicine manufacturing
	Paint, coating, and adhesive manufacturing
	Soap, cleaning compound, and toilet preparation manufacturing
Plastics and rubber product manufacturing	Plastics product manufacturing
Fabricated metal product manufacturing	Architectural and structural metals manufacturing
Computer and electric product manufacturing	Semiconductor and other electronic component manufacturing
	Navigational, measuring, electromedical, and control instruments manufacturing
Electric equipment, appliance, and component manufacturing	Electrical equipment manufacturing
	Other electrical equipment and component manufacturing
Transportation equipment manufacturing	Motor vehicle manufacturing
Medical equipment and supplies manufacturing	

Note: Sector and subsectors are identified from the analysis presented in Appendix C.

⁴⁰ Reshoring Initiative, “2022 Q3 Data Report,” https://reshorenow.org/content/pdf/2022_Q3_data_report.pdf.

The Regional Flow of Goods

Targeting firms that can integrate into the manufacturing supply chains noted in the prior section is central to a regional plan for industrial development and economic diversification. Leveraging the flow of goods into and out of the Southern Nevada warehousing and logistics ecosystem offers other opportunities for supply chain integration and value-added operations such as component manufacturing before final assembly of goods or critical metals and minerals. Appendix C contains an overview of employment trends in warehousing and transportation and Appendix D provides an analysis of trade flows that inform this discussion.

Most of the forecasted growth will be in warehouse and distribution center tonnage, including an increase in local intra-county (origin and destination within Clark County) activity, as more goods move by truck within Clark County instead of to and from the region. This, coupled with expected population growth and industrial development, will further strain current ground infrastructure resources. Much of the increase in tonnage of this intra traffic will be for food and kindred products (20.2 percent), miscellaneous manufacturing products (32.1 percent), and transportation equipment (26.7 percent).

The size in the increase of warehousing and distribution activity is notable (see Appendix D). We forecast between 2021 and 2050 a 33 percent increase in outbound goods leaving Clark County and 72.3 percent increase in intra goods (origin and destination is Clark County) by value of freight activity through warehouse and distribution centers. By 2050 commodities within warehousing and distribution centers will surpass all other commodities (e.g. petroleum refining products, scrap metal, gravel, and sand) by tons and proportional of all freight moved in Clark County. Still, the largest commodity by value will remain motor vehicles and parts. The proportion of commodity value by mode for rail and air freight is forecasted to slightly decrease in relation to warehouse and distribution due to the continued need to transport into the region the types of commodities carried by semi-truck.

To justify investments in transportation infrastructure carried by truck or other modes, Southern Nevada needs to expand the output of commodities beyond warehouse distribution. These include high value commodities that are forecasted to grow in value of outbound, inbound, and intra traffic between 2021 and 2050 such as electrical equipment (166.0 percent) (e.g. battery manufacturing), machinery (146.0 percent) (e.g. electronic data processing equipment), chemicals and allied products (84.7 percent) (e.g. pharmaceutical or industrial product manufacturing), and fabricated metal products (59.7 percent) (e.g. sheet metal and other metal products used for industrial use).

To capture these supply chains, we analyzed current and future trade flows for the U.S., Canada, and Mexico. The results of the analysis are presented in Appendix D and suggest that the amount of through origin value (goods coming from Mexico but not necessarily originating in Mexico) is forecasted to increase by 216 percent by 2050 (1.52 billion to 4.81 billion). The amount of outbound traffic by value (goods leaving Mexico and having originated in Mexico) is also forecasted to increase by 220 percent (\$1.2 billion from \$390.13 million).

These data also indicate similar trade flow dynamics with Canada for through origin value (goods coming through Canada, but not necessarily originating in Canada), but we also observe significant increases of inbound goods by value (where the goods by value are arriving) as Canadian consumption expands. This suggests that in the future, international trade by value will increase moving from the south to the north. How Southern Nevada takes advantage of these trade flows depends on the region's ability to serve not only as a space where goods pass through but as a destination that adds value to the production of these goods.

To better understand these opportunities, trade flows by value for Southern Nevada's Economic Area as defined by the Bureau of Economic Analysis were analyzed. This area encompasses several counties in Nevada, parts of northern Arizona, and southern Utah (see Appendix D). For Mohave County, Arizona, which contains I-40, trade flows are expected to increase 87.5 percent of total value for goods moving through the region, rather than in or out of the region, with total value increasing from \$468.2 million to \$660.5 million by 2050. This suggests that future truck traffic is likely to be transported through major transit corridors, putting additional strain on existing infrastructure.

To the north, the five counties in the lower half of Utah are forecast to increase their outbound and inbound freight values by \$8 billion (see Appendix D). If nothing changes, then it is likely that an increasing share of freight traffic moving through Southern Nevada will be processed and distributed in the southern half of Utah instead of in Clark County. This forecast reflects Utah's advantage in rail and the expected benefits resulting from the state's inland ports in Salt Lake and Iron counties (see Part 3). If Nevada fails to act, then any regional investments in transportation infrastructure will effectively be supporting Utah's economy.⁴¹

⁴¹ As is detailed in Appendix D, the increase for Utah in commodities by value are those coming by rail, while those for Las Vegas are coming by truck. The top commodities by value and tons include rail intermodal drayage from ramp (rail to receiver destination), petroleum refining products, pickled fruits or vegetables, livestock, and drugs. Between 2015 to 2050, rail intermodal drayage from ramp dominates in both value and tons, with the value ranging from around \$176 million to \$213 million and tons from 43,628 to 52,688 by 2050. Petroleum refining products also show a significant dollar value of approximately \$150 million in 2050. Drugs, processed milk, and livestock contribute to the diverse commodities in this region, with values ranging from thousands to millions and tons ranging from the low thousands to tens of thousands. For the Las Vegas Economic Area region excluding southern Utah or northern Arizona, the top commodities by value and tons include petroleum refining products, clay ceramic or refractory minerals, gold ore, miscellaneous waste or scrap, and warehouse and distribution center. The data show a significant presence of petroleum refining products, with the value ranging from around \$77 million to \$100 million and tons from 92,945 to 124,019. Gold ore also stands out, especially in 2050, with a value of around \$79 million and 6,745 tons. The region also has a

More generally, the analysis of goods highlights Southern Nevada's Achilles heel. As a consumptive market that is dependent upon the transportation of nearly all its food and consumer products, much of what flows into the region is mixed freight that is then distributed from local warehouses to consumers.

Why this matters is that before goods reach Las Vegas they are already broken down from single commodities or products shipped by manufacturers to distribution centers at various points in the supply chain between production and consumer use. Thus, the goal of a coordinated warehousing and logistics strategy is to position the region to intercept the flow of goods before they are ready for distribution for final consumer purchase.

The region's geography suggests two such opportunities. The Burlington Northern Santa Fe (BNSF) Railway is investing \$1.5 billion to develop the Barstow International Gateway (BIG), an intermodal facility directly linking to the ports in Southern California. The goods and commodities shipped to BIG will be consolidated and will require staging before distribution to firms farther down the supply chain. While most materials will be transloaded to train lines that run east from Barstow, California, across northern Arizona, there may be opportunities for Southern Nevada to capture some of this traffic at higher levels in the supply chain.

The second opportunity is the Mojave Inland Port east of Bakersfield, California. The 400-acre site is next to the Mojave Air and Space Port, a commercial cargo airport, and adjacent to rail lines and California State Routes 14 and 58. Like BIG, the main purpose for the port is to alleviate congestion at the ports of Los Angeles and Long Beach. Integration between the port and operations in Southern Nevada can provide a similar point of supply-chain engagement. While trucks to and from Las Vegas can reach these facilities in half a day or less, the earlier that these supply chain interventions occur, ideally at the commodity or pre-assembly level, the better the prospects for future rail development.

In terms of commodities that can be targeted for supply chain intervention, the increased mining in Southern Nevada of critical metals and minerals supporting the clean energy transition as well as the presence of the nation's only rare earth mine across the state border from Primm hold promise. If these efforts were coupled with refinement, processing, manufacturing, and assembly operations, then the region would be able to strengthen its position in the electric battery logistics network.

significant amount of miscellaneous waste or scrap and clay ceramic or refractory minerals, showing diversity in the commodities handled in connection with mining and critical minerals.

Current and Future Economic Development in the South County and North County Areas

To scale industrialization at a level to facilitate diversification necessitates available land and infrastructure to support these uses. Work by RCG Economics for GOED details that land available for scaled industrial use within the Las Vegas Valley is limited.⁴² Moreover, the pollution in all its form (noise, air, dust, etc.) and associated environmental degradation generated by industrial activity and the NIMBY politics that these projects invariably invite offer good reasons why these initiatives should be concentrated in areas that are accessible to but separated from areas that are primarily residential and commercial. The land available for scalable industrial activity in the South County – Primm, Jean, Sloan, and the Eldorado Valley – and North County – Apex and the UNLV North Campus – areas is at the edges of or outside of the urban core. Current and near-term planned development in each of these areas is summarized below.

South County Economic Development

Located at the California-Nevada state line at I-15, Primm is now largely where traffic into California backs up due to lane reductions on the California side of the I-15. This will change when the Southern Nevada Supplemental Airport (SNSA) sited north of Primm in the Ivanpah Valley is brought to fruition.

The SNSA is proposed as a relief airport to support passenger air travel that cannot be accommodated at Harry Reid International Airport once that airport reaches its federally imposed capacity limit in the coming years. Project planning for the SNSA was halted during the Great Recession but restarted in 2018. The goal established by Clark County's Department of Aviation is to build and open the airport by 2035-2037 with construction commencing at the end of this decade. The project is undergoing a Federal Aviation Administration airspace feasibility study and environmental review. Approval will trigger the transfer of federal land along the I-15 to Clark County.

Three pieces of federal legislation underlie the SNSA project and land-conveyance processes. The 2000 Ivanpah Valley Airport Public Lands Transfer Act conveyed 6,000 acres to Clark County for construction and operation of an airport to the east of I-15 between Jean and Primm. The Clark County Conservation of Public Land and Natural Resources Act of 2002 allows Clark County to acquire 17,000 additional acres after environmental review is completed. This land, currently under control by the Bureau of Land Management

⁴² RCG Economics, "Policy Brief No. 2: Southern Nevada Employment Land Analysis."

(BLM), facilitates the airport's development and related infrastructure and provides a noise buffer from airport activity. Some of this space will be available for airport compatible development. Because the airport site is located at a low spot in the Ivanpah Valley where ground water collects, the 2015 National Defense Authorization Act identified land for flood control basins to protect the airport from major flooding events.

As a first step to define this physical space and its uses, in the 2023 regular session of the Nevada Legislature, Clark County submitted SB 19. The legislation, which passed unanimously and with no amendments, allows Clark County to incorporate a town in the territory provided by land conveyed by the federal government for the airport project and forbids the governing board of a city (i.e., the City of Henderson) from annexing the territory. Land that lies north of the airport site is within an interlocal agreement between Clark County and Henderson to guide land use planning for future development. The net result is that the airport site and adjacent land is to be under the purview of the county. If it chooses, then the county can incorporate a town in that space without being subject to the NRS-defined (NRS 288.570) incorporation requirements. The area north falls in the interlocal agreement and can be annexed by Henderson if the Clark County land disposal boundary is expanded through federal legislation.

The remoteness of the SNSA project from the Las Vegas Valley creates both benefits and challenges. On the one hand it is directly accessible via I-15. The airport's connectivity will likely be augmented by an alternative route through a transportation/utility corridor. This consideration, coupled with distance from the airspace surrounding Reid International and the limited available open space in this mountainous region, facilitates a major construction project.

The project will require substantial investments to bring utilities and water, including a return flow line, to the site and to develop flood control basins. Much of this work will occur before construction on the airport proper can accelerate. Clark County will also determine when a town servicing the airport will be incorporated and developed.

The SNSA's location will induce commuting by airport employees and vendors from the Las Vegas Valley. Without investments in alternative modes of transit, this activity as well as the future transportation of passengers, will add additional traffic to I-15 south of the Las Vegas Valley. Lastly, there may be concerns from the perspective of the airline carriers about the desirability of duplicating their operations and staffing at a location 35 miles from Harry Reid International, the region's primary airport.

The SNSA and the ensuing conveyance of associated land and the development of supporting infrastructure will reshape the South County area. The project has drawn comparisons to the Denver International Airport.⁴³ When that airport was built, it was remote from Denver's urban core. In the subsequent decades, the area has been developed and now features rail service between the airport and the city that displaces a portion of the auto traffic. The SNSA abuts the Union Pacific (UP) rail line and the route for the high-speed train under development by Brightline West linking Las Vegas to the Inland Empire region of California. Having rail lines adjacent to the airport site creates the potential for future rail service between the airport and the resort corridor.

One area that will benefit from the SNSA is Jean, north of Primm. Like Primm, Jean's economy historically catered to those travelling along I-15. No more. The shuttering and demolition of Jean's former hotels 30 miles south of the Las Vegas Valley and the purchase of the sites, along with 142 acres, and the existing infrastructure by a private investor sets the stage for the development of an industrial park catering to the logistics and warehousing sectors. The shuttered state prison at Jean provides another opportunity for development. Plans are underway by the state to lease the property, including the surrounding 471 acres.⁴⁴

An attraction of Jean for this type of development is the potential for a one-day turnaround for trucks coming from the Southern California ports.⁴⁵ The ability to transport a load to Las Vegas and return to Southern California within the federal daily driving limits is more feasible if a driver does not have to drive into or through the Las Vegas Valley. Further bolstering the project is the pushback in the Inland Empire on environmental grounds for additional warehousing.

Coupled with the lower land and operating costs in Nevada, Jean may be an attractive choice for firms looking to expand or relocate their operations. This type of development also can be supported by the utilities that are currently at the site (i.e., electricity, groundwater rights, and a wastewater facility). There also is a small airport next to these facilities that could be used for further industrial expansion in the future. However, without additional infrastructure and land conveyances the site will be unable to support heavy industry or expand beyond its current footprint.

⁴³ Ray Hagar, "Business leaders see great economic potential in proposed Ivanpah airport," Nevada Newsmakers, May 30, 2023, <http://nevadanewsmakers.com/RayHagar/article.asp>.

⁴⁴ SRI International, *Realizing Nevada's Electric, Innovative, and Connected Future*, Nevada Governor's Office of Economic Development, February 2023, <https://goed.nv.gov/about/state-plans/>.

⁴⁵ The Federal Motor Carrier Safety Administration generally limits truck drivers to a maximum of 11 hours a day behind the wheel with this driving required to occur in a 14-hour period after a rest of 10 or more consecutive hours.

Sloan, an unincorporated community between Jean and Henderson along I-15, is best known for the Sloan Canyon National Conservation Area and the Sloan Petroglyph Site. Clark County is targeting the area for future manufacturing and industrial use. A proposal was included in Southern Nevada's application for the EDA's Build Back Better Regional Challenge to fund a study assessing the land and development potential for a future Sloan Industrial and Manufacturing Park.

The goal is to build facilities catering to general and advanced manufacturing. However, any future development of Sloan for scaled industrial use will require passage of legislation akin to the Southern Nevada Economic Development and Conservation Act carried by Sen Cortez Masto in the 117th Congress (2021-2022) expanding the Las Vegas Valley Disposal Boundary.

While most of the current or planned development in the South County area focuses on the I-15 corridor, the Eldorado Valley between the City of Henderson's eastern boundary and City of Boulder City's western boundary also is in play. Through a series of land annexations by both cities, much of the unincorporated area in the valley that previously divided the cities has been eliminated.

The Henderson-controlled areas of the Eldorado Valley has the potential to accommodate warehousing, retail, and residential uses. Continued renewable energy development is the priority on the Boulder City side of the valley. Like Jean, locating logistics and warehousing in the area will allow for a one-day turnaround to and from the ports in Southern California via Nevada State Route 164 through Searchlight. The location also will capture freight traffic moving north from the Sun Corridor and U.S.-95, which intersects with I-8, I-10, and I-40 before entering Nevada. Along with I-11, upgrading these roads to interstate grade will further enhance connectivity in the South County area. Unlike the South County projects along the I-15 that will require workers to commute from the Las Vegas Valley, the El Dorado Valley's proximity to residential areas may make it more appealing for workers, while also constraining the type of industrial activity that can be developed.

North County Economic Development

While most of the development in the South County is either in its infancy or years away, Apex Industrial Park, with 7,000 acres of developable land in three tranches in North Las Vegas is hitting its stride. Getting to this point has not been easy and demonstrates the importance of long-term planning and infrastructure investment required to scale industrial development.

Since it was annexed by the City of North Las Vegas two decades ago, the park has been plagued by a chicken versus eggs dilemma: without business activity, there was not a tax base to fund utilities and infrastructure to develop the park. Without utilities and infrastructure, firms were unwilling to locate their businesses to the park. The Faraday Future project did not pan out, but the project was the impetus for the 2015 special session that cleared the way for Apex's development. As part of this process, the firm provided the resources for land and utility planning.

Since then, North Las Vegas has invested more than \$60 million to support water and sewer lines and is working with SNWA on the remaining \$250 million needed to complete the water and sewer infrastructure including a return flow line to reduce the park's consummative water use. The water line to the southern part of the park is operational. Construction on the second phase is ongoing and planning for phase three is approved. An upgraded Garnet interchange at I-15 and U.S.-93 has improved access to the park and the Nevada Department of Transportation (NDOT) is widening I-15 north of the Speedway and over the Apex Summit. The park also has a road from its southern edge at Miner's Mesa to U.S.-93

Despite this activity, the park's development is hindered by federal restrictions. The park contains a mix of private property, county holdings, and federal land. Before most parcels can be developed, a lengthy federal environmental review and approval is required. As is discussed in Part 5, federal legislation carried by Sen. Cortez Masto in the current Congress proposes to expedite this process.

Apex is well-suited for industrial development. Residential zoning is prohibited, and it has large parcels or adjacent parcels that can be combined to facilitate scaled industrial and manufacturing projects. The park has attracted a diverse array of businesses including cannabis growing facilities, Air Liquide, Kroeger, and Hey Dude. However, to date, a major manufacturing firm that can induce supply chain integration and anchor a manufacturing cluster has not located at Apex. We return to this point in Part 5.

South of Apex along I-15 there has been a boom in warehousing and logistics operations. West of the I-15 sits the Veterans Administration Medical Center at the 215 Beltway. North of the 215 Beltway between Pecos Road and Lamb Boulevard is the 2,000 acres for the long-planned UNLV North Campus. Once the land is cleared of munitions by the U.S. Army Corps of Engineers it will be conveyed to the Nevada System of Higher Education for development by UNLV.

The UNLV North Campus site consists of three tranches that run from south to north adjacent to the City of North Las Vegas (with Nellis Air Force Range to the east), the southern tranche will facilitate development

benefiting the campus and community. The middle tranche will be developed for academic uses. The northern tranche can house research and testing facilities.

Currently, the federal conveyance agreement limits the university to developing public-public partnerships. Federal authority is required to allow the university to form private-public partnerships to develop the campus.⁴⁶ Because it is unlikely that state funding will be available at the levels needed to build the campus's research infrastructure, partnerships with public entities such as the City of North Las Vegas and private firms will be needed to realize the campus's potential. We return to this point in Part 5.

Summary

Part 2 placed Southern Nevada in its megapolitan geography and evaluated the region's weak economic performance relative to adjacent megapolitan areas in Southern California, Arizona's Sun Corridor, and Utah's Wasatch Range. Also reviewed were industrial trends and opportunities as well as current and planned economic development activity in the South County and North County areas of Clark County.

⁴⁶ The Southern Nevada Economic Development and Conservation Act carried by Sen. Cortez Masto in the 117th Congress (2021-2022) contained language allowing for public-private partnerships.

Part 3: Governing the Region

Part 3 provides an overview of Southern Nevada’s governing structures. Also addressed are the consequences that governance has for regional economic development as well as regional governance structures that exist in neighboring metros to coordinate regional economic priorities and infrastructure development that do not exist in Southern Nevada.

General-Purpose Local Governments in Southern Nevada

Southern Nevada contains six general-purpose local governments: Clark County and the incorporated cities of Boulder City, Henderson, Las Vegas, Mesquite, and North Las Vegas.⁴⁷ A general-purpose government is one in which a diverse range of services are provided to citizens that are paid for with taxes and fees. With 2.3 million residents, the fact that Southern Nevada is comprised of one very large county and five incorporated cities means that its overall decision-making structure is efficient compared to other metropolitan regions nationally.

The 2017 Census of Governments identifies 14 special purpose governments and one school district, Clark County School District (CCSD), that operate in Southern Nevada.⁴⁸ These local governments may have elected governing boards or boards appointed by elected officials representing general-purpose governments. There is another kind of special purpose government called a special assessment district (SAD), also known as a special improvement district, that is discussed in Part 5. These are used to finance infrastructure and improvement projects usually funded from ad valorem property tax revenues. Tax revenues can be used to retire bonds or other debt instruments. Special assessment districts are formed to benefit specific geographic areas such as residential developments or business districts.

Although cities and counties can marshal their resources to advance economic development priorities, they are not required to coordinate their efforts. Consequently, these general-purpose governments may be in competition with one another to secure economic development opportunities. This is characterized as

⁴⁷ See U.S. Census, *Individual State Descriptions*, 2017 Census of Governments, April 2019, www.census.gov/content/dam/Census/library/publications/2017/econ/2017isd.pdf.

⁴⁸ Ibid.

“winner take most” competition⁴⁹ that often makes a region worse off collectively. This occurs when one jurisdiction overcommits concessions to secure an economic development opportunity only to result in long-term returns on investment falling short of expectations. Also at stake for other local governments are the impacts of negative externalities over which they have little or no control such as traffic congestion, pollution, and increased demand for their facilities and services.

In the larger scheme, none of the general-purpose governments in Southern Nevada has the resources to compete with state or regional economic development authorities in nearby megapolitan areas such as Southern California, Utah’s Wasatch Range, or the Sun Corridor in Arizona. Moreover, as a Dillon’s Rule state, Nevada’s local governments have limited autonomy that constrains their ability to act independently.⁵⁰ Unlike other Mountain West states such as Arizona, Colorado, and Utah, where the largest MSA is home to the state capital, Nevada’s capital is located hundreds of miles away in Carson City, creating a geographic divide between state government and Nevada’s population and economic center.

Nevada ranks highly in assessments of state business tax climate due to its relatively low property taxes and lack of personal and corporate income taxes. It fares poorly in tax stability because of its overreliance on sales tax and taxation of specific industries (e.g., gaming and mining) and activities (e.g., live entertainment) that ebb and flow with macroeconomic conditions. Specific to local governments, the consolidated tax or C-Tax, the formula by which the state distributes local government revenues, is an ongoing source of complaints. The tax’s inability to adapt to the effects of economic booms and busts on property taxes or account for asymmetric patterns of growth creates budgeting and planning challenges for local governments.

Major Special-Purpose Governments in Southern Nevada

This section reviews three major special-purpose governments in Southern Nevada: the Las Vegas Convention and Visitors Authority (LVCVA); SNWA; and the Regional Transportation Commission (RTC) of Southern Nevada together with Southern Nevada Strong (SNS).

⁴⁹ See Brookings Metro, “Boosting growth across more of America: Pushing back against the ‘winner-take-most’ economy,” January 29, 2020, www.brookings.edu/events/boosting-growth-across-more-of-america/.

⁵⁰ One analysis of local government autonomy ranked Nevada 33rd, two places behind California. Colorado ranked 15th, Arizona ranked 27th, and Utah ranked 28th. See Harold Wolman, Robert McManmon, Michael Bell, and David Brunori, “Comparing Local Government Autonomy Across States,” in *The Prosperity Tax and Local Autonomy*, edited by Michael Bell, David Brunori, and Joan Youngman (New York: Lincoln Institute of Land Policy Press, 2010), pp. 69-114.

Analysis of these governance structures reveals a number of defining characteristics: statutes authorized their formation; they are single-purpose entities meaning their jurisdiction is just one function such as attracting tourism, securing and managing water, and crafting and implementing transportation plans; all entities have dedicated sources of revenue; all entities are overseen by governing bodies that are not directly elected for their purposes (although in all cases some members of the government body are themselves elected to other governing bodies that appoint them to their respective roles); and all are administered by a professional staff.

However, and is the case across the U.S., none of these entities have direct authority over local government land use and development decisions. More importantly for the purposes of this report, while all are important for specific aspects of economic development, none address economic development comprehensively. On the other hand, they have an organizational model that appears to have been embraced by the governor, legislature, locally elected officials, key private and nonprofit organizations, and presumably the public.

Las Vegas Convention and Visitors Authority

The LVCVA was created by the Nevada Legislature in 1955 as a single-purpose government agency serving Southern Nevada. Its sole purpose is to attract “an ever-increasing number of visitors to Southern Nevada.”⁵¹ State law establishes the number, appointment, and terms of the board members.

The LVCVA owns and operates the Las Vegas Convention Center (LVCC) and helps generate tourism for the region through advertising campaigns. The LVCVA also owns the Las Vegas Convention Center Loop, a subterranean system of Tesla vehicles allowing conventioners to shuttle to different convention venues.⁵² In addition, it runs a 3.9-mile monorail that connects several hotels to the convention center.⁵³

The LVCVA’s fourteen-member board of directors is made up of eight elected officials appointed from each local municipality and six industry members appointed equally by the Nevada Resort Association and the Vegas Chamber.⁵⁴ Funding is provided by a room tax on all hotels in the county plus building revenue from the LVCC. It also has the power to issue bonds that are retired with LVCVA revenues.⁵⁵

⁵¹ DBpedia, “Las Vegas Convention and Visitors Authority,” 2023 (https://dbpedia.org/page/Las_Vegas_Convention_and_Visitors_Authority).

⁵² Las Vegas Convention and Visitors Authority, “Vegas Loop at LVCC,” 2023 (www.lvcva.com/vegas-loop/).

⁵³ Las Vegas Monorail, “Ride the Monorail,” 2023 (www.lvmonorail.com).

⁵⁴ Las Vegas Convention and Visitors Authority, “About the Las Vegas Convention and Visitors Authority,” 2023 (<https://press.lvcva.com/media-resources/about-the-las-vegas-convention-and-visitors-authority/s/de46193a-5f35-429d-b4bc-03fc1fa1d7c6>).

⁵⁵ Las Vegas Convention and Visitors Authority, “Funding & Finance,” 2023 (www.lvcva.com/funding-finance/).

Southern Nevada Water Authority

Considering the tensions over the Colorado River, the SNWA is a study in regional collaboration. The SNWA is a single-purpose special district that was formed in 1991 to manage Clark County’s water needs.⁵⁶

The SNWA is governed by a seven-member board of directors consisting of one elected official from each of Big Bend Water District, Boulder City, Clark County Water Reclamation District, Henderson, Las Vegas, Las Vegas Valley Water District, and North Las Vegas. While the SNWA Board of Directors sets policy, the Las Vegas Valley Water District is responsible for the day-to-day management through agreements with member agencies. A key role of the SNWA is to acquire long-term water resources for Southern Nevada. In 1992, the SNWA secured the state’s full 300,000 acre-feet of Colorado River water rights.⁵⁷

Colorado River water accounts for 90 percent of the regional water supply. The other 10 percent comes from groundwater.⁵⁸ Before the SNWA, Colorado River and groundwater rights were held by several jurisdictions that needed to be assembled. Once agreements were in place, this allowed the Bureau of Reclamation to assign them formally to the SNWA. Through changes in state law during the early 1990s, the groundwater rights held by Clark County jurisdictions were also assigned to the SNWA. With full control over Colorado River and groundwater rights, including three representatives on the Colorado River Commission, the SNWA has impressive control over maintaining and managing the water supply for Southern Nevada.

Regional Transportation Commission of Southern Nevada and Southern Nevada Strong

The Regional Transportation Commission of Southern Nevada, which is customarily referred to as the RTC, is the MPO for urbanized Clark County.⁵⁹ As the region’s mass transit system provider, it oversees public transportation, traffic management, roadway design and construction funding, transportation planning and regional plans prepared by Southern Nevada Strong (SNS).

The RTC governing board is comprised of two members from the Clark County Board of Commissioners, two members from the city council of the largest incorporated city (Las Vegas), and one member each from

⁵⁶ For an analysis of the creation of the Southern Nevada Water Authority and its operations, see Christian S. Harrison, *All the Water the Law Allows* (Norman: University of Oklahoma Press, 2021).

⁵⁷ Southern Nevada Water Authority, “Mission and history,” 2023 (www.snwa.com/about/mission/index.html).

⁵⁸ Las Vegas Valley Water District, “Where your water comes from,” 2023 (www.lvwd.com/water-system/where-your-water-comes-from/index.html).

⁵⁹ Regional Transit Authority of Southern Nevada, “About the RTC,” 2023 (www.rtcnv.com/about/about-the-rtc/).

the city council of the other incorporated cities in the county being Boulder City, Henderson, Mesquite, and North Las Vegas. The NDOT director is an ex-officio member.⁶⁰ As the federal MPO for the region, the RTC is the entity receiving and managing spending of federal money to help implement transportation projects. Other RTC funding comes from sales tax as well as a motor vehicle fuel tax, fuel tax revenue indexing, and transit fares.

Initially funded from a U.S. Housing and Urban Development Sustainable Communities Initiative Planning Grant,⁶¹ SNS oversees the regional plan for the Las Vegas Valley. As the principal administrator of SNS, RTC provides support for the plan-making process and works in collaboration with the SNS Steering Committee to oversee development and implementation.

The current plan was adopted in 2015 by 13 government partners including: Southern Nevada Regional Planning Coalition; City of Henderson; City of Las Vegas; City of North Las Vegas; City of Boulder City; Clark County; RTC; UNLV; Southern Nevada Regional Housing Authority; SNWA; CCSD; Southern Nevada Health District; and Conservation District of Southern Nevada. The 2015 plan identified four main themes to organize goals and strategies across the region: improving economic competitiveness and education; investing in complete communities; increasing transportation choice; and building capacity for implementation.⁶²

Regional Governance and Administration

Other counties outside of Clark have major special-purpose governance entities like those reviewed above (e.g. the Reno-Sparks Convention & Visitors Authority, the Regional Transportation Commissions for Elko and Washoe counties, the Truckee Meadows Water Authority), and like those in Clark County, their structures and scope of activity reflect the communities they serve and thus, can be thought of as more locally grounded. Other regional governance and administrative structures are state mandated. Here we consider the LVGEA and the Southern Nevada Regional Planning Coalition

⁶⁰ Regional Transit Authority of Southern Nevada, “Board of Commissioners,” 2023 (www.rtcnv.com/about/our-leadership/board-of-commissioners).

⁶¹ The 2012 grant was awarded to the Southern Nevada Regional Planning Coalition. In 2015 the RTC became the administrator of the plan and at that time a steering committee with representatives from member agencies and governments was created to oversee the development and implementation of the regional plan, see Southern Nevada Strong, “History,” 2023 (www.southernnevadastrong.org/plan/history/).

⁶² Southern Nevada Strong, “Regional Plan,” 2023 (www.southernnevadastrong.org/plan/).

Las Vegas Global Economic Alliance

The LVGEA is Clark County's official RDA.⁶³ Before reviewing its powers, some history is useful. In 1956, the Southern Nevada Industrial Foundation was formed as a coalition of public, private and nonprofit entities to recruit businesses to Southern Nevada. It was later rebranded the Nevada Development Authority. As part of the 2011 reforms to Nevada's approach to economic development, the LVGEA became one of eight county-based RDAs.⁶⁴ Its mission is to "strengthen the Greater Vegas economy through intentional business attraction, expansion, and connectivity" consistent with its values: focused on jobs; driven by leadership; enhanced through partnerships; fueled by information; and accelerated through innovation.⁶⁵

The LVGEA is a partnership of public, private, and nonprofit entities and includes a professional staff. LVGEA's efforts are guided by its plan *Vision 2025: A Comprehensive Economic Development Strategy for Southern Nevada*⁶⁶ that was ratified by consensus among the partners in 2021. At its heart, it is a business recruitment entity focused on identifying opportunities, responding to business development inquiries, and brokering deals among its partners to expand investment and job opportunities in the region.

The LVGEA is the official link between Southern Nevada and GOED for tax abatement applications. Procedurally, a firm works directly with the LVGEA. Together, they apply for tax abatements to GOED. The GOED staff then performs an economic analysis to establish eligibility and qualifications. Staff make recommendations that are presented to the GOED Board for final determination of awards.⁶⁷ However, the LVGEA has no power over local land use and development decisions, it is organized outside the purview of local governments, and it does not have a tax base although it does receive revenue from partners and the state to support its staff and operations.

Southern Nevada Regional Planning Coalition

To bridge planning efforts between the cities, county, and special districts in Clark County, the state required the establishment of a regional planning coalition via a cooperative agreement between the county

⁶³ State of Nevada Department of Business & Industry, "Regional Economic Development Authorities," 2023 (https://business.nv.gov/Resource_Center/Regional_Economic_Development_Authorities/).

⁶⁴ Las Vegas Global Economic Alliance, "History," 2023 (<https://lvgea.org/about-us/history/>).

⁶⁵ Las Vegas Global Economic Alliance, "2023 Action Plan," https://lvgea.org/wp-content/uploads/2023/02/LVGEA_Action-Plan-2023-digital-1.pdf.

⁶⁶ SRI International, *Vision 2025: A Comprehensive Economic Development Strategy for Southern Nevada*, Las Vegas Global Economic Alliance, July 2021, <https://lvgea.org/wp-content/uploads/2020/04/LVGEA-Comprehensive-Economic-Development-Strategy1.pdf>.

⁶⁷ Nevada Governor's Office of Economic Development, "Nevada Incentives," 2023 (<https://goed.nv.gov/programs-incentives/incentives/>).

commissioners and the city councils of each of the three largest cities in the county. The Southern Nevada Regional Planning Coalition's (SNRPC) mission is to "bring together all public jurisdictions to coordinate regional planning in a seamless fashion while respecting each member's autonomy."⁶⁸ The SNRPC has seven mandated priorities including: conservation, open space, and natural resource protection; population forecasts; land use; transportation; public facilities; air quality; and infill development.

The SNRPC Board is comprised of one member each from Clark County, the cities of Boulder City, Henderson, Las Vegas, and North Las Vegas, and CCSD. This board aims to coordinate planning activities between the county and the cities with regional agencies, such as the RTC, the SNWA, Regional Flood Control District, CCSD, and Clark County Department of Air Quality.⁶⁹ Representatives from those agencies serve on the SNRPC's Technical Committee.⁷⁰

Although the SNRPC Board aims to meet monthly, in 2023 eight of the monthly meetings were canceled.⁷¹ During 2022, 10 of its 12 monthly meetings were cancelled. Eight of 12 monthly meetings were cancelled in 2021. One reason for this is many of its functions have been transferred to the RTC. For instance, the SNRPC was the grant recipient for SNS but after the plan was adopted, administration was transferred to the RTC, which unlike the SNRPC has the staff capacity to oversee plan implementation and revisions.⁷² Inspection of meeting minutes indicates that the SNRPC is a forum for presentations on and discussions of regional issues. However, with no formal authority over land use and development decisions, no revenue streams, and many of its activities subsumed by other agencies, its ability to influence regional outcomes is limited. In 2023, the Nevada Legislature passed legislation making the SNRPC's existence optional.

Megapolitan Level Governance

Part 2 examines Nevada's megapolitan geography and the connectivity of its regions to neighboring megapolitan clusters (see Figure 2.1). These relationships have been supported by the creation of bistate and multistate governance structures that are reviewed below. The existence of these entities reflects a shared

⁶⁸ Southern Nevada Regional Planning Coalition, "SNRPC Mission," 2023 (www.snrpc.org/snrpc-mission).

⁶⁹ Southern Nevada Regional Planning Coalition, "Meet the Board," 2023 (www.snrpc.org/meet-the-board).

⁷⁰ Southern Nevada Regional Planning Coalition, "Meet the Technical Committee," 2023 (www.snrpc.org/meet-the-technical-committee).

⁷¹ Southern Nevada Regional Planning Coalition, "Past Agendas & Minutes," 2023 (www.snrpc.org/coalition-board-agendas-minutes).

⁷² Southern Nevada Strong, "Regional Plan," 2023.

understanding that economic development and the stewardship of natural resources are not limited to state boundaries and that coordination across state lines can deliver better outcomes for all participants.

Bistate Governance

Tahoe Regional Planning Agency. In 1969, California and Nevada created with congressional consent a bistate compact to establish the Tahoe Regional Planning Agency to oversee environmental planning at Lake Tahoe on the California and Nevada border. The agency’s authority is unique as it is granted the powers to oversee land use, regional planning, establish environmental thresholds related to air and water quality, soil, vegetation, and wildlife conservation as well as recreation among other concerns across state lines.⁷³

The California-Nevada Super Speed Ground Transportation Commission. In 1988, California and Nevada approved legislation to create the California-Nevada Super Speed Ground Transportation Commission composed of private and public interests to pursue a maglev-train linking Las Vegas and Anaheim through Barstow, Victorville, and Ontario, California. While the project was never built, it laid the foundation for the Brightline West high-speed rail project that is under development.

The creation of the commission also speaks to bistate efforts to reduce congestion on I-15 and improve the connectivity between the two states and their economies. Since then, California and Nevada reorganized the commission to establish the California High-Speed Rail Authority and Nevada High-Speed Rail Authority to ostensibly achieve the same goal – linking Southern California and Southern Nevada together via high-speed rail – and to develop other high-speed rail lines in their states.

Multistate Governance

The I-15 Mobility Alliance. The I-15 corridor is the most important link for the movement of goods and people between Southern California, Southern Nevada, northern Arizona, Utah and beyond. In recognition of this fact, in 2007 the Federal Highway Administration designated I-15 as one of six national Corridors of the Future. The I-15 Mobility Alliance was created to promote innovation, planning, investment, and implementation of multimodal transportation systems (e.g., highways, freight and passenger rail, and transit) as well as technologies supporting the movement of energy, data, and communications within the corridor.⁷⁴ The alliance is led by the departments of transportation in Arizona, California, Nevada and Utah and its

⁷³ Tahoe Regional Planning Agency, “How We Operate,” 2023 (www.trpa.gov).

⁷⁴ I-15 Mobility Alliance, “I-15 Corridor System Master Plan Update 2017,” pg. 51.

members consist of local governments and effected state, regional, and federal agencies operating in those states, ports in Southern California, and private firms and transportation associations.

The Colorado River Compact. Formed in 1922 to divide up state allocations of Colorado River water between the Upper Basin (Colorado, New Mexico Utah, and Wyoming) and Lower Basin (Arizona, California, and Nevada), the Colorado River Compact created a framework for managing the ever-evolving Law of the River.⁷⁵ With certain high-profile exceptions (e.g., *Arizona v. California* (1964)) notwithstanding, for most of its 100-year history the compact has managed conflict between the states and serves as an example of an institution for the successful governance of the commons.⁷⁶ As long as conflict is managed between the states, the Department of Interior exerts light regulatory control.

However, as the historical overallocation of the river’s water meets the reality of climate change and the continued aridification of the American West, the sustainability of the compact and the willingness of the federal government to allow the states to develop and implement their own solutions is being tested. In the spring of 2023, the Biden Administration announced investments to promote conservation and more efficient water use in the Colorado River Basin as well as reductions in water use of 13 percent by the three Lower Basin states. These reductions were subsequently reduced due to the better-than-expected 2023 snowpack. Current conditions on the river are facilitating new forms of cooperation at the megapolitan level to improve water management among Colorado River water users. Most notably, the SNWA is investing in a wastewater reuse project in Southern California to increase the amount of water available in Lake Mead.

Why Local Governance Structure Matters for Economic Development

Having reviewed the various governing entities in Southern Nevada, we present an evaluation of how the structure of local governance matters for economic development. Included here is an evaluation of the regional-based governing organizations in Denver, Phoenix, and Salt Lake City.

Much of the debate around regional economic development focuses on regional or metropolitan governance structures and the ability of those entities to compete for “basic” industries. These are economic sectors that

⁷⁵ The Law of the River is shorthand for subsequent agreements, treaties, court cases, and congressional acts that determine the policies governing the river. For example, a 1944 treaty guarantees Mexico 1.5-million-acre feet of Colorado River water annually. For an overview of the Law of the River and its impact on Nevada, see Harrison, *All the Water the Law Allows*.

⁷⁶ Elinor Ostrom, *Governing the Commons* (New York: Cambridge University Press, 1990).

generate regional wealth by exporting goods or services that are purchased outside the region. While automobiles and semiconductors are common examples, so are such things as brain surgery that brings patients into the region for treatment and professional sports stadiums that attract patrons from outside the region. In contrast, non-basic or local serving industries serve the people and workers already in the region such as drug stores, grocery stores, gyms and so forth. However, scale matters. For instance, within a region, competition for sales tax revenues may lead to competition for shopping centers if the winning community captures all new sales taxes while losing communities incur spillover costs.

The academic literature assessing the link between the structure of governance at the metropolitan level and economic development divides schools of thought into “polycentrists,” “centrists,” and “regionalists.”

Polycentrists posit that fragmented structures offer more service and tax/fee choices for residents and firms with diverse preferences, constrain the costs of local government because of competition, elevate overall government performance because of competition and experimentation by many units of governments at all levels, and increase the level of political representation and participation by individuals, including those from under-represented communities.

Centrists counter that consolidated structures are more desirable because they capture efficiencies in economies of scale and agglomeration of talent, internalize externalities, promote fiscal equity, facilitate more efficient coordination of land use and facility planning, and economize on the potentially costly concessions common to many well-publicized competitions for "marquee" firms.

A third school of thought advanced by regionalists focuses on the existence of regionwide mechanisms for collaborative decision making in targeted areas of mutual concern. Research in this vein suggests that as decision making becomes fragmented, growth in personal income declines but the presence of a regional multi-purpose government such as a council of governments (discussed below) has a positive effect on personal income growth, even when fragmentation exists. This is supportive of the expectations that individual welfare is enhanced through regional governance arrangements.

More generally, there are two competing threads with respect to governmental fragmentation and centralization or regionalism.⁷⁷ First, consistent with the Tiebout Hypothesis where households seek

⁷⁷ This review is drawn and updated from Arthur C. Nelson and Kathryn A. Foster, “Metropolitan Governance Structure and Income Growth,” *Journal of Urban Affairs* 21 (September 1999), pp. 309-324. For a pioneering perspective on the role of regional governance in advancing individual welfare, see James McAndrews and Richard Voith, “Can Regionalization of Local Public Services Increase a Region's Wealth?” *Journal of Regional Science* 33 (August 1993), pp. 279-302 (1993). Also see George W.

communities that cater to their tastes and preferences for the best value in terms of housing prices, taxes, and government services delivered, fragmentation is associated with population growth. Second, however, when it comes to economic development, firms tend to prefer locating where there are fewer local government decision-makers along with high capacity to meet their needs, especially infrastructure. These competing perspectives are often at work simultaneously and at cross-purposes.

On the surface, fragmentation should not be a major concern in Southern Nevada or the state. Analysis of the 2017 Census of Governments indicates that at just 1.2 general purpose governments and 5.2 special purpose governments per 100,000 residents, among the 50 states, Nevada has the fourth lowest ratios of governments to residents. To put this into perspective, compare the two megapolitan counties of Clark County in the Las Vegas Megapolitan Area and Salt Lake County in the Wasatch Range Megapolitan Area. With Clark County having 2.3 million and Salt Lake County having 1.2 million, Clark County has just six general purpose governments – one county and five cities, compared to 17 general purpose governments in Salt Lake County – one county and 16 cities.

But the lack of governmental fragmentation does not tell the whole story. Nevada typically has the lowest ratio of state and local public employees, which limits service provision. The limited number of governments and government employees coupled with limited home-rule and the absence of a regional council of governments may foment competition for the implementation of economy development priorities that may not be collectively beneficial.

Every city in the region and Clark County has its own economic development initiatives focused on advancing local interests. This can lead to competition for opportunities with firms playing one community against the other to negotiate the best agreement. The outcome can be one community gaining important benefits at the cost of others that incur such costs as local road congestion, increased housing demand, and spillover impacts on public safety, parks and recreation, and other services. No entity in the region or the state ensures that local economic development decisions advance not only local but regional interests in a way that minimizes adverse impacts among communities.

Hammond and Mehmet S. Tosun, “The Impact of Local Decentralization on Economic Growth: Evidence from U.S. Counties,” *Journal of Regional Science* 51 (November 2009), pp. 47–64; Christopher B. Goodman, “Political Fragmentation and Economic Growth in U.S. Metropolitan Areas,” *Journal of Urban Affairs* 43 (October 2021), pp. 1355-1376; and Jaewoo Cho, Jae Hong Kim, and Yonsu Kim, “Metropolitan governance structure and growth-inequality dynamics in the United States,” *Environment and Planning A: Economy and Space* 51 (May 2019), pp. 598-616.

Councils of Governments

Although Southern Nevada has a low ratio of governments to population and the LVGEA collaborates with all local governments, there are nonetheless economic development outcomes that create winners and losers among communities. This is more likely to occur in context where there is not an overlaying regional governance structure to coordinate activity and potentially referee disputes.

A solution to this tension and one that has been embraced by other Mountain West metros is the creation of a council of governments (COG). Also known as regional councils, COGs are associations of local governments, usually counties and cities. In many states, they are created by state legislatures as mandatory entities. Their governing bodies are usually comprised of representatives from each of the member general purpose local governments (usually counties, cities, and towns depending on the state definitions), with each having one vote. The result is that smaller, suburban, and exurban jurisdictions can outvote larger cities and urban jurisdictions. While COGs coordinate the activities of local governments, they have few powers over local government and have no direct taxation authority.

Metropolitan Planning Organizations such as the RTC of Southern Nevada that are created by the U.S. Department of Transportation to be a conduit of federal funds to targeted metropolitan regions are often subsumed within COGs. One chief advantage of this structure is that MPOs are provided with planning funds that COGs can use to coordinate regional transportation, land use, public facilities, housing, economic development, and human service activities among jurisdictions.

To provide an overview of how COGs operate, we consider the COGs operating in Denver, Phoenix, and Salt Lake City. We summarize their geographic and governance features, revenue sources, and then highlight their roles in economic development efforts. Note that all three of these COGs contain their regional MPOs and consequently, much of their funding is from federal sources.

The Denver Regional Council of Government

The Denver Regional Council of Government (DRCOG), established in 1955, serves a region that is comprised of nine counties (including city-county forms of government) and 49 cities. Its 2022 population of 3.2 million is 14 percent greater than its 2010 population of 2.8 million. Its governing board is comprised of one representative from each of the general-purpose local governments in the region for a total of 58. Each government has one vote meaning that smaller, suburban and exurban jurisdictions can outnumber large

urban ones.⁷⁸ The extent to which this is a concern is not reviewed here. In fiscal year 2023, DRCOG had funding of nearly \$34.8 million with the bulk of its funding from federal sources (67 percent), state grants (17 percent), member dues (5.8 percent), and local funds (5.6 percent).⁷⁹ Within the federal tranche, revenues are split between transit and traffic administration and programming and the Area Agency on Aging.⁸⁰

The Maricopa Association of Governments

Founded in 1967, the Maricopa Association of Governments (MAG) serves the greater Phoenix metropolitan area that is comprised of all of Maricopa County and urbanized Pinal County. Its 2022 population of 4.7 million is 24 greater than its 2010 population of 3.8 million. In total, MAG is comprised of two counties, 27 cities and towns, and three Indian nations. All have representatives serving on the governing board with equal votes. We do not explore the extent to which this creates tensions in resource allocation. For fiscal year 2024, MAG budgeted revenue of more than \$46 million. Like DRCOG, the primary funding sources are federal (71 percent), followed by state sources (24 percent).⁸¹ Most of the federally funding that MAG receives support highway and transit projects and include both formula-based and discretionary funds.⁸²

The Wasatch Front Regional Council

The Wasatch Front Regional Council (WFRC) was originally established in 1969 and now serves the Salt Lake City and Ogden metropolitan areas comprised of Davis, Morgan, Salt Lake, Tooele and Weber counties. Its MPO serves not only the narrow area along the Wasatch Front but extends north into Brigham City in Box Elder County. It grew by about 20 percent between 2010 and 2021, from 1.64 million to 1.97 million residents. The WFRC has the most proportional voting scheme of the COGs surveyed. Its 21 voting members are comprised of one vote each from Box Elder, Morgan, and Tooele counties, four each from Davis and Weber counties, and eight from Salt Lake County. Each of the counties decide for themselves who represents them at WFRC. For fiscal year 2023, WFRC operated with revenue of just over \$13 million. Federal sources accounted for 55 percent of its budget, followed by state (24 percent) and local sources,

⁷⁸ For a review of the issue and consequences, see Arthur C., Nelson, Thomas W. Sanchez, James F. Wolf and Mary Beth Farquhar, "Metropolitan Planning Organization Voting Structure and Transit Investment Bias," *Transportation Research Record*, 1895 (January 2004), pp.1-14.

⁷⁹ Denver Regional Council of Governments, "2022/2023 Budget and Work Program," May 2022, <https://drcog.org/sites/default/files/resources/EO-RP-20222023WORKANDBUDGET-22-06-03.pdf>.

⁸⁰ Ibid.

⁸¹ Maricopa Association of Governments, "MAG Agency Overview," June 2023, https://azmag.gov/Portals/0/Documents/MagContent/MAG_Info-Book.pdf.

⁸² Ibid.

including dues from member organizations (21 percent).⁸³ While federal resources appropriated to the WFRC primarily support transportation and transit initiatives, the WFRC also receives funding from the Department of Housing and Urban Development and the Economic Development Administration.⁸⁴

Role in Economic Development

Although all COGs support economic development efforts, none can raise or spend money for economic development, acquire or condemn property for any public purpose including economic development, or generate revenues through taxes. Their influence is mostly in planning, including steering infrastructure investments of other governmental entities to target areas, negotiating changes in land use plans and regulations of counties, cities, and towns (and Indian nations in the case of MAG), and informal brokering to bring investors, lenders, developers, and local and state agencies together.

In Phoenix, MAG, for instance, has an Economic Development Committee that aims to leverage transportation investments into economic development opportunities. It consists of 36 members of whom 20 are MAG member elected officials plus one representative from the Arizona Department of Transportation appointed by the MAG Regional Council. The Economic Development Committee also includes 15 business representatives.⁸⁵ In contrast, DRCOG has no formal economic development entity but wraps related efforts into regional transportation planning and investment.⁸⁶

The WFRC probably has the most comprehensive suite of economic development efforts. It is a formally constituted Wasatch Front Economic Development District (WFEDD) that is conterminous with the WFRC boundaries and is managed by it. The WFEDD received federal designation as an economic development district able to access federal economic development funds.

The WFEDD's overarching mission is to "support economic development plans, promote long-term economic competitiveness, and attract federal monies in order to implement local plans."⁸⁷ Its four objectives

⁸³ Wasatch Front Regional Council, "FY24 WFRC Goals, Budget, and Unified Planning Work Program," May 2023, https://wfr.org/Committees/Budget/2023/03_May11/Item6a_WFRCBudgetComm.pdf.

⁸⁴ Ibid.

⁸⁵ Maricopa Association of Governments, "Economic Development Committee," 2023 (<https://azmag.gov/Committees/Policy-Committees/Economic-Development-Committee>).

⁸⁶ Denver Regional Council of Governments, "Committees and Working Groups," 2023 (<https://drcog.org/about-drcog/committees-and-working-groups>).

⁸⁷ Wasatch Front Regional Council, "Wasatch Front Economic Development District," 2023 (<https://wfr.org/programs/wasatch-front-economic-development-district/>).

are: linking development with transportation and other infrastructure; creating fiscally sustainable places; providing amenities to attract skilled labor; and attracting and retaining businesses and encouraging innovation.⁸⁸

The WFEDD frames these objectives around the broader *Wasatch Choice 2050* regional vision plan.⁸⁹ A key advantage of the WFEDD is its ability to engage formally with the Utah Governor’s Office of Economic Opportunity and the private, non-profit Economic Development Corporation of Utah. These entities bring transportation planning and finance, state and local business incentives, marketing, and related economic development efforts to the same table. This triumvirate model of economic development may be a model for other regions.

In 2017, Utah’s Inland Port Authority was added to the economic development governance mix. The statewide entity, reviewed below, pursues targeted economic development interventions.

Inland Ports

In Nevada, as in most if not all states, regional transportation agencies or regional councils of government do not have state or federal authority to engage specifically in economic or industrial development even though their activities may advance those objectives. Many successful efforts are led by port authorities or industrial development authorities operating locally or regionally, though often with state enablement. While our focus is on inland ports, particularly the Utah Inland Port Authority, for context and reference, Appendix E provides background information about seaports and inland ports, including summaries of the governance and funding of the main seaports operating on the West Coast.

Assembly Bill 182 passed during the 2011 legislative session established a framework for the approval and creation of inland ports in Nevada (NRS 277B).⁹⁰ In response to this legislation, the viability of an inland

⁸⁸ Ibid.

⁸⁹ Wasatch Front Regional Council, “Wasatch Choice Vision,” 2023 (<https://wfrc.org/wasatch-choice-regional-vision-wcrv/>).

⁹⁰ The legislation requires a county or counties and incorporated city or cities to apply for approval from the Office of Economic Development (the predecessor to GOED) to establish an inland port within the applying entity or entities boundaries provided that the proposed port does not include residential property and is a contiguous area that contains at least two of the following: a publicly owned airport with a runway that is at least 4,500 feet long; a portion of an interstate highway (i.e., I-11, I-15, or I-80); or the operating assets of a Class I railroad. If approved, port governance is vested in a board of directors with an odd number of members appointed by the participating municipal entities. The board of directors has the authority to enter into agreements with private entities; establish a compensation schedule for the use of facilities owned, constructed, operated, or maintained by the port authority; and accept the conveyance of land from a county, city, or other governmental entity.

port in Southern Nevada was studied by RCG Economics on behalf of GOED.⁹¹ A main conclusion of the analysis was that “an inland port in Nevada was not viable in the near- and intermediate terms.”⁹² Among the reasons was that the ports of Los Angeles and Long Beach had and were planned to have sufficient capacity to meet future demand. However, as seen in the recent past, those ports were unable to manage demand. Although delayed docking has been eliminated,⁹³ container volume is expected to grow from 20 million in 2022 to 34 million in 2030 even in the face of competition from ports in the Gulf of Mexico and along the eastern seaboard.⁹⁴

Another reason, based on a study prepared for Austin, Texas, is that an inland port requires a population base of three million to justify its support by public entities.⁹⁵ In 2012, metropolitan Las Vegas had about half this population. Now, in the early 2020s, it is clear that the metropolitan area will have more than three million persons by the early 2040s.⁹⁶

In short, economic forces maybe be aligning to make inland ports in Southern Nevada feasible. From a governance perspective, we consider the inland port initiative in Utah that to date has supported installations in Salt Lake and Iron counties.

Utah Inland Port Authority

Based on studies issued in 2016⁹⁷ and 2017,⁹⁸ the Utah State Legislature created the Utah Inland Port Authority (UIPA) in 2018. Its jurisdiction is the entire state. The UIPA’s “overarching goal is to create generational regional economic growth by concentrating on regional economic empowerment and creating solutions to connect domestic and global marketplaces.”⁹⁹ The UIPA is governed by a Board of Directors

⁹¹ RCG Economics, “Nevada Inland Ports Viability & Funding Study,” September 2012, <https://rcgecon.com/wp-content/uploads/2013/05/Final-Nevada-Inland-Port-Report2.pdf>.

⁹² Ibid, pg. 3:2.

⁹³ Greg Miller, “Coast is (almost) clear as port congestions fades even further,” *Freight Waves*, January 6, 2023, www.freightwaves.com/news/coast-is-almost-clear-as-port-congestion-fades-even-further.

⁹⁴ Mohave Inland Port, “The Need,” 2023 (www.mojaveinlandport.com/03-the-need).

⁹⁵ See RCG Economics, “Nevada Inland Ports Viability & Funding Study.”

⁹⁶ See Center for Business and Economic Research, “2022-2060 Population Forecasts: Long-Term Projections for Clark County, Nevada.”

⁹⁷ Natalie Gochnour, “Salt Lake Inland Port Market Assessment Research Brief,” Kim C. Gardner Policy Institute, August 2016, <https://gardner.utah.edu/wp-content/uploads/2016/10/IP-Brief-FINAL.pdf>.

⁹⁸ Cambridge Systematics and GLD Partners, *Utah Inland Port - Feasibility Analysis*, World Trade Center - Utah & Utah Governor’s Office of Economic Development, December 2017, <https://inlandportauthority.utah.gov/wp-content/uploads/UIP-Feasibility-Analysis.pdf>.

⁹⁹ Utah Inland Port Authority, “About,” 2023, (<https://inlandportauthority.utah.gov/about-the-utah-inland-port-authority/>).

comprised of five voting members and three non-voting members from governmental entities and industry. Two board members are appointed by the Utah Governor with one each appointed by the Utah House of Representatives and the Utah Senate, and one member appointed jointly by the legislature.¹⁰⁰

The UIPA is statewide in scope and currently has two geographic emphases. The first is creating an inland port of about 16,000 acres of land – 25 square miles – in the northwest area of Salt Lake City and Salt Lake County. The second is a local option for cities and counties anywhere in the state with Cedar City, Utah, in Iron County being the first. The Salt Lake inland port is reviewed first.

Studies show that up to 60,000 direct jobs may be created in the Salt Lake inland port.¹⁰¹ Assuming a low-end multiplier of 2.5 for industrial sectors,¹⁰² a total of 150,000 jobs maybe be associated with this location, adding about 50,000 households to the region along with their associated demand for services.

The UIPA has expansive authority to plan, finance, and maintain improvements to facilitate development of these 16,000 acres. Because most of the port area is privately owned, its authority includes the ability to capture the incremental property taxes generated from new development for at least 25 years and up to 40 years depending on factors determined by the governing board.

A key area of contention is that the UIPA effectively requisitioned 75 percent of the base property tax revenue generated from the Salt Lake City port area. For fiscal year 2022, this amounted to \$6 million.¹⁰³ These are funds that no longer flow to affected local governments. The funds are used to pay for staff and operations. They are also used to retire debt, make improvements, and recruit businesses. Over time as development occurs, 25 percent of the increment in property taxes will flow back to affected local governments along with half off the incremental sales tax revenues. In addition, the port will allocate 10 percent of those revenues for local affordable housing.

The UIPA has not been without controversy in at least four respects: although technically state law preserves local land-use planning, the UIPA is allowed to create its own plan and require the city to permit development

¹⁰⁰ Ibid.

¹⁰¹ Taylor Stevens, “Utah Inland Port Authority releases long awaited business plan,” *Salt Lake Tribune*, May 21, 2020, www.sltrib.com/news/politics/2020/05/21/utah-inland-port/.

¹⁰² Josh Bivens, “Updated employment multipliers for the U.S. economy,” Economic Policy Institute, January 2019, <https://files.epi.org/pdf/160282.pdf>.

¹⁰³ Utah Inland Port Authority, “Fiscal Year 2022 - Budget Narrative,” <https://inlandportauthority.utah.gov/wp-content/uploads/UIPA-FY-2022-Amended-Budget.pdf>.

consistent with it;¹⁰⁴ the financing scheme deprives Salt Lake City, Salt Lake County, and several special districts – including school districts – of the new revenue they need to support the infrastructure impacts of jobs that are anticipated to be generated from the inland port; increased road congestion due to increased truck traffic that is likely to extend well beyond the port’s boundaries;¹⁰⁵ and increased air pollution in a region that has difficulty complying with ambient air quality standards.¹⁰⁶

In addition, the basic assumptions of the UIPA have been challenged. The UP-Salt Lake City Intermodal Terminal receives freight from the west (Ports of Oakland, Long Beach, and Los Angeles) and the east (Chicago, Kansas City, and St. Louis connecting to the Gulf Coast). The offloading and breaking down of transloaded containers into truck size loads (three containers fit into two standard truck loads) to be hauled throughout the intermountain west may not be economically efficient.¹⁰⁷

On the other hand, the inland port is more than a platform for shipping as it includes various forms of industrial activity, research and development, and related economic efforts. Ports around the world include industrial parks where raw materials are off-loaded from ships and then processed or manufactured into goods and shipped out of the same port. Many ports include hotels, shopping, and even residential areas. In other words, the lines between traditional ports and other kinds of land uses are becoming increasingly blurred.¹⁰⁸

This may be especially so with next generation inland ports with the UIPA at the forefront. By design, the 25 square mile Salt Lake inland port will be more than just where trains offload containers that are then unloaded onto trucks for shipping; it will be a vast system of warehouses as well as processing and manufacturing plants. It will include conventional office buildings, business service operations, hotels, and many other land uses. It will even have parks and recreation facilities. Although it may not provide onsite residential opportunities, one could imagine these would be provided in the future given that 10 percent of the incremental property taxes the UIPA receives are dedicated to affordable housing.

¹⁰⁴ Fred Ash, “Opinion: You’ve heard about Utah’s inland port—here’s the history behind the opposition,” *Deseret News*, October 6, 2022, www.deseret.com/opinion/2022/10/6/23388044/opinion-utah-inland-port-history-public-opposition.

¹⁰⁵ Ibid.

¹⁰⁶ Ibid.

¹⁰⁷ Malin Moench, “Opinion: The fatal flaw in Utah’s Inland Port idea,” *Deseret News*, October 4, 2002, www.deseret.com/opinion/2022/10/4/23380765/opinion-transloading-problem-utah-inland-port.

¹⁰⁸ For instance, the Port of Portland includes several business parks whose tenants do not necessarily serve shipping clients.

For purposes of this report, it is the second part of the UIPA's geographic reach that is more germane to Southern Nevada through the installation in Iron County. The Iron Springs Project Area¹⁰⁹ northwest of Cedar City, Utah, includes about 820 acres. It is part of the privately operated 899-acre Commerce Crossroads Logistics Park. At build out, it is projected to have 41-buildings and eight million-square-foot of office and industrial space. Over the next 25 years, the inland port is expected to add 4,000 to 6,000 jobs to the local economy. For comparison, in December 2022, Iron County had about 25,000 jobs.

Through its tax increment finance (TIF) authority, the UIPA expects the project to generate about \$130 million in additional local property taxes over 25 years. On this, 25 percent goes to the local taxing authorities while 75 percent goes to the inland port district. Of the 75 percent retained, 10 percent is dedicated to local affordable housing while another five percent supports UIPA administrative costs. The balance is available for use by the Commerce Crossroads Logistics Park to help finance infrastructure and recruit businesses. After 25 years, all the property tax flows to local governments including Cedar City, Iron County, the local school district, and other special districts with jurisdictions that include the inland port. Projects locating in the port would not be offered incentives if they use more than 200,000 gallons of potable water per day.

We also note that while Nevada does not have a governance entity and financing structure akin to the UIPA, it is in the process of developing an inland port in Lyon County near Fernley. Backed by a \$25 million grant from the U.S. Department of Transportation to support planning, environmental analysis, and design and construction, the project proposes to connect I-80 and U.S.-50 and improve capacity for accessing the UP and BNSF rail lines to accommodate logistics and supply chains that move through the northern end of the state.

Summary

Part 3 detailed Southern Nevada's governing structures at the local, regional, state, and megapolitan levels. Also considered were COGs, a form of government that the region does not have but that exists in neighboring Mountain West metros to coordinate and implement regional initiatives. Part 3 also examined how inland ports are being used in neighboring Utah to target economic development. In Part 5 we return to these points in our recommendations.

¹⁰⁹ Utah Inland Port Authority, "Iron Spring Inland Project Area Plan," April 2023, <https://inlandportauthority.utah.gov/wp-content/uploads/Iron-Springs-Project-Area-Plan-FINAL.pdf>.

Part 4: Transportation Infrastructure to Improve Connectivity

Part 4 provides an overview of current and future transportation capacity that inform the infrastructure recommendations presented in Part 5. Specifically, we evaluate the current, planned, and missing transportation linkages serving the region, provide estimates of future traffic and congestion levels under different scenarios, assess the investments needs to enhance existing highway infrastructure, provide estimates of future pollution resulting from expected highway traffic growth, and the electricity requirements for charging electric semi-trucks using I-15. Also considered are “known unknowns” that may alter future transportation patterns and infrastructure needs. To streamline the presentation, Appendices F, G, H, and I summarize the technical analysis that underlie the discussion presented in Part 4.

Overview

Due to Southern Nevada’s narrow export economy, limited manufacturing capacity, and geographic proximity to Southern California, the region is both a consummative market and a pass-through zone. These considerations have important implications for the region’s transportation infrastructure.

Southern Nevada’s economy is dependent upon the movement of people and goods into and out of the region by car and truck. Despite the presence of a UP rail line paralleling I-15 and proximity to the ports in Southern California, the region’s demand for mixed freight is inconsistent with the economies of rail that value moving heavy commodities over long distances. While Las Vegas was established in the early 1900s to service rail traffic, today most rail service passes through the region to serve commerce outside of the state.¹¹⁰

The lack of rail activity, coupled with the dearth of alternative ground options for the east-west movement of goods and people, means that the region is overly dependent on I-15. This dependency, in turn, means that the regional economy is highly vulnerable to disruptions and shutdowns of I-15. Moreover, because much of the I-15 truck traffic passes through the region, Southern Nevada absorbs the costs (e.g., increased pollution, traffic, and road deterioration) but receives little benefit from these exchanges. Traffic on I-15 that is intensified by delays at the California-Nevada state line undermine the efficiency of the regional economy.¹¹¹

¹¹⁰ Nevada Department of Transportation, *Nevada State Rail Plan*, February 2021, www.dot.nv.gov/mobility/rail-planning/state-rail-plan.

¹¹¹ To help alleviate traffic at the state line, in 2022 California repaved and restriped the southbound shoulder as a part-time third lane that is used during peak congestion times.

At the megapolitan level, ground-based transportation connections in the Southwest Triangle Megapolitan Cluster are underdeveloped relative to its urban scale. A single interstate that in many sections remains just two lanes in each direction connects Las Vegas to Los Angeles. Until Arizona completes its share of I-11, Las Vegas and Phoenix will remain the two largest proximate metropolitan areas in the U.S. not connected by an interstate.

Contrast this condition with the Texas Triangle Megapolitan Cluster. All three corners of the triangle – Dallas-Fort Worth, Houston, and San Antonio – are linked by interstates that in many sections exceed four lanes in each direction. This is also true of the Piedmont Megapolitan Cluster anchored by the I-85 corridor running from Raleigh, North Carolina, to Charlotte, North Carolina, to Atlanta where sections of the road are six and eight lanes wide.

Certainly, Harry Reid International Airport, with more than 70 inbound commercial flights a day from Southern California airports, alleviates some of the demand. However, this activity is largely limited to passenger travel, which is rapidly moving towards capacity. Data from the Federal Aviation Administration for 2021 ranks the airport 8th in passenger deplanements nationally,¹¹² but 72nd in cargo landed weight.¹¹³ By comparison, the Reno/Tahoe International Airport in northern Nevada ranks 49th in cargo landed weight and handles nearly 50 percent more cargo weight than does Reid International. The limited movement of cargo into the region via airlinks, in turn, adds to the dependency on I-15 for the transportation of goods.

In the next section, we provide a summary of existing and planned transportation infrastructure before presenting our analysis of future traffic congestion, highway expansion needs and costs, emissions, and electricity generation need to service an electrified I-15.

Summary of Existing and Planned Transportation Infrastructure

Road, rail, and air infrastructure are the lifeblood of Southern Nevada’s economy. Highways, rail, and air transportation linkages assist in moving goods and tourists in and out of the Las Vegas Valley and throughout

¹¹² Federal Aviation Administration, “CY 2021 Commercial Service Airports, Rank Order,” September 2022, <https://www.faa.gov/sites/faa.gov/files/2022-09/cy21-commercial-service-enplanements.pdf>.

¹¹³ Federal Aviation Administration, “Calendar Year 2021 All-Cargo Landed Weight,” August 2022, www.faa.gov/sites/faa.gov/files/2022-08/cy21-cargo-airports_0.pdf.

the Southwest Triangle. Specific to freight, truck transportation is the least expensive and most accessible way to transport goods; 97 percent of the freight movement in and out of Las Vegas is conveyed on I-15 and I-11.¹¹⁴ Las Vegas does have access to rail transportation for freight movement. However, the single lane UP rail line that runs from Southern California through Las Vegas and on to Salt Lake City is underutilized for the movement of goods into Southern Nevada. In 2020, only about three percent of the freight arriving and originating from Nevada was via rail transportation.¹¹⁶

Southern Nevada's air transportation system is efficient for the movement of people. Harry Reid International Airport is one of the busiest airports in the country, but because the airport will soon reach capacity, the SNSA is being developed in the Ivanpah Valley north of Primm. The prioritization of passengers minimizes the airport's role in freight movement to and from Southern Nevada. Consequently, air transportation is not a reliable mode of transportation for moving freight.

There several projects overseen by NDOT that are under way to increase the capacity on I-15. The I-15 North project widening the interstate from four to six lanes from Speedway Boulevard to the recently upgraded Garnet Interchange north of Apex is scheduled to be completed in 2024. The I-15 South project to widen and improve I-15 from Sloan Road to Warm Springs Road is under construction and scheduled to be completed in 2025. North of Las Vegas, NDOT is planning to construct a dedicated truck climbing lane south of Glendale, Nevada. In addition, NDOT is beginning work on the I-15 Sloan to Stateline Feasibility Study to evaluate the impact that economic development in the South County area will have on future land use and traffic demands. The study will consider the need and location for over ramps to accommodate the Brightline West high-speed rail project, access points to accommodate increased semi-truck traffic for logistics and warehousing being developed at Jean, and transportation infrastructure to facilitate the development and efficient use of the SNSA north of Primm.

Through the I-15 Mobility Alliance (see Part 3), NDOT works with state transportation agencies in Arizona, California, and Utah and more than 95 public and private sector partners to identify projects along the I-15 corridor that have a significant interregional impact on the movement of people and goods. To date, the alliance has completed 23 projects including the I-15/Primm interchange in Nevada to the California

¹¹⁴ Bureau of Transportation Statistics, "Freight Analysis Framework," 2023 (www.bts.gov/faf).

¹¹⁵ About 22.7 miles of I-11 has been completed from Las Vegas to the Hoover Dam area. The Arizona portion of I-11 is under development and will run from Nogales, Arizona, at the U.S.-Mexico border through Phoenix to the Arizona-Nevada border following the current routes of I-19, I-10, U.S.-93. The current routing of I-11 north of Las Vegas is U.S.-95 terminating at I-80 east of Reno (although see Part 5).

¹¹⁶ Bureau of Transportation Statistics, "Freight Analysis Framework."

Agriculture Station (about seven miles) and the I-15 Dynamic Mobility Project that centralizes and disseminates real-time data to I-15 travelers.¹¹⁷ The alliance also completed the I-15 Alternate Route Study that identified U.S.-95 and U.S.-93 as alternate routes to connect Salt Lake City, Las Vegas, and San Diego.

In 2021, NDOT, working with several partners including GOED, updated the state's rail plan. The plan highlights the economic benefits of an efficient freight and passenger rail transportation system and develops a strategic framework for increasing the role of rail to augment ground transportation. Some of the plan's recommendations are to expand Nevada's freight rail service to and from California and points east, initiate and expand new intermodal services, and establish partnerships with the UP and BNSF railroads.

The private, high-speed rail company Brightline West has initiated a passenger high-speed rail project to connect Rancho Cucamonga, California, to Las Vegas (approximately 218 miles). The electrified track will run along the I-15 median. Riders will be able access the train in Rancho Cucamonga from the Southern California Metrolink, a regional rail system that serves parts of Los Angeles, Orange, Riverside, San Bernadino, San Diego, and Ventura counties. In late 2023, the Biden Administration awarded \$3 billion in federal funding to support construction of the line.¹¹⁸ In early 2024, the U.S. Department of Transportation approved the issuance of \$2.5 billion in tax-exempt private activity bonds in addition to a \$1 billion previously approved private activity bond allocation.¹¹⁹ The company previously received a \$25 million federal grant to build stations in Hesperia and Apple Valley, California. In July the Federal Railroad Administration approved the project's first phase from Rancho Cucamonga to Victor Valley, California. With a planned completion date of 2028 ahead of the Los Angeles Summer Olympics, the company reports that 20 percent of passenger traffic on the I-15 corridor between Southern California and Southern Nevada will be supplanted.

Harry Reid International Airport will soon reach its maximum annual capacity of 63 to 65 million passengers. To accommodate additional passenger travel, the Clark County Department of Aviation is moving forward with the SNSA in the Ivanpah Valley. As a prime tourist destination, air transportation in and out of Southern

¹¹⁷ I-15 Mobility Alliance, "I-15 Corridor System Master Plan Update 2017," April 2017, https://i15alliance.org/Documents/I-15_FactSheet_2017-04_CSMP_Update.pdf.

¹¹⁸ Ken Ritter and Adam Beam, "Biden administration pledges \$6 billion to a pair of high-speed electric rail routes in the US West," Associated Press, December 6, 2023, <https://apnews.com/article/bullet-train-vegas-los-angeles-brightline-funding-8ee203c4acc17a1f320f534418532725>.

¹¹⁹ U.S. Department of Transportation, "U.S. Department of Transportation Approves \$2.5 Billion In Private Activity Bonds Allocation for Brightline West Project," Press Release, January 23, 2024, www.transportation.gov/briefing-room/us-department-transportation-approves-25-billion-private-activity-bonds-allocation.

Nevada focuses on moving passengers rather than cargo. According to Freight Analysis Framework data, less than one percent of goods were transported to and from Southern Nevada via air transportation in 2020.¹²⁰

Estimates of Future Traffic and Congestion

As is detailed in Appendix F, traffic count data available from NDOT are used to develop estimates of future traffic and levels of service (LOS) (as a proxy for congestion) at Primm (I-15 South County) and Apex (I-15 North County) and at Hoover Dam at the Nevada origin point of I-11. Regression equations were developed using the annual average daily traffic (AADT)¹²¹ to estimate these values for the years 2023, 2030, 2040, and 2050 at these three locations under three scenarios: normal traffic growth; changes in traffic growth in the South County section of I-15 due to the completion of the Brightline West high-speed rail; and changes to traffic growth on I-15 due to the completion of the Brightline West high-speed rail and the UP doubling its rail capacity. The LOS estimates are presented as qualitative lettered tiers ranging from A (least amount of congestion) to F (most amount of congestion). For technical details, see Appendix F.

Expected Normal Traffic Growth and Congestion Levels in the I-15 Corridor and I-11 Highways

Based on 10 years of traffic data collected by NDOT at Primm (I-15 in South County), we predict that the AADT in this section of I-15 will be 48,000 (2023) 52,500 (2030), 58,900 (2040), and 65,300 (2050). For this section of I-15 the estimated LOS is C in 2023, 2030 and 2040. However, the LOS in this location is expected to be D in 2050. Generally, an LOS below C is unacceptable. Based on this estimate, the South County section of I-15 South will need to be expanded (one lane in each direction) by 2050 to carry the traffic with an acceptable congestion level. After lane expansion, the LOS in this section of I-15 in 2050 will be C.

We conducted a similar analysis for Apex (I-15 in North County) and the results suggest that the AADT in this section will be 34,300 (2023), 40,500 (2030), 49,500 (2040); and 58,400 (2050). The LOS at this location will be B, B, C, and D in 2023, 2030, 2040, and 2050, respectively. It is estimated that the I-15 North County at the Apex area needs to be expanded (one lane in each direction) by 2050. After the expansion in 2050, the LOS in I-15 North County will be C, which is acceptable.

¹²⁰ Bureau of Transportation Statistics, "Freight Analysis Framework."

¹²¹ Note that because these data are annualized averages, they do not facilitate within year estimates to account for peak demand on weekends and holidays.

The traffic prediction analysis at Hoover Dam along the I-11 shows that the traffic will be 22,300 (2023), 29,300 (2030), 39,100 (2040), and 49,000 (2050). The congestion level at this location will be estimated to be A, A, B, B in 2023, 2030, 2040, 2050, respectively. This estimate shows that the I-11 will be able to handle traffic until 2050 with an acceptable LOS (although see below).

The Impact of High-Speed Rail on I-15 South County Traffic

We assume that Brightline West high-speed rail will begin operating in 2028, which, according to estimates offered by the company, will result in a 20 percent reduction in passenger traffic along I-15 in South County. We estimate that the AADT around the Primm area will be 43,700, 49,100, and 54,400, and the LOS will be B, C, and C in 2030, 2040, and 2050, respectively. Under this scenario, the I-15 South County section will be able to deliver an acceptable LOS until at least 2050.

The Impact of High-Speed Rail and Increased Rail Capacity on I-15 Corridor Traffic

Assuming Brightline West high-speed rail begins operations in 2028 and the UP doubles its capacity of transportation goods through Southern Nevada, South County passenger and truck traffic on I-15 traffic will be reduced. We predict that the AADT at this location will be 43,200, 48,600, and 53,900 in 2030, 2040, and 2050, respectively. However, the reduction in the number of trucks is so small that it will have minimal impact on the congestion level at Primm in 2030, 2040, and 2050. If the UP were to double its capacity, then some truck traffic will be alleviated on the I-15 in the North County. However, the reduction in trucks on this section of I-15 is so small that it will not improve the congestion level around Apex in 2030, 2040, and 2050.

Investments Needed to Enhance Existing Highway Infrastructure

The analysis presented in the prior section suggests the need for future expansion of the South and North County sections of I-15 to maintain an acceptable LOS in the face of increased traffic. The analysis also suggests that the Nevada section of I-11 should be able to accommodate predicted traffic flows until 2050 (although see below). Thus, we only consider the costs of expanding the South and North County sections of the I-15 corridor. We do not consider the cost of railroad expansion since the UP is privately owned.

The estimated cost of the I-15 expansion lacks precision because information about the highway design is unknown. Absent this information, we calculated the expansion cost per lane mile based on the assumptions outlined in Appendix G for 2030, 2040, and 2050 based upon the average rate of inflation for the Nevada section of the I-15 corridor under the three scenarios modelled above: normal traffic growth; changes in traffic

due to the completion of the Brightline West high-speed rail; and changes to traffic growth due to the completion of the Brightline West high-speed rail and the UP doubling its rail capacity

Highway Investments Needed due to Normal Traffic Growth

From the congestion level prediction presented above and that are detailed in Appendix E, under the normal traffic growth scenario, the I-15 South County section will need to be expanded by one lane on each side. Once this section of highway is expanded, it should be able to accommodate traffic growth until 2050 with an acceptable LOS. As the length of the I-15 from Sloan to Primm is about 25.3 miles, the cost to expand this section of road in 2030 will be about \$232 million (2050 base cost). Appendix G presents the cost calculation.

The congestion analysis shows that the I-15 North County section will need to be expanded by 2050. Since the I-15 passes through Arizona before connecting to Utah, we have calculated the cost of I-15 North County expansion to the Arizona border. The total length of the I-15 North County from Nellis Air Force Base to the Arizona-Nevada border is about 65 miles. We consider Nellis as the starting point and Mesquite as the ending point of the I-15 North County section. The total cost of two-lane highway expansion (one lane on each side) in 2050 will be about \$595 million (2050 base cost). The cost calculation is shown in Appendix G.

The Impact of High-Speed Rail on Highway Investments

As shown in the previous section, if Brightline West high-speed rail begins service in 2028, then there will be a reduction in passenger vehicles on the I-15 South County corridor, which will delay the need to expand that section of I-15 until 2050. The Brightline West high-speed rail will not affect traffic in either the I-15 North County section or the Nevada section of the I-11.

The Impact of High-Speed Rail and Increased Rail Capacity on Highway Investments

The analysis presented above suggests that if the UP doubles its capacity by 2030, then it will not significantly reduce the traffic on the I-15. The investment cost of the infrastructure will be unchanged under this scenario.

Estimates of Future Pollution due to Expected Highway Traffic Growth

Increased traffic on the I-15 and the I-11 will generate additional pollution. To estimate these increases for the years 2023, 2030, 2040, and 2050, we use emissions data collected by the U.S. Environmental Protection

Agency and Bureau of Transportation Statistics within the U.S. Department of Transportation¹²² Based on the traffic data estimates presented above, we determined the emissions levels for the total miles traveled by the cars and trucks in Nevada along these highways under the same three scenarios used previously as well as a scenario in which California, Nevada, and Utah build electric semi-truck lanes along the I-15 corridor. Appendix H provides an overview of the assumptions and techniques used in these estimations.

Future Pollution due to Normal Highway Traffic Growth

Annual emissions in Nevada due to normal traffic growth along the I-15 and I-11 in 2023, 2030, 2040, and 2050 are roughly 611, 712, 856, and 1,004 thousand tons, respectively. The pollution level will increase by about 17 percent, 41 percent, and 64 percent in 2030, 2040, and 2050, respectively, compared to 2023.

The Impact of High-Speed Rail on Future Pollution

If the Brightline high-speed rail begins operating in 2028, then the annual emissions will decrease due to fewer passenger vehicles on the I-15 South County section. Still, due to traffic growth, the annual emissions will increase by about 10 percent, 34 percent, and 57 percent in 2030, 2040, and 2050, respectively, compared to 2023 and annual emissions will decrease by 38, 43, and 49 thousand tons, respectively, in 2030, 2040, and 2050, compared to annual emissions without the operation of the Brightline West high-speed rail.

The Impact of High-Speed Rail and Increased Rail Capacity on Future Pollution

If Brightline West high-speed rail begins service in 2028 and the UP doubles its capacity, then there will be fewer cars and trucks using the I-15 corridor in Nevada, which will reduce annual emissions. The analysis shows that under this scenario, emissions in Nevada will be reduced by 48, 51, and 55 tons in 2030, 2040, and 2050, respectively, compared to our base scenario.

The Impact of High-Speed Rail, Increased Rail Capacity, and Electric Semi-Truck Lanes on Future Pollution

The last scenario estimates emissions in Nevada if Brightline West high-speed rail begins service in 2028, the UP doubles its capacity, and California, Nevada, and Utah build electric semi-truck lanes in the I-15 corridor. Because trucks are the main source of highway emissions, this would reduce the emissions significantly. The analysis predicts that if the electric semi-truck lanes are added and all the gasoline or diesel trucks are replaced,

¹²² Bureau of Transportation Statistics, "Estimated U.S. Average Emissions Rates," 2023 (www.bts.gov/).

annual emissions will decrease in Nevada by about 200, 232, and 269 thousand tons in 2030, 2040, and 2050, respectively, compared to 2023 baseline.

Estimates of Electricity Requirements for Charging Electric Semi-Trucks

We have also estimated the amount of electricity required every year if all the trucks using the I-15 corridor are replaced by electric semi-trucks.¹²³ The electricity requirement is calculated based on the annual truck mileage travelled in the Nevada sections of I-15 and I-11. These estimates of electricity requirements to charge the electric semi-trucks are presented in Appendix I. The results show that the total electricity required to charge electric trucks every year will be about 2.21, 2.63, and 3.04 gigawatt hours (gWh)¹²⁴ per year in 2030, 2040, and 2050, respectively. If the UP were to double its capacity by 2030, then the number of electric semi-trucks using the I-15 corridor would be reduced, necessitating the need to generate less electricity. If this were to occur, then the annual electricity requirement will be decreased to 2.11, 2.52, and 2.93 gWh per year in 2030, 2040, and 2050, respectively.

Known Unknowns

The estimates summarized above provide a general understanding of future traffic growth, congestion, highway expansion needs and costs, emissions, and electricity generation to service semi-trucks on an electrified I-15. However, because these estimates are derived from currently available data, they cannot account for the effects of factors that will play out in the coming decades in response to changing political and economic conditions, shifts in global supply chains, climate change, and population growth among other considerations. Thus, we conclude Part 4 by reviewing the “known unknowns” – factors that we are currently aware of but for which there are not reliable data to evaluate – that will affect future behavior, policy decisions, and economic development activity.

¹²³ While electric semi-trucks reduce the direct emission of greenhouse gases, they have limited ranges (i.e., 500 miles) and their electric batteries add substantial weight (i.e., four times more than the weight of a tank of diesel fuel). In addition to necessitating significant investments in charging facilities, frequent in-route charging creates down time that reduces the economic efficiency of moving goods long distances by truck. Moreover, if the electric grid used for charging is powered by non-renewable energy sources, then the net environmental benefits are minimal. While also constrained by limited ranges and the need for refueling infrastructure, hydrogen-fueled semi-trucks reduce both the direct and indirect emission of greenhouse gases and these vehicles can be refueled in a fraction of the time compared to their electric counterparts. See Jack Ewing, “Truck Makers Face a Tech Dilemma: Batteries or Hydrogen?” *The New York Times*, April 11, 2022, www.nytimes.com/2022/04/11/business/electric-hydrogen-trucks.html.

¹²⁴ One gigawatt hour is equivalent to one million kilowatt hours, which is the amount of energy needed to supply power to 876,000 homes, see Carbon Collective, “Gigawatt (GW),” 2023 (www.carboncollective.co/sustainable-investing/gigawatt-gw).

As noted in Part 2, the opening of the SNSA and the development of the associated land conveyed by the federal government in the Ivanpah Valley will induce additional traffic from employees, vendors, and travelers to and from the Las Vegas Valley. What is unknown is how much additional travel demand the airport will encourage from the eastern parts of the California's Inland Empire, how much of that demand will be served by the Brightline West high-speed rail, and how much will be accommodated on I-15.

Brightline West estimates that the high-speed rail will reduce passenger travel on I-15 by 20 percent. As the analyses presented above that incorporate that estimate suggest, if that prediction comes to fruition, then it would result in notable reductions in traffic, congestion, and emissions in the South County section of I-15. However, it may be that the rail line supplements car traffic or that any reduction in auto traffic will be offset by increases in truck traffic and population exchanges between Southern California and Southern Nevada.

California is mandating that in 2035 all new cars sold in the state be zero emission vehicles.¹²⁵ Between 2024 and 2035 the state is requiring delivery and local, state, and federal fleets to transition to zero-emission vehicles including those serving the Ports of Los Angeles and Long Beach. In 2039 the mandate will apply to work and day cab trucks and in 2042 new semi-trucks sold in the state must be zero-emission. Given the share of Southern Nevada's economy that depends on the movement of goods and people from Southern California, the mandate has consequences for the electricity needed in South County to service these vehicles and creates opportunities to develop some of the electric/clean-vehicle supply and production chain consistent with the framework for economic development articulated in GOED's *Realizing Nevada's Electric, Innovative, and Connected Future*. If Southern Nevada fails to align its infrastructure and economic development efforts accordingly, then it is at risk of becoming a future dumping ground for "dirty" trucks and cars, while failing to capture part of the electric/clean vehicle supply and production chain.

As a consummative market that is reliant on Southern California for goods and people, Southern Nevada has little leverage to induce California to widen I-15 east of Barstow, California, or to incentivize the UP to increase freight transportation by train. Prioritizing economic development activity, particularly manufacturing and other initiatives that grow the region's export economy beyond tourism and business services, in a manner that serves the Southern California market provides the clearest pathway to altering this dynamic.

¹²⁵ Nationally, the shift to zero-emission semi-trucks may be accelerated to comply with a 2027 Environmental Protection Agency requirement that diesel engines reduce nitrogen oxide emissions by 80 percent.

In the near-term, the failure to pass the Southern Nevada Economic Development and Conservation Act (i.e., the Clark County lands bill) in the prior Congress limits the available land for industrial development. Until such legislation is passed and the amount and location of land suitable for industrial development is known, the infrastructure needs and associated car and truck traffic cannot be estimated or planned.

The eventual completion of the Arizona share of the I-11, coupled with infrastructure upgrades in Baja California, including the development of the deep-water port at Punta Colonet (see Part 5), will reorient supply chains and the transportation of goods to Southern Nevada in a manner that is likely to require additional capacity on the Nevada portion of I-11. Closer in, the northern third of I-11 will serve as an “intraregional highway” that connects commuters in Mohave County, Arizona, to employment in Southern Nevada, including many who work for short periods around major event that are held in Las Vegas such as the National Finals Rodeo and the Consumer Electronics Show. The journey-to-work provides the most essential link for megapolitan integration. Any frictions of movement that lengthen commuting times reduce economic efficiency and output.

Part 5: Recommendations

In Part 5 we present recommendations for policy and governance interventions to establish a unified strategy for industrial development to diversify the Southern Nevada economy. To contextualize these recommendations, we begin with a discussion of macrolevel considerations that inform the proposed clustering of industrial activity in the South and North County areas of Clark County that follow.

The Macrolevel Context

Underlying federal legislation such as the CHIPS and Science Act, IIJA, and IRA is a broader policy shift away from a reliance on international trade for energy supply chains, technologies, and other industrial goods in favor of increased domestic production that is sourced by domestic or nearshored suppliers. As supply chains are reshuffled post-COVID 19, some imports are moving from the West Coast ports to ports on the eastern seaboard and in the Gulf of Mexico as companies seek to diversify how they access their supply chains.

What is unknown is if this is a permanent shift or a temporary consequence of the inefficiency of the Southern California ports that has been exacerbated by a long-running labor dispute that was recently resolved. Further complicating these dynamics is a historical drought in Panama that has reduced the number of ships that are able to navigate the Panama Canal on a daily basis, creating a backlog of traffic.¹²⁶ More generally, because climate change is affecting the stability of long-established global trade routes, in the coming decades there is likely to be continuous adjustments to how goods flow into and out of the Southwest Triangle.

What is known is that for the past three plus decades, Southern California has been hyper-focused on connections with Asia as part of a broader Pacific Rim strategy. While this is an enviable trade position, the U.S. has historically run large trade deficits with China and South Korea. China also dominates the world supply of rare earth minerals and metals needed for electrification at the scale that the U.S. government is hoping to reach. A goal of the Biden Administration is to reduce American dependence on China for products that are vital to the country's defense and energy needs. To this end, throughout 2023 imports from China decreased significantly.¹²⁷

¹²⁶ Elida Moreno and Marianna Parraga, "Panama Canal's bottleneck eases, some vessels detour," *Reuters*, August 22, 2023, www.reuters.com/world/americas/panama-canals-bottleneck-eases-some-vessels-detour-2023-08-22/.

¹²⁷ U.S. Census, "Trade Goods with China," 2023 (www.census.gov/foreign-trade/balance/c5700.html).

The focus on Asia has come at the expense of developing similar relationships with Latin America. By contrast, the Texas Triangle Megapolitan Cluster consisting of the megapolitan areas of Dallas-Fort Worth, Houston, and San Antonio has developed strong trade and business ties with Mexico, now the country's leading trade partner. These connections induce logistics and supply chains that link northern Mexico to Texas and the entire I-35 corridor and on to the Midwest manufacturing belt in the north.

The Southwest Triangle is well positioned to broaden its business connections and exchanges with Latin America. Many U.S. firms outsource stages of their manufacturing to the region to reduce costs and liabilities. These connections will grow with planned upgrades to the Mexican logistics infrastructure in Baja California.¹²⁸ The development of this capacity, especially the long-planned port at Punta Colonet that will compete with the Southern California ports, is critical for Arizona and Nevada. The development of associated rail links to border crossings east of San Diego would avoid the congestion of Southern California and realize the purpose for I-11: to enhance the CANAMEX Corridor by creating a "middle lane" between California and Texas for the flow of goods between South, Central, and North America. Bolstering these connections are lower tariff barriers relative to China.

A shift in the flow of goods will make Phoenix and Las Vegas the first major U.S. metropolitan areas in the path of this enhanced trade. The three state economies that will be most impacted by the I-11 corridor's link between Phoenix and Las Vegas are Arizona, Nevada, and Utah. The I-11 corridor lies in Arizona and Nevada, but the link provides the Mountain West with much better access for the flow of goods into the interior west via I-15 running from Las Vegas to Salt Lake City with a connection to I-80 in northern Nevada.

In the face of U.S. efforts to become less dependent on Asian trade, this may prove to be an attractive option for China and South Korea as well. Following the lead of as domestic manufactures, products intended for the U.S. could be shipped to Mexico in a state of partial completion. Once finished in Mexico, they could be moved to U.S. markets under more favorable terms than if they were sent directly from Asia and bypass the inefficiency of the Southern California ports.

In addition to conveying imports from Mexico and farther south, I-11 will support two key sectors that Arizona and Nevada share: defense contracting and the shift to green technology. Arizona and Nevada are both major

¹²⁸ Fernando Mares, "Baja California to Restart Infrastructure Project," Mexico Business News, December 1, 2022, <https://mexicobusiness.news/infrastructure/news/baja-california-restart-infrastructure-projects>.

aerospace states that are home to an abundance of military facilities, especially air bases. The supply chain in this industry in emerging technologies such as drones runs between Creech Air Force Base in Southern Nevada and Fort Huachuca in southeast Arizona.

The other sector that should see future growth and will benefit from I-11 is green energy production. While Utah has a voluntary renewable portfolio goal, all three Southwest Triangle states are requiring a significant share of their future electrical generation to come from renewable sources. Servicing and supplying remote renewable energy facilities, including large-scale geothermal and solar projects in a number of Nevada counties,¹²⁹ with heavy equipment would be boosted by I-11. The Las Vegas and Phoenix metros have growing production, employment, and research and development capacity in green tech. The exchange of products would also be eased by improved surface transportation capacity.

In the next section we consider the implications that these macro conditions have on locating industrial activity in Southern Nevada.

Mapping Southern Nevada's Industrial Future

Underlying the megapolitan framework is an understanding of how connections between large-scale, geographically adjacent metropolitan regions facilitate population and economic exchanges. As applied to Southern Nevada, the megapolitan perspective offers insight into how the region should organize its industrial strategy in the South County and North County areas.

South County

Market forces are pushing logistics and warehousing into Southern Nevada. This is a consequence of the region's geography, pushback to additional warehousing in the Inland Empire, lower operating costs, and favorable state policies (e.g., free port status and tax abatements) that are aided by a workforce culture that is shaped by shift work and non-traditional work weeks.

Tracing the goods that flow into the region reveals identifiable pathways into the global economy: the Southern California ports service trade with Asia and the international border at San Diego links to trade and industry

¹²⁹ Jennifer Solis, "More solar, geothermal development on NV public lands — and likely some conflict too," Nevada Current, November 13, 2023, <https://www.nevadacurrent.com/2023/11/13/more-solar-geothermal-development-planned-on-nv-public-lands-and-likely-some-conflict-too/?emci=e1c88a58-4582-ee11-8925-00224832e811&emdi=12a42c03-4782-ee11-8925-00224832e811&ceid=93476>.

in Baja California and further south. In the coming decades southern trade will be boosted by the development of the long-planned port at Punta Colonet and I-11 connecting the Mountain West to markets in Mexico and Latin America.

Logistics and warehousing in the Southwest Triangle will be further enhanced with improvements to the railyard in Barstow, California. The yard lies roughly halfway between Los Angeles and Las Vegas and sits at the nexus of the BNSF and UP lines that originate in the Alameda Corridor linking to the Long Beach and Los Angeles ports. The BNSF is investing \$1.5 billion to create the Barstow International Gateway (BIG). Envisioned as an intermodal facility, BIG will redirect domestic and international freight transloaded at the ports to BNSF's eastern line that runs through northern Arizona. Farther west, less than 100 miles from BIG, is the Mohave Inland Port with rail, air, and ground transportation links.

Geographically, because this economic activity originates in areas that are south and west of Las Vegas, it connects most easily to the South County area. One of the main selling points of the Jean and Eldorado Valley locations to site warehousing and logistics is the potential for a one-day turnaround to the ports as well as to most of Arizona. In particular, the large-scale semiconductor investments being made in the Phoenix and Salt Lake City metros create high-value supply chain opportunities for Southern Nevada.

The current utilities serving Jean can accommodate the beginnings of a warehousing and logistics cluster. This area's viability for this activity will be enhanced once the water and utilities lines needed for the SNSA and Ivanpah Valley are in place. Henderson's vision for the Eldorado Valley also is compatible with a warehousing and logistics focus as part of a mixed-use development strategy. Development of this type is less likely to draw the ire of neighboring Boulder City that is looking to expand renewable energy initiatives in that space as opposed to manufacturing or other heavy industries. The location is in the direct path of goods flowing north through Arizona along the I-11. To integrate logistics and warehousing activity across the entire South County area and to provide a link for semi-trucks between I-11 and I-15 outside of the Las Vegas Valley, Nevada State Route 164 connecting I-15 and U.S.-95 should be upgraded including a bypass of Searchlight.

Prioritizing warehousing and logistics in South County will complement the SNSA. The airport's primary purpose is to serve passenger travel. However, one can also see how the area with its interstate highway, rail for both freight and passenger traffic via the UP and Brightline West high-speed rail project, and air connections coupled with height and density restricted land use adjacent to the SNSA could accommodate this activity. This location may also be well situated for related industries such as light manufacturing, product assembly, and reverse supply chain operations. The area is also close to the country's only rare earth mine.

Compared to Primm and Jean, the pathway for industrialization in Sloan is unclear. Without the awarding of the Build Back Better Regional Challenge grant there is no funding for utility and infrastructure planning for future industrial use. The failure to move the Clark County lands bill in the prior Congress delays any land conveyance from the federal government to site large-scale industrial activity. Moreover, for the foreseeable future Clark County's development priorities are going to be steered to the SNSA and its estimated \$12 billion price tag,¹³⁰ as well as economic development projects that are planned or are underway in the Las Vegas Valley. Still, future land use in the area is being evaluated as part of the Clark County-City of Henderson Joint Land Use Study¹³¹ and the I-15 Sloan to Stateline Feasibility Study being conducted by NDOT.

North County

The North County area is primed to serve as the region's manufacturing and research and development hub. While warehousing and logistics along and near I-15 and into Apex have grown significantly in the last few years and are poised to continue to do so in the near term, Apex is the only area with sufficient available land to site a manufacturing cluster. North Las Vegas and Apex are finding ways to implement the power, gas, water, and sewer infrastructure to facilitate scalable industrial development.

To date, however, Apex has not secured an anchor manufacturer that can attract suppliers and other manufacturing firms to the park. In the next section, we offer suggestions for targeted industries that may fill this bill. In addition, there are clear opportunities that are consistent with the goals articulated in GOED's 2023 economic development report, *Realizing Nevada's Electric, Innovative, and Connected Future*.

In particular, the report highlights how Nevada is uniquely positioned to capture all the stages of lithium production from mining to developing battery cells and battery packs, to EV manufacturing, and recycling. Currently, the scaling of the state's lithium economy is occurring in northern Nevada. These efforts are being augmented by a UNR-led TechHub that was awarded by the EDA and funded through the CHIPS and Science Act to support the supply chain and ecosystem essential to vehicle electrification.¹³² The Southern

¹³⁰ Ray Hagar, "Clark County official: New Vegas airport will cost more than \$12 billion," Northern Nevada Business Weekly, June 6, 2023, www.nmbw.com/news/2023/jun/06/clark-county-official-new-vegas-airport-will-cost-more-than-12-billion/.

¹³¹ Clark County, "Joint Land Use Study - Clark County and City of Henderson," 2023 (https://www.clarkcountynv.gov/government/departments/comprehensive_planning_department/joint_land_use_study_-_clark_county_and_city_of_henderson.php).

¹³² U.S. Economic Development Administration, "Nevada Lithium Batteries and Other EV Material Loop," 2023 (<https://www.eda.gov/funding/programs/regional-technology-and-innovation-hubs/2023/Nevada-Lithium-Batteries-and-Other-EV-Material-Loop>).

Nevada lithium ecosystem is primarily composed of smaller firms working in niche markets. While these firms are positioned to grow, they are unlikely to require a major manufacturing plant in Apex or be able to attract the capital needed to build such a facility in the near term.

To accelerate growth in clusters supporting the country's energy transition, UNLV was awarded an EDA grant, matched by GOED with funding from the Knowledge Fund, to support renewable energy-technology focused accelerators throughout the state.¹³³ A multi-institution consortium led by Arizona State University (ASU) and that includes DRI and UNLV is being funded as part of the National Science Foundation's (NSF) inaugural Regional Innovation Engines program. The Southwest Sustainability Innovation Engine will coordinate research projects and the formation of technology transfer hubs supporting carbon capture, water security, and energy storage.¹³⁴

In the coming years, mining of lithium and other critical minerals needed for EVs will increase in Nevada including in Nye County. There also is lithium mining west of Southern Nevada in California that is staffed by employees who commute from Las Vegas. Moreover, given federal resources supporting the EV market and California's mandate for clean energy cars and semi-trucks, it is not difficult to envision a role for Apex in this transition such as citing facilities for processing of rare-earth minerals, assembling and distributing battery packs, or expanding the EV manufacturing market.

Siting manufacturing at Apex will facilitate easier connections to central and northern Nevada. While the economic linkages between the state's regions have never been well established, as the demand for the state's mineral and ore reserves grows and Nevada works to realize its vision of being the only state that can support every phase of the lithium supply chain that may change. As we recommend below, increased intrastate economic synergy to support these initiatives would be enhanced by an eastern routing of I-11 to I-80 and beyond as opposed to the currently designated western routing.

In addition to manufacturing, through the development of the UNLV North Campus, the North County area is positioned to become a regional research and development hub supporting industries that are and will be key contributors to the region's economic profile. The site also the potential to add much needed innovation and research capacity.

¹³³ Nevada Governor's Office of Economic Development, "UNLV Awarded EDA Build to Scale Grant for GOED-Inspired Renewable Energy Cluster Development Project," Press Release, November 14, 2023, <https://goed.nv.gov/unlv-awarded-eda-build-to-scale-grant-for-goed-inspired-renewable-energy-cluster-development-project/>.

¹³⁴ Arizona State University, "NSF Engines: Southwest Sustainability Innovation Engine," 2024 (<https://swsie.asu.edu/>).

As the NSF data presented in Table 5.1 make clear, Southern Nevada lags in science and engineering research space, research and development expenditures, and doctoral degrees awarded. Compared to UNR, UNLV has less than half the square footage available for research, a stunning systematic underinvestment in the research capacity of a university serving a region that is home to more than 73 percent of the state’s population and that generates 70 percent of Nevada’s GDP. Combined, the three Nevada research institutions – DRI, UNLV, and UNR – have less research space, generate fewer research expenditures, and confer significantly fewer doctorates than ASU, University of Arizona, or University of Utah.

Table 5.1: Comparison of Innovation and Research Capacity in Arizona, Nevada, and Utah, 2021

Institution*	Science and Engineering Research Space		Research and Development		Earned Doctorates	
	Total Net Assignable Square Feet**	Rank***	Expenditures (in millions)	Rank^	Total	Rank†
Arizona						
Arizona State University	1,384,196	49	\$677,303	42	508	20
Northern Arizona University	249,608	205	\$69,129	178	43	218
University of Arizona	1,692,190	36	\$770,031	36	380	40
Total	3,325,994	-	\$1,516,463	-	931	-
Nevada						
Desert Research Institute	135,615	275	\$26,365	249	-	-
University of Nevada, Las Vegas	262,695	197	\$101,009	168	106	139
University of Nevada, Reno	558,287	126	\$175,386	136	134	115
Total	956,597	-	\$302,760	-	240	-
Utah						
University of Utah	1,717,502	35	\$624,737	84	321	52
Utah State University	802,334	84	\$325,223	47	93	151
Total	2,519,836	-	\$949,960		414	-

*Private institutions and institutions without reported science and engineering research space are excluded.

**Excludes medical schools.

***584 total institutions ranked.

^908 total institutions ranked.

†430 total institutions ranked.

Source: National Science Foundation.

First, Southern Nevada already has a strong track record in attracting firms supporting the research and development of innovative transportation technologies.¹³⁵ These include the Las Vegas Monorail, the Boring Company’s tunnelling project, and driverless vehicle companies such as Nuro, Halo, and Vay as well as the Brightline West high-speed rail project and the now defunct Hyperloop One test track.

Between Apex’s ability to site manufacturing firms, the Las Vegas Motor Speedway and the Innovation District created by the City of Las Vegas that provides spaces for real world testing of transportation technologies, and the Transportation Research Center at UNLV, Southern Nevada has many of the components to become a center for urban transportation technology research and development, testing, and manufacturing.

A next step would be to work with private and public partners to develop a future transportation center of excellence at the UNLV North Campus. The goals of such an initiative would be the continued agglomeration of firms, particularly manufacturing firms, operating in these spaces to facilitate the exporting of these technologies to a global market that is quickly urbanizing and in need of efficient transportation solutions.

Second, market forces are pushing warehousing and logistics firms into the region. While this economic activity has absorbed some of the employees who have not returned to jobs in Tourism, Gaming, and Entertainment, many of these positions do not offer the wages, benefits, and opportunities for upward or lateral mobility that are often associated with a “good job.” Moreover, long-term employment growth is unlikely to be sustained in the sector given advancements in warehouse automation and efficiency.

An opportunity to capitalize on these forces would be to establish a center of excellence for supply chain and logistics automation akin to California State University, San Bernadino’s Supply Chain, Logistics and Transportation Management initiative. Housed in the Information and Decisions Sciences Department, the initiative offers undergraduate, masters, and certificate programs in supply chain management, logistics and e-commerce, and data analytics.¹³⁶ Following opportunities suggested in a 2019 report from the Brookings

¹³⁵ This recommendation was adapted from *Nevada Economic Development and Public Policy 2022-2026* and Arthur C. Nelson, “The Rise of Southern Nevada as a Cluster for Metropolitan Transit Technology Innovations,” Brookings Mountain West, March 2022, https://digitalscholarship.unlv.edu/brookings_policybriefs_reports/9/.

¹³⁶ California State University San Bernadino “Supply Chain, Logistics and Transportation Management,” 2023 (www.csusb.edu/supply-chain-management).

Institution,¹³⁷ faculty in the program are leading an effort to secure federal funding to create the California Sustainable Logistics Center of Excellence to foster sustainable and inclusive economic growth in the warehousing and logistics sector.¹³⁸

UNLV has strong programs in mechanical engineering, computer engineering, and computer science.¹³⁹ A next step would be to work with warehousing and logistics firms to support industrial-based research and development to spur innovation through start-ups and other industrial applications including the licensing of intellectual content that could be exported from the region. This initiative could also incorporate supply chains for critical minerals and metals.

Third, even with the addition of the Kirk Kerkorian School of Medicine at UNLV, Southern Nevada's healthcare employment lags its expected share of the regional economy. The consequences of this are at least twofold: the region continues to export healthcare to neighboring metros and it lacks the wet and dry lab space to scale its healthcare research. The proximity of the UNLV North Campus to the Las Vegas Medical District and the North Las Vegas Veterans Affairs Medical Center can facilitate a healthcare research and development cluster that leverages the region's diverse demography and large number of veterans to attract federal grants, increase the number of residencies, and strengthen the regional healthcare ecosystem.

Fourth, the UNLV North Campus location shares a boundary with Nellis Air Force Base. AFWERX, the U.S. Air Force's innovation and research arm that works with universities, industry, government agencies, and private and international organizations to develop dual-use technologies and products, has a presence in Las Vegas.¹⁴⁰ Future collaborations with UNLV researchers, local aerospace firms, and Nellis sited on the UNLV North Campus would bring together existing regional assets, while also strengthening the regional tech ecosystem and reenergizing the region's aerospace economy.

¹³⁷ Chad Shearer, Isha Shah, and Marek Gootman, *Advancing Opportunity in California's Inland Empire*, Brookings Metropolitan Policy Program, February 2019, www.brookings.edu/wp-content/uploads/2019/02/Full-Report_Opportunity-Industries_Inland-California_Final_Shearer-Shah-Gootman.pdf.

¹³⁸ Deepa Bharath, "Inland Empire groups seek \$100 million in federal grants to promote racial equity in logistics industry," *Daily Bulletin*, December 10, 2021, www.dailybulletin.com/2021/12/10/inland-empire-group-seeks-100-million-in-federal-grants-to-promote-racial-equity-in-logistics-industry/.

¹³⁹ Olivia K. Cheche, Joshua Padilla, Caitlin J. Saladino, William E. Brown, Jr., 2023 Graduate Program Rankings, UNLV & UNR, Higher Education Fact Sheet No. 21, The Data Hub at Brookings Mountain West & The Lincy Institute, https://digitalscholarship.unlv.edu/bmw_lincy_he/17.

¹⁴⁰ Air Force Tech Connect, "AFWERX Las Vegas, NV," 2023 (<https://spaceforcetechconnect.org/locations/afwerx-las-vegas-nv-0>).

Regional Benefits

The geographic division of future industrial development between the South County and North County areas along the lines suggested here offers collective benefits that extend beyond the recruitment and locating of individual firms and the associated jobs that these firms will create.

First, it offers a framework to guide infrastructure development and decisions in the coming years. If warehousing, logistics, and associated industries are to be concentrated in the South County area, while manufacturing and research and development is centralized in the North County area, then private and public sector leaders know where the infrastructure for these different activities needs to be located and when resources need to be marshalled to develop this infrastructure. Having a clear plan for infrastructure development in place will, in turn, allow the region to more effectively leverage its geography to pursue targeted opportunities in existing and future supply-chain systems.

Second, locating warehousing and logistics in the South County area is collectively advantageous for a number of reasons. It will allow for a one-day back-and-forth to the ports in Southern California and when Arizona completes its section of I-11, deep into Arizona. Knowing that the Ivanpah and Eldorado valleys will be the main locations for servicing semi-truck traffic should guide decisions to ensure that there is sufficient truck parking adjacent to the logistic and warehousing hubs along I-15 and I-11 and to develop the charging or hydrogen refueling capacity (see note 123) to support a future where semi-trucks are transitioning to fleets of zero-emission vehicles. Concentrating this activity to the South County also will alleviate some of the congestion and pollution on I-15 through the Las Vegas Valley. Increased automation that will require fewer warehouse employees to commute to the South Valley will also reduce this traffic.

Third, Apex's prohibition on residential development means that manufacturing cluster will not conflict with land needed to support urban growth in North Las Vegas. Separating residential development from industrial activity will reduce the impact of the externalities associated with industrialization. For these same reasons, except for workforce housing, as land in the South County area becomes available, industrial use should be prioritized. Opening these spaces to large-scale residential and commercial development will do little to diversify the regional economy, and instead, will undermine the urgency for urban-based land use reforms such as infilling and require local governments to extend their services farther from the urban core.

Fourth, the geographic bifurcation of industrial activity between the South County and North County areas may eventually help to resolve Southern Nevada's rail deficit. The volume of goods shipped to Southern Nevada by rail is minimal because the economics of rail favor the movement of heavy freight over long

distances. Until the Brightline West high-speed rail is built and begins service, visitors to Southern Nevada from Southern California will be limited to current ground and air transportation modes.

Still, one can imagine a future where short-line rail moves goods into and out of Southern Nevada. Consider that the BNSF's BIG facility that will transload freight directly from the ports in Southern California will be just 120 miles from Southern Nevada's logistics and warehousing hub in the South County area. Then imagine how much traffic on the I-15 would be alleviated if the freight from Southern California was transloaded in Barstow, California, and then conveyed to Southern Nevada on a short line instead of by semi-trucks.

Proponents of the SNSA have compared the project to the Denver International Airport. Rail service between the airport and The Strip akin to what was developed in Denver would minimize the remoteness of the South County area from the Las Vegas Valley, reduce traffic congestion in the South County section of I-15, and create a more seamless transition between what may be viewed as a far-flung airport location and the resort corridor. Such a line could then be extended to link together the South and North County industrial areas.

One of the goals of the *Nevada State Rail Plan* is to strengthen intrastate connections. Doing so will help to overcome the limited economic exchanges between the southern, central, and northern sections of Nevada in a manner that can connect supply chains, particularly those supporting the transitions to renewable energy and EVs, within the state. As these industries grow their presence in Nevada, their scale may facilitate the development of short lines to move ores and other heavy commodities including equipment that could be serviced if not manufactured in Nevada. The UP line runs through Apex but without goods to pick up it does not stop. In the future it could connect to a line from the north central part of Nevada delivering ores of magnesium and other metals and minerals needed to power the country's energy transition.

Target Industries

With the passage of the CHIPS and Science Act, IIJA, and IRA the federal government is anticipated to spend over \$2 trillion over the next 10 years on initiatives to spur investment in infrastructure, manufacturing, supply chains, workforce, technology, and clean energy.¹⁴¹ The laws are expected to induce an additional \$4

¹⁴¹ Eggers, O'Leary, and Pollarl, "Executing on the \$2 trillion investment to boost American competitiveness."

trillion in private investment as many of the programs within the acts incentivize private industry participation through tax incentives, loans, grants, and public and private partnerships¹⁴²

The federal government estimates that it has already directly spent \$299 billion matched by \$503 billion in private industry investment over the past year and a half.¹⁴³ With the changing landscape for industrial development in the Mountain West, especially as the population in these states grow and manufacturing firms continue to leave California, it is imperative for Southern Nevada to seize this unique opportunity by building competitive advantages beyond transportation and warehousing.

From the manufacturing sector employment analysis (see Part 2 and Appendix C), the manufacturing of electric batteries, which includes production, assembly, components, mining and refining of critical minerals and metals, all the way to recycling is expanding. Southern Nevada needs to focus its efforts in landing a facility as large or larger than the Tesla and Panasonic facility in northern Nevada. This should not be limited to battery manufacturing, but also other clean energy initiatives with high export potential that the federal government is prioritizing including solar manufacturing, wind turbine assembly, hydrogen production, and geothermal energy.

A concern observed in the flow of goods analysis (see Part 2 and Appendix D) is that while we do forecast increases in outbound freight activity from warehouses and distribution centers, a larger portion is likely to come as result of through traffic that does not stop in Clark County. Instead, these forecasts suggest that these goods will flow to destinations in southern Utah for processing. This is particularly notable given that Southern Nevada is a larger region and is closer to the ports in Long Beach and Los Angeles.

In addition, the analysis suggests there will be increases in intra traffic (freight traffic within Clark County) due to increasing demand based on population and growth in industries such as construction and package delivery. Absent federal legislation that would allow a major increase in available land for industrial use, the economic benefits from warehousing and distribution will be limited yet the costs will be significant due to increased traffic congestion, pollution, and road deterioration.

¹⁴² Center for Business and Economic Research analysis of IIJA, CHIPS and Science Act, and IRA Funding and estimated private investment.

¹⁴³ Abha Bhattarai, "Infrastructure and green energy spending are powering the economy," *Washington Post*, July 28, 2023, www.washingtonpost.com/business/2023/07/28/federal-infrastructure-spending-economy-manufacturing/.

To help ease these costs and secure more benefits, Southern Nevada should look at the flow of goods, specifically commodities related to microchips, mining, critical minerals, and metals that can be processed and redistributed in Clark County via truck, rail, and air. Such a focus on those commodities would increase the incentives for freight rail investment that are currently negligible. Investment in rail is more likely to involve a significant portion of private investment unlike taxpayer funded highways.

Moving some of the anticipated freight traffic off the road and onto rail and/or air may create opportunities for new companies with large volumes of high value goods such as pharmaceuticals, medical equipment, industrial products, and automotive, transportation, and electronic manufacturing. Moving large commodities on to rail also would ease highway congestion and allow investments in roads to be maximized for locals.

Infrastructure Investments

The analysis presented in Part 4 offers estimates for the upgrading the region's ground transportation infrastructure that are reviewed here.

Assuming normal traffic growth, I-15 in both the South and North County will require lane expansion before 2050 to maintain an acceptable LOS at a cost of over \$800 million (2050 base). If Brightline West high-speed begins operations in 2028 and the company's predication of a 20 percent reduction in passenger traffic between Las Vegas and Southern California is accurate and the UP were to double its freight capacity to Southern Nevada, then all else equal lane expansion in the South County section of I-15 may be less urgent. Under this scenario, traffic in the North County section of I-15 would not be reduced significantly enough to defer lane expansion, which would cost an estimated \$595 million (2050 base).

However, the estimates underlying this recommendation are unable to account for traffic that the SNSA and the development of adjacent land in Primm and Jean induces from either the Las Vegas Valley or the Inland Empire. Similarly, industrial development in the Eldorado Valley and future traffic on the Arizona portion of I-11 is likely to generate additional truck traffic via the CANAMEX corridor. Continued growth in the Las Vegas Megapolitan Area is likely to generate additional commuter traffic from Mohave County, Arizona.

While these developments may increase traffic, the Brightline West high-speed rail line may spur additional passenger rail. Earlier this year, the Utah Department of Transportation applied for a \$500,000 federal grant,

accompanied by a letter of support from NDOT, to study the feasibility of a restarting passenger rail service between Las Vegas and Salt Lake City that ceased operation in the mid-1990s.¹⁴⁴

The Brightline West high-speed rail has the potential to reduce some of the emissions and air pollution in the South County area. However, far and away the infrastructure investment that would have the biggest effect on air quality in Southern Nevada is the transition to zero-emission semi-trucks in the I-15 corridor. Realizing such an initiative will require the coordination of multiple actors and significant resources including the daily generation of 3gWh of power (see Part 4) or extensive hydrogen fueling infrastructure just in Nevada as well as substantial infrastructure to deliver this energy to vehicles that are either in development or just now being introduced into the market.

But what may seem like a pipedream today may be closer to reality than we think. There already exists an organization, the I-15 Mobility Alliance, composed of private and public organizations representing Arizona, California, Nevada, and Utah with a vested interest in improving the efficiency of the I-15 corridor and a track record of achievements supporting this goal. All the states in the alliance have either required or voluntary renewable energy and net-zero emission goals. Arizona and Nevada in particular have the potential to be leaders in renewable energy generation. As a first step, included in the development of the SNSA and the Ivanpah Valley should be infrastructure scaled at a level to support future semi-truck electrification.

Designated I-15 lanes for zero-emission semi-trucks may be necessary for California to invest in the I-15 to expand capacity north of Barstow, California, to realize its mandate for zero-emission semi-trucks before mid-century. As the situation presently stands, Nevada can continue to add lanes on the South County section of I-15, but without similar capacity on the California side, the reduction in congestion in the corridor is minimal.

Above we outlined how the geographic clustering of industrial development may facilitate short-line rail services between Barstow, California, and South County, between South County and the Las Vegas Valley, and between North County and central and northern Nevada. In the near-term, Southern Nevada's best prospects for increasing the movement of freight via rail is to bend the cost structure underlying the economics of rail. In short, Nevada needs to incentivize the UP to utilize its line in Southern Nevada other than to pass through the region. As suggested previously, one path for this is to grow the region's manufacturing economy

¹⁴⁴ Mick Akers, "Possible Las Vegas to Salt Lake City rail line to be studied," *Las Vegas Review Journal*, June 26, 2023, www.reviewjournal.com/news/news-columns/road-warrior/possible-las-vegas-to-salt-lake-city-rail-line-to-be-studied-2799765/.

with goods that are exported through the Southern California ports. To this end, as Southern Nevada builds out its industrial parks, where appropriate, the infrastructure should include co-locating rail.¹⁴⁵

Growing and diversifying Southern Nevada's export economy through industrial development also requires a commitment to increasing the region's research and development capacity. In this regard, the UNLV North Campus is a blank slate that in the coming decades can be developed through public-public and public-private partnerships in transportation, logistics, and supply chains to create the research and workforce capacity to support targeted industries through the establishment of centers of excellence.

Building the campus will not be easy. The state is unlikely to provide the resources needed to support such scaled investments in research and development capacity. This will necessitate much of the burden being carried by partnerships. Fortunately, with Black Fire Innovation, UNLV has experience funding economic development and establishing industrial partnerships outside of state funding channels. Through engagement with hospitality, gaming, and entertainment firms, Black Fire integrates industry needs with academic research to develop innovative products and solutions. Black Fire provides both a model and the seasoned staff needed to guide the development of the UNLV North Campus.

Governance Reforms

In Part 3 we evaluated the governing organizations that operate in Southern Nevada. We also evaluated two governance structures, COGs and inland port authorities, that do not exist in Southern Nevada but offer useful models to consider. Below, we examine three governance reforms to support scaled industrial development. While each is presented separately, implementing all three would create a regional based governance framework of autonomous but interlocking organizations working to coordinate planning, administration, and infrastructure development at the regional level to support industrialization.

The Council of Governments Option

Nevada's track record in supporting planning is not strong. Little money is designated to regional planning and UNLV does not have an urban planning program to produce research and training to address problems that the region faces. The RTC, Southern Nevada's federally designated MPO, has sought to fill this gap with the SNS project. Originally funded by a federal grant, through technical and administrative support provided

¹⁴⁵ See Nevada Department of Transportation, *Nevada State Rail Plan*.

by RTC and a steering committee of representatives from local and state governments, higher education, and nonprofits, SNS is working to revise and update the regional plan that was developed and approved in 2015. Out of this process may be a suggestion for governance reform, including the creation of a COG like those that exist in neighboring Mountain West metros.

The SNS and its regional partners are primarily interested in the urban core of the Las Vegas Valley. Indeed, the regional plan map from 2015 defining the Clark County urban boundary excludes most of the South and North County areas that are the focus of this report (the exception is the North County area south of Apex). A COG also would not have authority over land use policy, independent funding streams, or bonding authority. Still, a COG may be effective for realizing the goals of the SNS to address policy challenges in urban Las Vegas. It would also offer a body to coordinate infrastructure prioritization, negotiate changes in land use plans, unify regulations, and convene private and public stakeholders needed to effectuate the recommendations offered here. Additionally, it could facilitate regional-level coordination across state lines through engagement with COGs in neighboring states.

A Reimagined Regional Planning Organization Option

Added to NRS in 1999 by the Nevada Legislature, the SNRPC was given broad authority to conduct comprehensive, long-term regional planning. Specifically, the statutory language creating the SNRPC gives mandates to focus its efforts in areas such as land use, population projections, transportation, and environmental stewardship. However, since its inception, it has struggled to fulfill this vision. Much of its activities are now under the purview of the RTC. The SNRPC has no dedicated funding streams to support its mission. Instead, it is reliant on interlocal agreements for funding specific projects. During the 2023 legislative session, the SNRPC sought legislation (SB 247) that its existence is not mandated and if it does exist, to have greater flexibility to define its activities.¹⁴⁶

Rather than be abolished, the SNRPC's leadership and staff should be joined to an expanded and rebranded agency that is the core of an expanded regional planning organization (RPO). As part of this, the organization should be placed under the same management structure as Southern Nevada's MPO, the RTC. It is not uncommon for RPOs to be combined with MPOs, particularly in regions the size of Southern Nevada. As

¹⁴⁶ Throughout 2020 and into 2021, the SNRPC investigated how it might expand its charge from that of a body focused on regional land use planning to a body that identifies issues of regional significance and consensus and develops an agenda of proposed policy actions at the state and federal levels. As part of this discussion an inter-local agreement was drafted that proposed to change the name of the Southern Nevada Regional Planning Coalition to the Southern Nevada Council of Governments with Clark County serving as the legal, fiscal, and clerical agent. However, the effort never gained traction and since then the vast majority of SNRPC meetings have been cancelled.

creations of the federal government, MPOs are powerful organizations that receive substantial federal, state, and local resources and are granted state and federal authority over critical infrastructure.

Metropolitan planning organizations are positioned to support RPO staff and projects and coordinate with their activity. Whereas MPOs develop and manage transportation systems, RPOs mostly focus on land use planning. As this report demonstrates, land use is closely related to transportation. There also is the added benefit that MPOs are known to elected leaders, the business community, and the public and because of this they are perceived as serious and capable organizations. Extending their power and authority to encompass an RPO such as the SNRPC can improve planning with minimal restructuring of existing governance.

It cannot be stated strongly enough how important it is that the region coordinate its land use and development initiatives. While Southern Nevada may have once been an “edgeless city”¹⁴⁷ with an abundance of land that could be developed for a wide variety of purposes, this is no longer the case. Moreover, even when this was the case, the region failed to align land use with the type of regional economic development needed to diversify the economy. Southern Nevada’s lagging performance relative to other Mountain West metros (see Table 1.1 and Table 1.2) is a consequence of this failure.

The Inland Port Authority Option

Formally integrating an RPO into an MPO will yield more coherent planning and effective use of finite planning resources. However, the ability of such an organization to seize economic development opportunities would be limited. Depending on their structure, ports including inland ports through a combination of land development control over delineated landscapes under their jurisdiction and financing sometimes at below market rates through tax-exempt debt instruments can do this.

Given trends, needs, and opportunities, a Southern Nevada Inland Port Authority may be appealing.¹⁴⁸ If so, that authority would need to engage in inland port planning, development, and management. It also needs to address various governance options. In this context, governance means the framework and manner of guiding government decision making, allocating scarce resources, and managing implementation. While these

¹⁴⁷ Robert E. Lang, *Edgeless Cities* (Washington DC: Brookings Institution Press, 2003).

¹⁴⁸ As noted in Part 3, NRS 277B outlines a process for the creation and approval of an inland port. The primary differences between the inland port authority proposed here and the current statutory language are threefold. First, whereas NRS 277B creates a separate governing board for each approved inland port, akin to the Utah Inland Port Authority, we propose a single, countywide governing entity with authority over all inland ports in Clark County. Second, we propose including representatives from the Governor’s office and relevant agencies on the governing board. Third and most significantly, like the Utah Inland Port Authority, the proposed Southern Nevada Inland Port Authority would have the authority to create tax increment finance districts to finance the infrastructure needed to support inland port activities.

functions can be pursued by an existing governmental entity or perhaps several of them through a collaborative structure, we recommend creating a new entity to carry out these functions. These considerations guide the discussion that follows.

Scale of Authority. At present, inland port and related prospects are sprinkled throughout Clark County concentrating in the South County and North County areas. At the scale of Southern Nevada, one could imagine multiple sites with each site managed by the inland port branded as a port, such as “Port Jean” or “Port Apex.” For these reasons, a countywide entity might be recommended to ensure nimbleness in responding to opportunities. Regardless, such an entity will need to be enabled by the Nevada Legislature with the backing of the Office of the Governor.

Location of Authority. To the extent that inland ports require specialized planning, development, and management skills, an entity dedicated to these functions is recommended rather than the existing county government or a special purpose government such as the LVCVA, the SNWA, or the LVGEA. The LVCVA and the SNWA specialize in planning, developing, and managing tourism and water resources, respectively. As such, their expertise may not extend to inland ports. Although the LVGEA is intimately tied to advancing economic development, its activities do not include planning, developing, and managing inland ports and large-scale infrastructure.

Governing Board and Staffing. If a new countywide entity is preferred, then the standard model is a governing board that sets policy and oversees a professional staff managed by an executive director. Southern Nevada has a tradition of selecting boards comprised of elected officials representing individual jurisdictions, as well as trade and subject matter experts. To the extent that the State of Nevada has an interest in the economic well-being of such an effort, consideration may be made for representation by the Governor’s office and perhaps relevant agencies such as LVGEA, NDOT, SNWA, or RTC. It also seems to make sense to have a professional staff managed by an executive director who is responsible to and serves at the pleasure of the board.

Scope of Authority. The purview of such an entity should be broadly consistent with the purviews of the West Coast ports and the UIPA. Part of this charge would include the nature of formal interactions with general and special purpose governments. In Utah, the UIPA seems already to have engendered some degree of conflict with cities and counties. Working relationships would need to be framed and ratified by the relevant governmental entities to ensure constructive inland port planning among those entities.

A novel power that the UIPA has is the ability to create TIF districts without objection from local government taxing authorities. In many states, TIF districts need the approval of all affected taxing authorities such as cities, counties, school districts, special assessment districts, and so forth. Any one of these entities holding out can prevent the TIF district from being formed. In Utah, the UIPA circumvents this. On the other hand, unlike other states where 100 percent of the incremental property and sales tax flows to the TIF district, in Utah 25 percent of the increment goes to affected local governments. Another 10 percent is earmarked to increase the supply of affordable housing. The disbursements acknowledge that the benefits of TIF investments may be disparate geographically; further, they recognize that localized pressures and externalities may arise, like the need for affordable housing.

It is the authority to create TIF districts that has been the source of conflict between local governments and the UIPA. However, in the case of Southern Nevada these tensions may be ameliorated. Except for Apex, most of the land in the South County and North County areas that could be defined as an inland port are either undeveloped or under federal purview. Local governments are currently deriving little to no tax revenue from these lands and may not have the resources to independently develop these areas for industrial use. If future tensions arise, a dispensation of the tax distribution could be devised to alleviate these concerns.

Financing. Inland port financing is the last but also the most important consideration. Without funding, there will be no inland port. Broadly and perhaps too simplistically, revenue comes in three broad stages. Seed money is needed to make initial investments that attract or support desired development. There may be a phasing down of seed money as revenues from development increase, where such revenue itself can be used to seed new ventures. Finally, there is long term sustainability where operations become self-supporting. As detailed in Appendix E, most of the California ports have no tax base and rely solely on shipping revenues. Yet, those ports are also considered among the least efficient in the world perhaps because they lack dedicated taxes to support investments. The Oregon and Washington ports have dedicated tax bases that account for a small share of their revenues.

In Utah, the statewide port authority is funded from 75 percent of the property tax revenues from the Salt Lake project that formerly went to the city of Salt Lake City and other affected local taxing authorities. This has proven to be politically unpopular. After all, if the state has a vested interest in the UIPA, it should be funded from a combination of state funds and a share of the increment gained from individual projects as seen with the Iron County, Utah, case study (see Part 3).

Asset Facilitation and Management. The entity should be flexible to create value in assets through several means. One would be outright ownership that generate lease and other revenues. The inland port would own the land and the structures. At the other end of the spectrum is where assets are owned and managed by private entities where the only revenues flowing back to local government are mostly property and sales taxes. Some of the incremental revenues could be recaptured through TIFs to help pay for the infrastructure and other investments needed to make development possible.

In between is a hybrid where the inland port entity may own land but leases it to private entities. Land leases would generate some cash flow as would property taxes on the actual structures built as well as sales tax if applicable. When the inland port acquires land, it should lease the land instead of sell it for four reasons. First, it becomes a perpetual source of income. Second, as the property gains value over time, that can be recouped through increasing rents. Third, the private sector entity avoids the cost of land acquisition that reduces overall investment requirements. Fourth, when the lease expires, the structures can be repurposed to the next highest and best use including being replaced. On this latter point, if an inland port entity sells its land, it has little control over the land's future use. The entity buying the property may delay moving it to the next highest and best use as timely as desired perhaps leading to localized disinvestment.

Summary Perspective. Greater Las Vegas sits at the crossroads connecting the megapolitan areas of Southern California, the Sun Corridor, and the Wasatch Range. By establishing a broad charge serving all of Southern Nevada with reasonable financial commitments and representatives of key entities and interests, an organization like a Southern Nevada Inland Port Authority could help the region and the state reach the next level of economic prosperity. Instead of being subsumed into existing entities that pursue different interests on behalf of important constituencies, an overarching regional entity is recommended with a decidedly new and different charge. This new regional governance entity would be intertwined with existing regional entities to advance their individual interests while creating new regional economic development opportunities.

Infrastructure Financing

In this section, we review choices to finance infrastructure investments. As with the discussion of governance, these options are presented separately but given the scale of infrastructure that needs to be developed in the South County and North County areas, a combination of revenue streams will be required.

Tax Increment Finance

While the Southern Nevada Inland Port Authority is presented as a governance intervention, its financial authority would be a defining feature of its scale and scope of authority. In this regard, it represents a specific type of TIF – one that also has authority over land use and that operates to promote infrastructure and economic development outside of local governments. Elsewhere, similar types of TIF districts are often called Enhanced Infrastructure Financing Districts (EIDs). They are used, for example, in California as a replacement for redevelopment agencies that were dissolved in the prior decade. However, in the subsequent decade their purview has been extended beyond housing, water, and transportation to include climate adaptation, infrastructure maintenance, and bonding authority (subject to voter approval).¹⁴⁹

California’s EIDs used to operate like Nevada’s special assessment districts (SADs).¹⁵⁰ These entities allow local governments to use ad valorem property tax revenue collected directly or to back bonds to finance projects geared towards supporting the revitalization of commercial areas or other needs of local governments such as parks, transportation and other utilities, and public safety. Broadening the scope of activity for Nevada’s SADs could be used to finance localized projects tied to a regional industrial development plan but they would remain under the purview of a municipal or county government and not a regional organization. Enabling authority for EIDs to a port authority could ensure unified oversight and strengthen the capacity to address regional needs comprehensively, insulating against unchecked impacts on neighboring communities.

Dedicated State Funding

Nevada established the State Infrastructure Bank to help state agencies and local governments, Tribal governments, and nonprofits finance infrastructure projects. In 2021, SB 430 amended the bank’s charge to include social infrastructure and infrastructure related to digital technology, sustainability, economic development, and renewable energy as well as transportation and utilities. However, the bank is capitalized at just \$75 million. For perspective consider that the City of North Las Vegas and the SNWA are spending more than \$250 million to complete the water and sewer lines at Apex and nearly \$60 million was spent on the interchange and road widening at the I-15 and U.S.-93. To run a water and return flow line to Primm for the SNSA will cost substantially more than these investments.

¹⁴⁹ Southern California Association of Governments, “Enhanced Infrastructure Financing,” 2023 (<https://scag.ca.gov/post/enhanced-infrastructure-financing-district-eifd>).

¹⁵⁰ In addition to special improvement districts, Nevada allows local government to create general improvement districts (NRS 318) and tax increment areas (NRS 278C) to support redevelopment agencies and defined infrastructure.

Without a significant increase in funding, using the State Infrastructure Bank to fund the infrastructure needed in Southern Nevada is of limited utility. This highlights the mismatch in scale between Southern Nevada and the rest of the state. The resources needed to develop the infrastructure to support industrialization in the region eclipse the capacity of *existing* state and local revenue sources. This point reinforces why a separate entity such as the Southern Nevada Inland Port Authority is needed.

Where the state can also help to fill this gap is by establishing an industrial park grant program managed by GOED to support infrastructure improvements needed for the development of industrial parks to attract firms in targeted industries. This, of course, is not a new idea. In 2011 as part of Nevada's reforms to economic development the state created the Catalyst Fund. Envisioned as a type of quick action closing fund, it was created to incentivize existing business to expand or to help new businesses relocate to the state. However, the last funding appropriated to the Catalyst Fund was in 2016.

In the 2023 legislative session, the Office of the Governor submitted SB 431 that included the creation of the Nevada Way Fund. Funded at a proposed \$315 million, it was designed to support economic development projects and critical infrastructure needs. However, the Nevada Way Fund was amended out of the bill, leaving the state without an available pot of money to support the development of the state's industrial park ecosystem that is needed to attract firms. In 2025, legislation should be passed with a smaller initial budget to provide revenue dedicated to support scaled infrastructure development.

Tax Abatements

The 2011 reforms to economic development codified what has become Nevada's primary tool for inducing investment to diversify its economy: tax abatements. Designed to jumpstart job creation after the Great Recession, until recently the criteria and process to qualify for abatements remained unaltered. During the 2023 second special session, SB 1 passed by the legislature and signed by the governor included a provision requiring companies seeking abatements to provide paid family and medical leave.¹⁵¹ While several states require all businesses operating in their states to provide this benefit, Nevada is the only state that has tied this requirement to tax abatements for incoming businesses. Given that the policy went into effect in October 2023, its impact is not yet known. However, the federal tax credit that businesses can use to offset some of the costs of providing paid family and medical leave is set to expire in 2025.¹⁵²

¹⁵¹ The same legislation (SB 429) was passed during the 2023 regular session but was vetoed due to concerns that the legislation would undercut economic development efforts.

¹⁵² Congressional Research Service, "Paid Family and Medical Leave in the United States," February 28, 2023, <https://crsreports.congress.gov/product/pdf/R/R44835>.

Considering ongoing legislative concerns, the time may be ripe to reevaluate Nevada’s tax abatement program. As part of this reassessment, the state should align abatements with regional economic development priorities and ensure that abatements reflect the wages and infrastructure for the industries that the state and the RDAs prioritize. Under NRS, standard abatements¹⁵³ are available to all comers that meet two of the three criteria related to average wages (median wages might be a better standard given the variability in wages between entry level positions and management), capital investment, and the number of expected jobs to be created.

The state also can encourage water conservation and renewable energy usage through economic development policy. Working with the LVGEA and others, the SNWA developed its Water Investment Rating tool to evaluate the consummative water use and community benefits of new businesses to ensure that companies locating to the region are resource efficient. To strengthen the coordination between water management and economic development, *Realizing Nevada’s Electric, Innovative, and Connected Future*, calls upon the agency to be a global leader in the development of water policy and water technologies.¹⁵⁴ Criteria for abatements could be developed such that firms pitching projects with minimal consummative water use or that develop renewable energy to support their operations are prioritized over projects that do not.¹⁵⁵

Federal Resources

Nevada needs to be much more effective in capturing federal resources to support infrastructure development and the associated workforce. Nevada’s inability to competently interface with the federal government is well documented, as is the limited coordination between the agencies overseeing workforce development and economic development.¹⁵⁶ This lack of alignment creates another barrier to compete for many of the current federal funding opportunities that expect synergy between economic priorities and workforce pipelines.

¹⁵³ The state also has abatement programs for data centers and aviation parts.

¹⁵⁴ SRI International, *Realizing Nevada’s Electric, Innovative, and Connected Future*, p. 53.

¹⁵⁵ Created in 2009, Nevada’s renewable energy tax abatement program awards partial sales and use and property-tax abatements to support construction of renewable energy facilities generating a minimum of 10 megawatts of renewable energy (10 megawatts is the amount of energy need to supply roughly 8,000 homes). Either lowering the 10 megawatt or creating a separate abatement program to incentivize businesses to reduce their carbon footprints by generating their own renewable energy would help the state meet its renewable portfolio standard goal of 50 percent by 2030 and its new-zero emissions goal by 2050.

¹⁵⁶ See Damore et. al, *Nevada Economic Development and Public Policy 2022-2026*; Gilbertson, “Strengthening the Southern Nevada Workforce Pipeline,” and Elizabeth Daniel and Scheherazade Salimi, “The Landscape of 2022 Workforce Development Federally and in the State of Nevada,” Center for Public Research and Leadership, Columbia University, August 2022, https://new.ccea-nv.org/wp-content/uploads/2023/01/2Columbia-University_The-Landscape-of-Workforce-Development-Federally-and-in-the-State-of-Nevada_CCEA_8_2022.pdf.

With Nevada's limited public dollars available to support the infrastructure needed for industrial expansion, state and local actors will need to seek federal funding. The good news is that this need comes during a time of unprecedented opportunities and funding over the next 10 years from the federal government for such projects via the CHIPS and Science Act, IIJA, and IRA. It will require state and local actors to prioritize and execute upon a shared vision that is able to leverage private resources and develop coalitions with local community partners and employers.

Many of the grants and programs that are available through the CHIPS and Science Act, IIJA, and IRA are not being administered through the same agencies and processes that the state has struggled to navigate. Rather consistent with these initiatives broader policy goals noted above, these funds are being allocated through agencies such as the Commerce and Energy departments and the NSF that have different grant requirements and processes compared to the Education and Labor departments that are more commonly used to distribute federal dollars. While these funding streams are not indefinite (see Appendix J), many are aligned with Southern Nevada's economic development opportunities.

In recent legislative sessions the state has made progress improving its grant infrastructure. Still, Nevada continues to be a bottom-dweller in capturing non-formula based federal aid due to how the state funds current programs, a lack of clarity about grant priorities, and limited capacity to process grant applications.

To overcome these deficiencies, the Nevada GrantLab is leading a working group to coordinate efforts to access federal resources supporting regional workforce and economic development needs in light of these funding opportunities. This is an important step, but this effort needs to be formalized if Southern Nevada is going to take advantage of this extraordinary federal moment. Innovate Illinois,¹⁵⁷ a coalition of researchers, private firms, state agencies, and nonprofit organizations that is chaired by Illinois Governor JB Pritzker, was formed in the spring of 2023 to coordinate efforts to secure federal funding. Innovate Illinois offers a model for scaling and institutionalizing Southern Nevada's efforts to access federal funding.

Other Policy Interventions

Many of the recommendations detailed above need state action. Other recommendations require coordination between state agencies and private and public organizations that operate in Southern Nevada.

¹⁵⁷ Illinois.gov, "Gov. Pritzker Announces Innovate Illinois: A Public-Private Partnership to Secure Federal Funding for Illinois," Press Release, March, 28, 2023, www.illinois.gov/news/press-release.26248.html.

Below, we present recommendations for additional policy interventions needed to realize this report's goals that require coordination between local, state, and federal representatives and governments.

At the federal level, local governments, with the support of the state, need to coordinate their efforts to facilitate the passage of a lands bill to increase the land available for future development. While such legislation is carried by members of the federal delegation, coordinated advocacy by private, public, and nonprofit organizations in Southern Nevada is critical to legislative success. The failure to secure additional developable land will undermine future economic growth and job creation.¹⁵⁸

The UNLV North Campus can anchor multiple research and development clusters to support regional economic diversification. However, the current federal land conveyance limits its development to partnerships among public entities. Included in the Southern Nevada Economic Development and Conservation Act of the 117th Congress (2021-2022) was language allowing for partnerships between public and private organizations. This issue must be revisited in future legislation so that UNLV can engage with private entities to develop partnerships akin to those that have made Black Fire Innovation so successful. In addition, in the 2025 session of the Nevada Legislature, AB 74 (2023) in the form that passed the Assembly unanimously should be reintroduced. This legislation would add blanket language to NRS ensuring that higher education institutions have the legal authority to enter public-private partnerships to construct capital projects.¹⁵⁹

A barrier to developing Apex is that the federal Bureau of Land Management controls the park's utility corridors. This means that projects on a one-by-one basis must satisfy federal environmental review before they are permitted. The Apex Area Technical Corrections Act introduced by Sen. Catherine Cortez Masto in the current Congress would streamline a process that currently can take three years to complete.¹⁶⁰ Passage of this legislation will expedite Apex's development and should be supported by state and local governments.

Nevada's federal delegation is a crucial conduit to access federal funds to develop the SNSA. The cost for the airport, based upon an estimate from 2019, is \$12 billion.¹⁶¹ Likewise, the federal delegation can support the

¹⁵⁸ RCG Economics, "Policy Brief No. 2: Southern Nevada Employment Land Analysis."

¹⁵⁹ See Legislative Counsel Bureau Audit Division, "Performance Audit: Nevada System of Higher Education, Capital Construction Projects," Carson City, Nevada, December 27, 2022.

¹⁶⁰ Katie Ann McCarver, "Legislation aims to streamline permit process at NLV industrial park," *Las Vegas Sun*, July 16 2023, <https://lasvegassun.com/news/2023/jul/16/legislation-aims-to-streamline-permit-process-at-nlv/>.

¹⁶¹ Hagar, "Clark County official: New Vegas airport will cost more than \$12 billion."

region's efforts to increase the use of rail to support the region's warehousing and logistics clusters. The state through the *Nevada State Rail Plan* has developed a comprehensive framework for expanding rail capacity. However, without federal support, the costs of developing industrial parks that are served by rail and that connect to truck-based shippers is prohibitive. This effort would gain additional political clout if it was coordinated with representatives from Arizona, California, and Utah like the Interstate 11 Caucus established by Arizona and Nevada members of the House of Representatives to advocate for I-11.

Lastly, we recommend that NDOT reconsider the routing of I-11 north of Las Vegas. Currently, a western route that uses U.S.-95 and links to Winnemucca, Nevada, is designated.¹⁰² However, this routing is inconsistent with the purpose of the CANMEX corridor because this routing would terminate at I-80 far from other interstates, reducing I-11's efficiency and economic development potential. In contrast, an eastern routing that utilizes U.S.-93 to I-80 offers a less congested and less expensive route through Nevada that links to existing interstates adjacent to northeast Nevada (e.g., I-84 and I-15) and eventually to Highway 3 in Canada. An eastern routing would also stimulate economic development in eastern Nevada and directly link Apex to the heart of Nevada's mining region to facilitate the industrial development noted above and provide an interstate alternative route for the Nevada section of the I-15 corridor.¹⁰³

Conclusion

The recommendations presented in Part 5 provide a framework to facilitate regional industrial-based economic development and diversification in Southern Nevada. However, the single most important factor that will determine if these recommendations are realized is buy in from local governments. Doing so will require the region's local governments to relinquish some authority over land use decisions and associated funding streams as well as the mix of firms and industries that each entity pursues as part of their individual economic development efforts. Fortunately, there are precedents for Southern Nevada's local governments to put aside their individual agendas to work together to advance collective goals.

In 2015, the local governments in the Las Vegas Valley ratified the SNS regional plan. The plan created a comprehensive strategy for addressing issues related to economic competitiveness, education, community

¹⁰² The recommendation is adapted from Damore et. al, *Nevada Economic Development and Public Policy 2022-2026* and Arthur C. Nelson, "Interstate 11: The Road to Prosperity in Nevada," Brookings Mountain West, December 2021, https://digitalscholarship.unlv.edu/brookings_policybriefs_reports/8/.

¹⁰³ I-15 Mobility Alliance, "I-15 Corridor Alternative Route Study," August 2017, <https://i15alliance.org/projects/i-15-project-corridor-alternate-route-study/>.

development, and transportation among other considerations. As noted above, the SNS steering committee is overseeing an update to the SNS regional plan. The continuation of this effort is indicative of the value that regional stakeholders see in working to develop and implement regional goals. When realized, these goals leave all participating entities better off than if they try to resolve these same issues on their own.

Established in 1991, the SNWA – arguably one of the most effective water agencies in the country if not the world – owes its existence to local governments collectivizing their individual water rights and decision-making authority. In return, local governments benefit from an agency that has been able to stabilize and expand the regional water supply, scale water infrastructure projects, and provide a single, powerful voice to negotiate with other Colorado River users and the federal government.

The creation of the SNWA was precipitated by a crisis exacerbated by policies and governing arrangements that incentivized individual water agencies to maximize their own use at the expense of the collective needs of the region. This precipice has parallels to the current state of economic development in Southern Nevada. Individual economic development organizations accountable to separate governing structures pursue their own agendas in hopes of besting their regional peers for one-off wins in a region with diminishing natural resources, insufficient infrastructure, and impending challenges that no one entity can solve.

These examples, as well as the coordination and cooperation among local governments that occurred during the COVID-19 pandemic, provide a pathway for a regional approach to industrial development that will better position Southern Nevada to compete against neighboring metros for the investments and opportunities that are needed to create a more diverse and resilient regional economy.

Appendix A: Prior Research

This report extends and incorporates ideas and recommendations from prior economic development research and analyses examining Nevada and its regions that are summarized below.

Unify, Regionalize, and Diversify: An Economic Development Agenda for Nevada (2011). Commissioned by the State of Nevada and written by researchers at the Brookings Institution, Brookings Mountain West, and SRI International, this report developed Nevada's post-Great Recession blueprint to restructure the state's approach to economic development. The report established a new governance and administrative structure (GOED and the RDAs), identified region-specific target industries, and suggested mechanisms and resources for direct state investment in economic development such as tax abatements, the Knowledge Fund, and the Catalyst Fund.

A Way Forward for Apex: A ULI Technical Assistance Panel Report (2016). Following the passage of legislation during the 29th Special Session of the Nevada Legislature (2015) facilitating the industrial development of Apex, this report summarizes the recommendations from the LVGEA-sponsored workshop conducted by the Urban Land Institute to develop a five-year plan to realize the industrial potential of Apex in North Las Vegas.

I-15 Corridor System Master Plan, Update 2017 (2017). This report updates the master plan developed by the I-15 Mobility Alliance partner organizations to articulate the alliance's vision, performance metrics, and project prioritization between the parts of California, Nevada, Arizona, and Utah that are economically and geographically dependent upon the I-15 corridor to move people and goods.

Nevada's Plan for Recovery & Resilience (2020). Written by researchers at SRI International with the assistance of RCG Economics and Brookings Mountain West, the report provided a pandemic-based SWOT analysis of Nevada's economic development efforts using 2011 benchmarking, offered economic forecasts for the state's recovery, and identified priority areas for short-and long-term policy interventions. The report also considered how Nevada's regions can leverage their megapolitan geography to grown and diversify their economies.

Nevada COVID-19 Coordinated Economic Response Plan: Supply Chain Analysis (2020). This report, commissioned by GOED and completed by RCG Economics and Spatial Economic Concepts, provides a

comprehensive overview of the economics of supply chains, how these processes are rapidly being challenged and invigorated by e-commerce and shifts in consumer spending brought on by the COVID-19 pandemic, and how Nevada's geography can be used to integrate connectivity corridors. The report also notes the dearth of north/south economic activity and infrastructure within the state and how goods have historically through Nevada along east/west routes due to the state's proximity to California.

Access 2050: Regional Transportation Plan for Southern Nevada (2021). This report updates the RTC of Southern Nevada's vision, goals, and strategies to strengthen regional economic competitiveness, maintain and enhance quality of life, and ensure sustainable use of infrastructure and resources through the year 2050. The report highlights the regional dependence on inbound freight and the challenges of freight movement through the urban core. The report also develops a project list, including the creation of a Freight Village, to create the infrastructure needed to accommodate current and future freight mobility.

Nevada State Rail Plan (2021). Produced by NDOT, the report develops a comprehensive overview of existing rail service in Nevada and strategies to increase freight and passenger rail initiatives, integrate rail with economic development and transportation planning, and fund new rail infrastructure to support freight and passenger traffic.

Report on the Southern Nevada Infrastructure Development Group (2021). The report was completed by RCG Economics on behalf of GOED and summarizes the six meeting of the Southern Nevada Infrastructure Development Group during the first half of 2021. The group considered how to position the region for the future; leverage the region's geography to expand logistics and operations; pursue opportunities in electrification and automation; finance infrastructure investments; utilize public transit to facilitate efficient land development; and manage industrial development in the face of limitations of suitable land.

Nevada Economic Development and Public Policy 2022-2026: A Sustainable Future for All Nevadans (2022). This report was completed by researchers at The Lincy Institute and Brookings Mountain West. It evaluates regional economic successes and challenges since the implementation of the 2011 reforms to economic development policy; provides state and regional demographic and economic trends for the coming decades; offers a summary of federal and state pandemic-based actions relevant to economic development; and makes recommendations for state and regional policy and governance interventions that leverage the connectivity of Nevada's region to its megapolitan geography.

Realizing Nevada's Electric, Innovative, and Connected Future (2023). This report was prepared by SRI International for GOED and provides a five-year strategy for economic development that focuses on opportunities for Nevada to play a key role in the nation's energy transition, the need to strengthen the state's innovation ecosystems, and offers recommendations for infrastructure investments to improve digital and transportation connectivity.

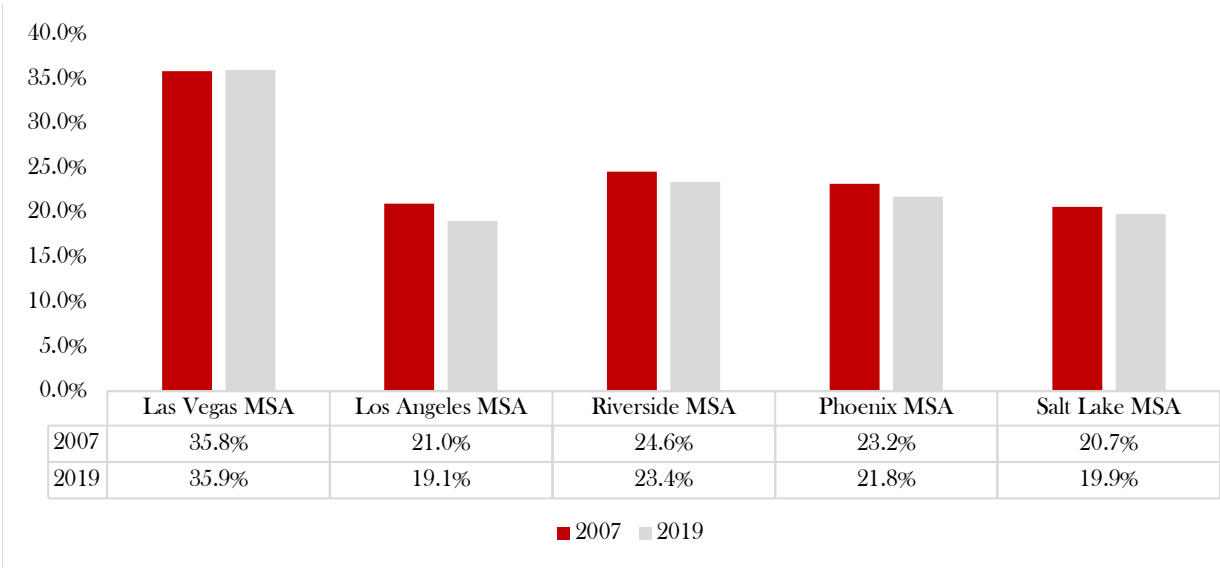
Policy Brief No.2: Southern Nevada Employment Land Analysis (2023). This GOED-commissioned report was completed by RCG Economics and update's the firms 2020 inventory of land suitable for industrial development in Southern Nevada. The report finds that there are 142 land parcels totaling approximately 16,400 acres, less than a third of which are ranked in the top two tiers, that can be developed to support economic growth. The report also estimates how limited land available for development can reduce employment growth and by extension, the gross regional product.

Appendix B: Low Labor Productivity and Wage Sectors

Las Vegas’s economic growth has primarily been driven by sectors with lower productivity and lower wages. This trend probably reflects Las Vegas’s tendency to train and attract a higher proportion of workers without bachelor’s degrees or higher, who often find employment in lower-wage or lower-productivity sectors. Las Vegas’s lower educational levels also contribute to a prevalence of lower-tier jobs within higher-productivity and higher-wage industries.

To evaluate that extent of these trends, we analyzed low labor productivity and low wage sectors (retail trade; transportation and warehousing; administrative and support and waste management and remediation services; arts, entertainment, and recreation; accommodation and food services; and other services) to evaluate the changes in combined shares of real GDP and employment between 2007 and 2019.¹⁶⁴ The data presented in Figures B.1 and B.2 illustrate that the reduced share of leisure and hospitality jobs in Las Vegas was predominantly replaced by jobs in lower-productivity and lower-wage sectors.

Figure B.1: Share of Real GDP for Selected Lower Productivity and Wage Sectors, 2007 and 2019

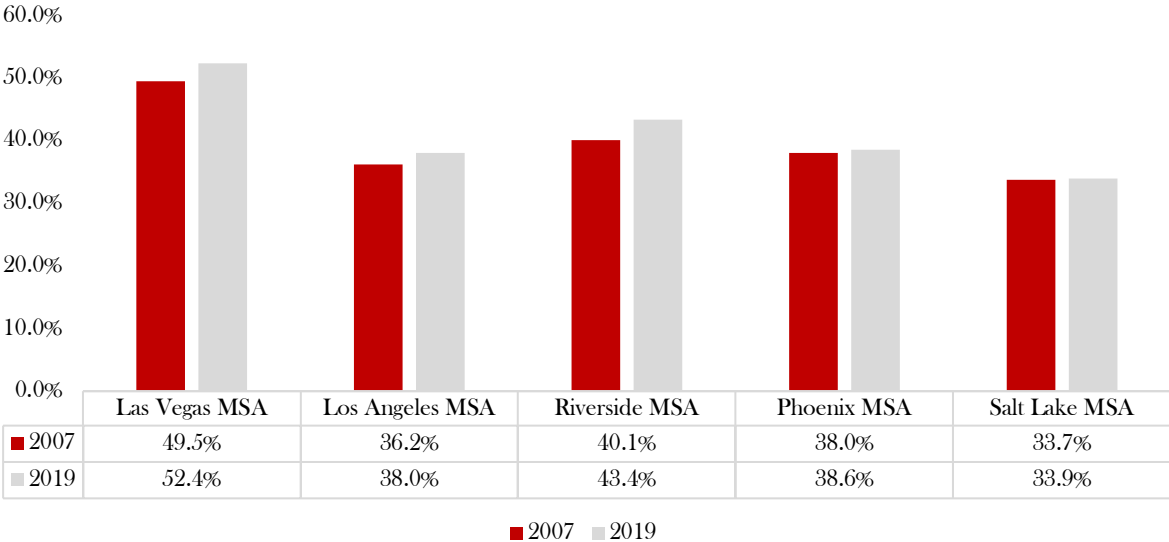


Note: GDP is the initialism for gross domestic product and MSA is the initialism for metropolitan statistical area.
Source: U.S. Bureau of Economic Analysis.

¹⁶⁴ Agriculture, forestry, fishing, and hunting were not included as this sector accounts for less than 0.1 percent of the Las Vegas MSA economy. Educational services, healthcare, and social assistance sectors were also excluded as they provide essential services to the population (although the average compensations in those sectors are lower compared to the average of the total employment in the U.S.). In addition, the shares of employment in these sectors are much lower in Southern Nevada compared to the U.S. average, suggesting that that region still needs to continue its efforts to expand these sectors to improve the delivery of health care and social services. Construction was also excluded included because Southern Nevada offers competitively higher compensation to construction workers compared to the average compensation of total employment in the U.S.

The selected lower-productivity and lower-wage sectors represented 35.8 and 35.9 percent of real GDP in Las Vegas, respectively, in 2007 and 2019. Despite these sectors already having substantial shares in 2007 compared to adjacent metros, the Las Vegas MSA was the only metro to experience an increase in the proportion over time. In terms of employment, the selected sectors accounted for 49.5 and 52.4 percent in Las Vegas, respectively, in 2007 and 2019 (see Figure B.2). Although the Riverside MSA saw the largest increase in the share of employment for the selected sectors, up 3.4 percent from 2007 to 2019, their share of real GDP in these sectors decreased by 1.2 percent over the same period. This suggests that higher productivity sectors grew, complementing the lower productivity sectors’ expansion.

Figure B.2: Share of Employment for Selected Lower Productivity and Wage Sectors, 2007 and 2019



Note: MSA is the initialism for metropolitan statistical area.
 Source: U.S. Bureau of Economic Analysis.

The proportionally larger share of the workforce in the Las Vegas MSA without a bachelor’s degree also constrains other industries in the region with higher productivity and wages such as finance and insurance. That is, the average compensation per worker in the finance and insurance sector is lower than the average compensation for total employment in Las Vegas. This stands in contrast to the Los Angeles, Phoenix, and Salt Lake City metros, where the finance and insurance industry provides significantly higher compensation than the average for total employment. We observe a similar trend in the manufacturing sector (see Appendix C), where manufacturing jobs with higher wages pay less in Clark County compared to nearby metros. Thus, Las Vegas’s lower educational levels often result in lower-level jobs within higher-productivity and higher-wage industries and may be the cause for widening growth gaps in real GDP relative to proximate MSAs.

As the data in Table B.1 detail, Southern Nevada’s relatively weak economic performance is due to limited diversification that concentrate employment in a handful of sectors with high shares of lower paying jobs, trends that have persisted even after the state reformed its approach to economic development. In 2007, the leisure and hospitality sector¹⁶⁵ accounted for 20.7 percent of the real GDP in the Las Vegas metro area, employing 25.0 percent of total employment. Although tourism dependency lessened to 18.3 and 23.3 percent of real GDP and employment in 2019, it still remained disproportionately large when considering that the top sectors in nearby metros accounted for less than 15 percent of employment.

Table B.1: Comparison of Employment Sectors Between Las Vegas and Adjacent Metros, 2007-2019

	Year	Las Vegas MSA	Los Angeles MSA	Riverside MSA	Phoenix MSA	Salt Lake City MSA
Real GDP (Share %)	2007	Accommodation and food services (17.2%)	Real estate and rental and leasing (14.1%)	Government (17.7%)	Real estate and rental and leasing (14.4%)	Finance and Insurance (13.1%)
	2019	Accommodation and food services (14.8%)	Real estate and rental and leasing (14.0%)	Government (16.9%)	Real estate and rental and leasing (15.0%)	Finance and Insurance (12.1%)
Employment (Share %)	2007	Accommodation and food services (22.1%)	Government (10.1%)	Government (14.7%)	Retail trade (11.6%)	Government (12.6%)
	2019	Accommodation and food services (20.1%)	Healthcare and social assistance (12.2%)	Government (13.3%)	Healthcare and social assistance (11.3%)	Government (12.3%)

Note: GDP is the initialism for gross domestic product and MSA is the initialism for a metropolitan statistical area.
Source: U.S. Bureau of Economic Analysis.

This high dependency led to a profound economic downturn during the COVID-19 pandemic recession, resulting in lower real GDP and employment levels in 2019 compared to 2021 in Las Vegas. Conversely, Phoenix, Riverside, and Salt Lake City experienced increases in both real GDP and employment. Employment in Los Angeles declined from 2019 to 2021, but its real GDP increased from 2019 to 2021.

¹⁶⁵ Arts, entertainment and recreation and accommodation and food services sectors.

Appendix C: Select Industry Employment Trends

Appendix C provides an overview of manufacturing and warehousing and transportation employment trends in Clark and adjacent counties that inform the report recommendations.

Manufacturing Employment Growth

The 3-digit codes from the National American Industry Classification System (NAICS) were combined with data from the U.S. Census County Business Patterns to assess manufacturing employment growth in Clark and selected counties in the Southwest Triangle Megapolitan Cluster and the Mountain Megapolitan Cluster. These data are presented in Table C.1.

Clark County added the most manufacturing employment in Miscellaneous Manufacturing (NAICS 339) between 2015 and 2020 due to strength in gaming machine manufacturing. Other noticeable gains occurred in Primary Metal Manufacturing (NAICS 331), Fabricated Metal Production Manufacturing (NAICS 332), and Food Manufacturing (NAICS 311). Overall, most manufacturing subsectors added employment from 2015 to 2020 in Clark County.

All counties except for Los Angeles saw the largest gains in Fabricated Metal Product Manufacturing, Food Manufacturing, and Chemical Manufacturing. Maricopa County added the most manufacturing jobs in Fabricated Metal Product Manufacturing, Food Manufacturing, and Machinery Manufacturing. Riverside County added the most manufacturing jobs in Beverage and Tobacco Product Manufacturing, Computer and Electronic Product Manufacturing, and Nonmetallic Mineral Product Manufacturing. Salt Lake County added the most manufacturing jobs in Miscellaneous Manufacturing mainly due to Medical Equipment and Supplies Manufacturing adding 2,473 jobs, Computer and Electronic Product Manufacturing, and Chemical Manufacturing.

An analysis of compensation for employees working in manufacturing suggests higher wages compared to all employees in their counties (see Table C.2). Clark County's manufacturing employees, however, were paid less than manufacturing workers in the counties. This may be a consequence of manufacturing jobs available in Clark County that may not require an advanced degree.

Table C.1: County-level Change in Manufacturing Employment, 2015-2020

Industry (NAICIS)	Clark, NV	Los Angeles, CA	Maricopa, AZ	Riverside, CA	Salt Lake, UT	San Bernardino, CA	Utah, UT
Food (311)	388	-3,782	2,427	663	564	1,542	-27
Beverage and Tobacco Product (312)	282	2,615	845	997	238	11	30
Textile Mills (313)	NA	-2,347	-27	-81	93	117	70
Textile Product Mills (314)	-61	6	-188	-47	-105	-134	-3
Apparel (314)	14	-20,035	80	-79	-105	-92	-28
Leather and Allied Product (316)	NA	108	-17	16	-21	5	148
Wood Product (321)	129	-301	878	558	110	111	215
Paper (322)	12	-974	1,337	210	-6	302	248
Printing and Related Activities (323)	346	-3,590	444	-297	-233	-208	-19
Petroleum and Coal Products (324)	147	88	202	183	303	66	NA
Chemical (325)	262	-1,366	1,145	116	1,466	233	545
Plastics and Rubber Products (326)	257	991	732	256	630	-256	242
Nonmetallic Mineral Product (327)	225	-411	873	668	83	233	213
Primary Metal (331)	692	-545	-395	194	74	-289	26
Fabricated Metal Product (332)	591	-2,070	3,338	516	-310	1,683	-196
Machinery (333)	133	-1,701	2,302	147	-151	-196	-240
Computer and Electronic Product (334)	211	-394	258	691	1,574	188	-601
Electrical Equipment, Appliance, and Component (335)	25	-1,466	-84	57	566	-75	293
Transportation Equipment (336)	-21	-503	992	-9	1,026	-527	104
Furniture and Related Product (337)	294	-2,098	117	551	162	-556	191
Miscellaneous (339)	884	-862	-71	-430	2,445	-577	97

Notes: NAICS is the acronym for the North America Industry Classification System. Because the U.S. Census data are inexact, the sum of NAICS 3-Digit Manufacturing Employment Growth may not match with the total manufacturing employment gains shown in Figure 2.4.

Source: U.S. Census.

Table C.2: County-level Manufacturing Average Annual Wages, 2020

Annual Wages	Clark, NV	Los Angeles, CA	Maricopa, AZ	Riverside, CA	Salt Lake, UT	San Bernardino, CA	Utah, UT
Total for all sectors	\$41,891	\$62,417	\$53,973	\$42,752	\$57,377	\$ 47,428	\$49,763
Manufacturing	\$48,758	\$65,005	\$63,479	\$53,268	\$65,384	\$54,329	\$56,346

Notes: U.S. Census data provide annual payroll and employee counts by the North America Industry Classification System codes. The average annual wages were calculated by dividing the total annual payroll by the number of employees.

Source: U.S. Census.

Manufacturing Employment Projections

Manufacturing subsectors identified in the Reshoring Initiative “2022Q3 Data Report” suggesting promising growth were evaluated to assess future opportunities.¹⁶⁶ These include essential product industries that support the manufacturing economy related to EV batteries, chips, pharmaceuticals, chemicals for batteries, personal protective equipment, and medical devices. These industries and their 3-digit NAICS codes are: chemical manufacturing (NAICS 325), plastics and rubber product manufacturing (NAICS 326), fabricated metal product manufacturing (NAICS 332), computer and electric product manufacturing (NAICS 334), electric equipment, appliance, and component manufacturing (NAICS 335), transportation equipment manufacturing (NAICS 336), and medical equipment and supplies manufacturing (NAICS 3391).

The projections that follow are based upon data obtained from the Arizona Commerce Authority for Maricopa County, Nevada Department of Employment, Training and Rehabilitation for Clark County, and the Southern California Association of Governments for Los Angeles, Riverside, and San Bernardino.¹⁶⁷ Because of a lack of comparable data, projections for Salt Lake and Utah counties are excluded. Also considered are national employment projections provided by the U.S. Bureau of Labor Statistics (BLS).¹⁶⁸

¹⁶⁶Reshoring Initiative, “2022 Q3 Data Report.”

¹⁶⁷Projections for Los Angeles, Riverside, and San Bernardino counties are the baseline employment forecasts from Regional Economic Models (REMI)’s PI+ 3.0 Models. These baseline forecasts were provided by the Southern California Association of Governments (SCAG). SCAG subscribes to the REMI PI+ Models for SCAG regions, which include Los Angeles, Orange, Riverside, San Bernardino, Imperial, and Ventura counties.

¹⁶⁸ U.S. Bureau of Labor Statistics, “Employment Projections 2021-2031,” www.bls.gov/emp/.

Chemical Manufacturing Projections¹⁶⁹

All selected counties except for Los Angeles increased chemical manufacturing employment from 2015 to 2020 (see Table C.1). Salt Lake, Maricopa, and Utah counties experienced the largest gains of 1,466, 1,145, and 545 jobs, respectively. Clark County added 262 jobs during the same period. Los Angeles County lost chemical manufacturing employment between 2015 and 2020. Analysis of Quarterly Census of Employment and Wages (QCEW) data from DETR from 2011 to 2022 (not reported) indicate that Clark County has posted upward employment trends in pharmaceutical and medicine (NAICS 3254); paint, coating, and adhesive (NAICS 3255); soap, cleaning compound, and toilet preparation (NAICS 3256); and other chemical product and preparation manufacturing (NAICS 3259). Consistent with national expectations, the employment projections for chemical manufacturing for the selected counties are robust (see Table C.3). Maricopa and Los Angeles counties are expected to add 3,885 and 2,668 jobs, respectively, while Clark is forecasted to add 409 jobs or grow by 32.7 percent in chemical manufacturing from 2020 to 2030, eclipsing both Riverside and San Bernadino counties.

Considering the projections from the by U.S. Bureau of Labor Statistics (BLS) and recent trends in Clark County, the following three sectors provide opportunities for growth: pharmaceutical and medicine manufacturing (NAICS 3254); paint, coating, and adhesive manufacturing (NAICS 3255); soap, cleaning compound, and toilet preparation manufacturing (NAICS 3256).

Table C.3: County-level Chemical Manufacturing Projections, 2020-2030

County	Net Change	Percentage Change
Clark, NV	409	32.7%
Los Angeles, CA	2,668	9.6%
Maricopa, AZ	3,885	67.1%
Riverside, CA	129	10.4%
San Bernardino, CA	164	8.4%

Sources: Arizona Commerce Authority, Nevada Department of Employment, Training and Rehabilitation, and Southern California Association of Governments.

¹⁶⁹Chemical manufacturing includes the following industries: basic chemical manufacturing (NACIS 3251); resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing (NAICS 3252); pesticide, fertilizer, and other agricultural chemical manufacturing (NAICS 3253); pharmaceutical and medicine manufacturing (NAICS 3254); paint, coating, and adhesive manufacturing (NAICS 3255); soap, cleaning compound, and toilet preparation manufacturing (NAICS 3256); and other chemical product and preparation manufacturing (NAICS 3259).

Plastics and Rubber Products Manufacturing¹⁷⁰

Between 2015 and 2020 (see Table C.1), all selected counties except for San Bernardino experienced gains in plastics and rubber products manufacturing. Los Angeles County posted the largest gain, adding 991 jobs, followed by Maricopa (+732 jobs), Salt Lake (+630 jobs), Clark (+257 jobs), Riverside (+256 jobs), and Utah (+242 jobs) counties from 2015 to 2020). Analysis (not reported) of QCEW data indicate that Clark County's rubber product manufacturing employment has experienced a downward trend over the decade. Nationally, the BLS forecasts that both industries will add 24,100 and 6,800 jobs, respectively, from 2021 to 2031.

Table C.4 presents the employment outlook for plastics and rubber product manufacturing for Clark and the other selected counties. Clark County is projected to add 374 jobs in plastic and rubber product manufacturing, a 20.8 percent increase. Maricopa and Los Angeles counties expect to add 1,389 and 269 jobs between 2020 and 2030. Riverside and San Bernardino counties, however, are predicted to have little to no growth in plastics and rubber product manufacturing.

Considering the BLS's projections and recent employment trends in Clark County, including a downward trend in rubber product manufacturing employment, plastic product manufacturing should be prioritized.

Table C.4: County-level Plastics and Rubber Products Manufacturing Projections, 2020-2030

County	Net Change	Percentage Change
Clark, NV	374	20.8%
Los Angeles, CA	269	2.2%
Maricopa, AZ	1,389	35.9%
Riverside, CA	-3	-0.1%
San Bernardino, CA	10	0.2%

Sources: Arizona Commerce Authority, Nevada Department of Employment, Training and Rehabilitation, and Southern California Association of Governments.

¹⁷⁰ Plastics and rubber products manufacturing includes two industries: plastics product manufacturing (NAICS 3261) and rubber product manufacturing (NAICS 3262). The Bureau of Labor Statistics forecasts that both industries will add an additional 24,100 and 6,800 jobs, respectively, in the current decade.

Fabricated Metal Product Manufacturing¹⁷¹

Maricopa, San Bernardino, Clark, and Riverside counties posted growth in fabricated metal product manufacturing employment from 2015 to 2020, while Los Angeles, Salt Lake, and Utah counties experienced declines in employment (see Table C.1). Analysis (not reported) of QCEW data indicate from 2010 to 2022 suggest that employment in architectural and structural metals manufacturing (NAICS 3323) has grown steadily in Clark County. Job growth in coating, engraving, heat treating, and allied activities (NAICS 3328), although small in overall numbers, also has been trending upward.

Nationally, the BLS predicts that the largest increases will occur in machine shops; turned product; and screw, nut, and bolt manufacturing (+18,100 jobs), and architectural and structural metals manufacturing (+13,700 jobs). Despite reduced employment in fabricated metal product manufacturing in Los Angeles County from 2015 to 2020, the employment outlook projections presented in Table C.5 indicate that Los Angeles County will add 3,705 jobs in fabricated metal product manufacturing. Clark, Riverside, and San Bernardino counties also expect increases in employment in fabricated metal product manufacturing from 2020 to 2030.

Given recent and projected trends, within fabricated metal product manufacturing, architectural and structural metals manufacturing (NAICS 3323) provide opportunities for growth.

Table C.5: County-level Fabricated Metal Product Manufacturing Projections, 2020-2030

County	Net Change	Percentage Change
Clark, NV	145	5.6%
Los Angeles, CA	3,705	11.1%
Maricopa, AZ	3,118	19.1%
Riverside, CA	2,043	12.1%
San Bernardino, CA	737	9.5%

Sources: Arizona Commerce Authority, Nevada Department of Employment, Training and Rehabilitation, and Southern California Association of Governments

¹⁷¹ Fabricated metal product manufacturing includes nine industries: forging and stamping (NAICS 3321); cutlery and hand tool manufacturing (NAICS 3322); architectural and structural metals manufacturing (NAICS 3323); boiler, tank, and shipping container manufacturing (NAICS 3324); hardware manufacturing (NAICS 3325); spring and wire product manufacturing (NAICS 3326); machine shops; turned product; and screw, nut, and bolt manufacturing (NAICS 3327); coating, engraving, heat treating, and allied activities (NAICS 3328); and other fabricated metal product manufacturing (NAICS 3329).

Computer and Electric Product Manufacturing¹⁷²

Most selected counties including Clark County exhibited an upward trend in computer and electric product manufacturing employment from 2015 to 2020 except for Los Angeles and Utah counties (see Table C.1). Analysis of wage data (not reported) indicates that workers in this sector were paid much higher compared to the average worker in their county. However, compensation in Clark and San Bernardino counties lagged relative to the other counties. This may be the case because sector employment in these counties may be concentrated in electronic equipment assembling rather than the better compensated hardware engineering.¹⁷³ Analysis of QCEW data (not reported) from 2010 to 2022 indicate that in Clark County employment in semiconductor and other electronic component manufacturing and navigational, measuring, electromedical, and control instruments manufacturing are on an upward trend.

The BLS forecasts an increase in computer and electric product manufacturing employment nationally with an expected increase of 11,600 jobs from 2021 to 2031.¹⁷⁴ Clark County and the other selected counties are expected to increase employment in computer and electronic product manufacturing 2020 to 2030 (see Table C.6). Los Angeles and Maricopa counties are projected to have the largest job additions of 6,669 and 3,263 respectively from 2020 to 2030. Riverside, Clark, and San Bernardino counties predict limited growth, adding 83, 82, and 56 jobs respectively.

Within computer and electronic product manufacturing, one area where Southern Nevada can play a role is in supply chain and suppliers for the growing semi-conductor facilities in Arizona. Through the CHIPS and Science Act, producers in Maricopa County are receiving over \$50 billion to support semiconductor manufacturing and research.¹⁷⁵ Although BLS projections expect almost no growth in navigational, measuring, electromedical, and control instruments manufacturing, it should be viewed as a target for supply chain integration. Thus, within computer and electronic product manufacturing semiconductor and other electronic component manufacturing (NAICS 3344) and navigational, measuring, electromedical, and control instruments manufacturing (NAICS 3345) should be prioritized.

¹⁷² Computer and electric product manufacturing includes six industries: computer and peripheral equipment manufacturing excluding digital camera manufacturing (NAICS 3341); communication equipment manufacturing (NAICS 3342); audio and video equipment manufacturing (NAICS 3343); semiconductor and other electronic component manufacturing (NAICS 3344); navigational, measuring, electromedical, and control instruments manufacturing (NAICS 3345); and manufacturing and reproducing magnetic and optical media (NAICS 3346).

¹⁷³ U.S. Bureau of Labor Statistics. "Occupational Employment and Wage Statistics," www.bls.gov/oes/current/naics3_334000.htm.

¹⁷⁴ The CHIPS and Science Act, which seeks to boost domestic manufacturing of critical computer and technology components, was passed and signed into law in August, 2022. Any expected increase in relevant employment is not included in these estimates.

¹⁷⁵ Cecilia Kang, "How Arizona Is Positioning Itself for \$52 Billion to the Chips Industry," *The New York Times*, February 23, 2023, www.nytimes.com/2023/02/22/technology/arizona-chips-act-semiconductor.html.

Table C.6: County-level Computer and Electric Product Manufacturing Projections, 2020-2030

County	Net Change	Percentage Change
Clark, NV	82	12.5%
Los Angeles, CA	6,669	9.7%
Maricopa, AZ	3,263	11.1%
Riverside, CA	83	10.6%
San Bernardino, CA	56	8.9%

Sources: Arizona Commerce Authority, Nevada Department of Employment, Training and Rehabilitation, and Southern California Association of Governments.

Electric Equipment, Appliance, and Component Manufacturing¹⁷⁶

Electric equipment, appliance, and component manufacturing has experienced strong growth recently thanks to expanding lithium battery manufacturing. Although Maricopa and Los Angeles counties lost employment in this sector from 2015 to 2020, they expect to add 1,185 and 1,590 jobs, respectively, from 2020 to 2030 (see Table C.7). In Clark County, analysis of QCEW data from 2010 to 2022 (not reported) suggest that employment in electrical equipment manufacturing, and other electrical equipment and component manufacturing has been increasing. Nationally, the BLS projects an increase in electrical equipment, appliance, and component manufacturing employment. Most of this increase (24,200 jobs) is expected in other electrical equipment and component manufacturing, reflecting growth in the battery market. The BLS predicts a slight employment increase in electrical equipment manufacturing, adding 1,800 jobs over the same period. The projections presented in Table C.7 indicate that Clark, Riverside, and San Bernardino counties expect to add 79, 172, and 335 jobs in electric equipment, appliance, and component manufacturing.

Queen Creek in Maricopa County received a commitment from LG Energy Solution for a \$5.5 billion investment in a battery plant, providing an opportunity for supply chain integration with firms in Clark County.¹⁷⁷ Appliance, and component manufacturing firms focusing on electrical equipment manufacturing (NAICS 3353) and other electrical equipment and component manufacturing (NAICS 3359) provide opportunity for manufacturing expansion.

¹⁷⁶ Electric equipment, appliance, and component manufacturing includes four industries: electric lighting equipment manufacturing (NAICS 3351); household appliance manufacturing (NAICS 3352); electrical equipment manufacturing (NAICS 3353); and other electrical equipment and component manufacturing (NAICS 3359).

¹⁷⁷ Hunter Bassler, "Queen Creek getting \$5.5 billion battery plant from LG," 12 News, March 24, 2023, www.12news.com/article/money/business/5-billion-battery-plant-queen-creek-lg/75-64991f98-d511-4808-ad66-50b7e2350267.

Table C.7: County-level Electric Equipment, Appliance, and Component Manufacturing, 2020-2030

County	Net Change	Percentage Change
Clark, NV	79	12.2%
Los Angeles, CA	1,590	22.6%
Maricopa, AZ	1,185	49.5%
Riverside, CA	172	27.3%
San Bernardino, CA	335	23.4%

Sources: Arizona Commerce Authority, Nevada Department of Employment, Training and Rehabilitation, and Southern California Association of Governments.

Transportation Equipment Manufacturing¹⁷⁸

Maricopa, Salt Lake, and Utah counties saw employment gains in transportation equipment manufacturing from 2015 to 2020, while the other counties, including Clark, experienced a loss (see Table C.1). Analysis of QCEW data from 2010 to 2022 (not reported) also indicates that jobs in transportation equipment manufacturing in Clark County declined. The BLS predicts that employment in the sector will be flat from 2021 to 2031 due to shifts within subsectors (gains in three industries will be offset by losses in the other four). The projections presented in Table C.8 suggest that employment in this sector will increase by 72.2 percent or add 239 jobs from 2020 to 2030. Los Angeles and Maricopa counties expect to see 3,854 and 1,902 jobs added between 2020 and 2030, respectively. Employment in transportation equipment manufacturing for Riverside and San Bernardino counties is predicted to be either unchanged or decline slightly.

Table C.8: County-level Transportation Equipment Manufacturing Projections, 2020-2030

County	Net Change	Percentage Change
Clark, NV	239	72.2%
Los Angeles, CA	3,854	8.0%
Maricopa, AZ	1,902	9.7%
Riverside, CA	5	0.3%
San Bernardino, CA	-67	-2.9%

Sources: Arizona Commerce Authority, Nevada Department of Employment, Training and Rehabilitation, and Southern California Association of Governments.

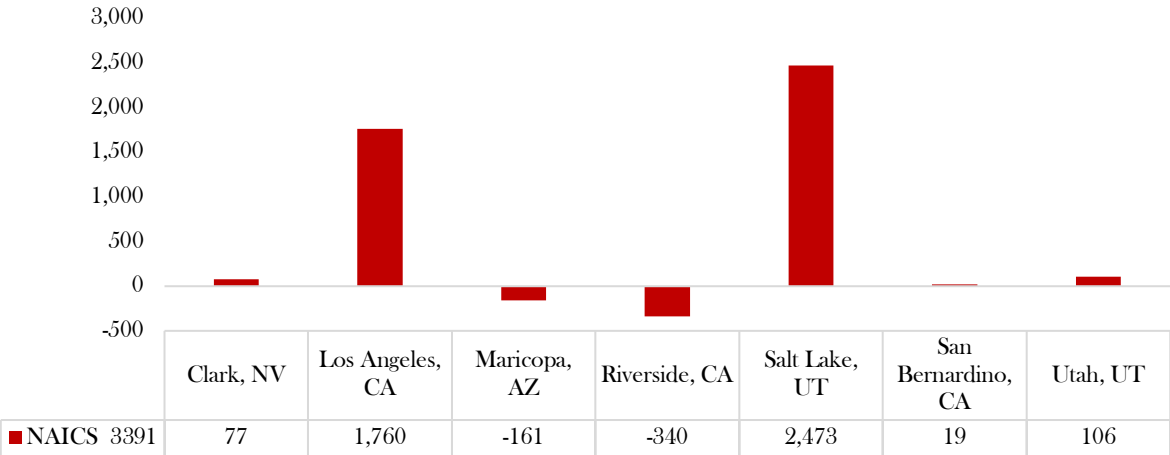
¹⁷⁸ Transportation equipment manufacturing includes seven industries: motor vehicle manufacturing (NACIS 3361); motor vehicle body and trailer manufacturing (NACIS 3362); motor vehicle parts manufacturing (NACIS 3363); aerospace product and parts manufacturing (NACIS 3364); railroad rolling stock manufacturing (NACIS 3365); ship and boat building (NACIS 3366); and other transportation equipment manufacturing (NACIS 3367).

Given expected growth, including a robust increase in motor vehicle manufacturing in 2022 and Clark County employment trends, within the transportation equipment manufacturing sector, motor vehicle manufacturing (NAICS 3361) provide opportunities for growth.

Medical Equipment and Supplies Manufacturing

COVID-19 demonstrated the importance of domestic manufacturing of medical equipment and supplies. In 2022 68 companies in this sector reshored, creating a projected 13,921 jobs nationally.¹⁷⁹ As the data presented in Figure C.1 indicate, employment in medical equipment and supplies manufacturing increased in Clark, Los Angeles, Salt Lake, San Bernardino, and Utah counties between 2015 and 2020. According to BLS’s projections, the sector will continue to grow, adding a projected 15,100 jobs by 2031. While Clark County’s medical equipment and supplies employment is limited, there is opportunity for growth

Figure C.1: County-level Medical Equipment Manufacturing Growth, 2015-2020



Note: NAICS is the acronym for the North America Industry Classification System. *Source:* U.S. Census.

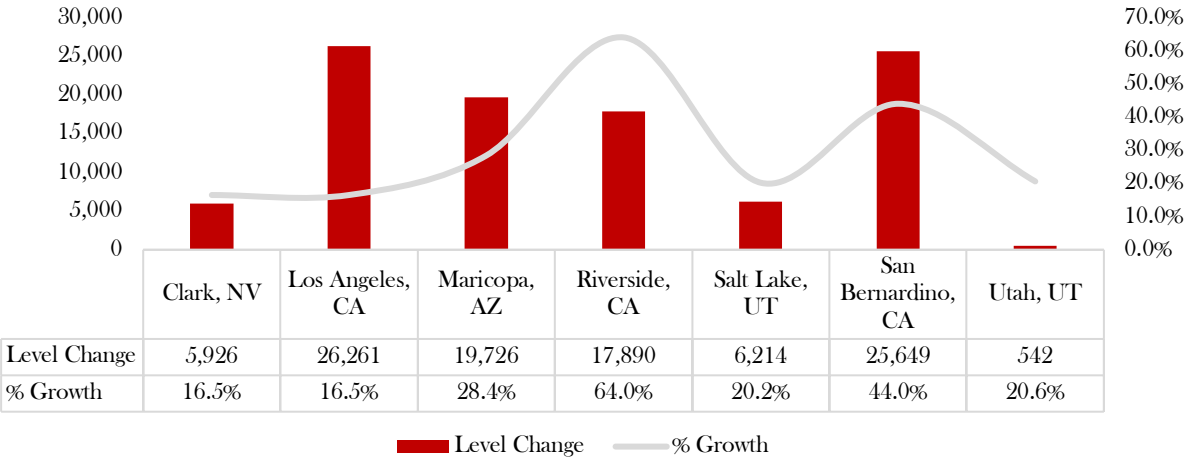
Transportation and Warehousing Employment Trends

Due to the introduction of e-commerce and changes in shopping habits as a consequence of COVID-19, employment in transportation and warehousing employment has grown substantially since 2010. In particular the warehousing boom increased economic activities in the Inland Empire to serve freight from the ports of Long Beach and Los Angeles. As the data in Figure C.2 summarizing transportation and warehousing

¹⁷⁹ Reshoring Initiative. “2022 Q3 Data Report.”

employment change from 2015 to 2020 indicate, employment in Riverside and San Bernardino counties soared by 64.0 and 44.0 percent. The employment gains in transportation and warehousing accounted for 40.9 and 21.9 percent of the total employment gains for San Bernardino and Riverside counties, respectively. Los Angeles County showed the largest increase of 26,261 jobs due to its proximity to the Southern California ports and Los Angeles International Airport, one of the largest airports in the world. Benefitting from the flow of goods on I-10 and I-17 (connected to I-40 in Flagstaff), Maricopa County experienced a gain of 19,726 jobs. In terms of net new space leased through the first half of 2022, among warehousing markets, Phoenix ranked third Salt Lake City ranked ninth, and the Inland Empire ranked 10th.¹⁸⁰ By comparison Clark County added 5,926 jobs, lower than the other selected counties except for Utah County.

Figure C.2: County-level Warehousing and Transportation Growth, 2015-2020



Source: U.S. Census.

Table C.9 disaggregates these data by subsectors and suggest that Clark County’s lower-than-expected employment gain in transportation and warehousing is due to a decrease in transit and ground passenger transportation employment, a likely consequence of increased use of services such as Uber and Lyft and the effects of the pandemic. Clark County added more employees in warehousing and storage compared to Maricopa, Salt Lake, and Utah counties. Clark County, however, had fewer job gains in truck transportation and couriers and messengers compared to Maricopa. Phoenix has better access to other regions due to its more extensive highways and rail connections compared to Las Vegas. San Bernardino also showed a strong employment increase in couriers and messengers as Ontario airport is a leading cargo hub for FedEx.

¹⁸⁰ Liz Young, “Warehouses Grow in the Desert as Phoenix Logistics Corridor Expands,” *The Wall Street Journal*, August 10, 2022, www.wsj.com/articles/warehouses-grow-in-the-desert-as-phoenix-logistics-corridor-expands-11660123801.

Table C.9: County-level Warehousing and Transportation Subsector Employment Growth, 2015-2020

Industry (NAICS)	Clark, NV	Los Angeles, CA	Maricopa, AZ	Riverside, CA	Salt Lake, UT	San Bernardino, CA	Utah, UT
Air Transportation (481)	887	5,778	-1,457	17	1,139	156	89
Water Transportation (483)	NA	-362	NA	NA	NA	NA	NA
Truck Transportation (484)	1,219	8,777	5,871	3,778	472	1,371	-571
Transit and Ground Passenger Transportation (485)	-6,151	2,081	1,875	597	-222	92	-12
Pipeline Transportation (486)	NA	-127	12	11	-94	-40	NA
Scenic and Sightseeing Transportation (487)	151	129	34	25	NA	41	NA
Support Activities for Transportation (488)	1,628	-8,267	2,922	1,507	497	984	202
Couriers and Messengers (492)	1,920	11,277	5,550	982	1,486	7,282	179
Warehousing and Storage (493)	6,272	6,975	4,919	11,057	2,529	15,796	655

Notes: NAICS is the acronym for the North America Industry Classification System. Because the U.S. Census data are inexact, the sum of NAICS 3-Digit transportation and warehousing employment growth may not match with the total transportation and warehousing employment gains shown in Figure C.2.

Source: U.S. Census.

The wage data presented in Table C.10 suggest that employees in transportation and warehousing were paid less compared to the average workers in their counties except for in Clark and Riverside counties. This may reflect higher demand for workers in Clark and Riverside counties that may not require a degree or skill training. Nationally, warehouse and storage workers are paid much less compared to the average workers.

Table C.10: County-level Transportation and Warehousing Average Annual Wages, 2020

Annual Wages	Clark, NV	Los Angeles, CA	Maricopa, AZ	Riverside, CA	Salt Lake, UT	San Bernardino, CA	Utah, UT
Total for all sectors	\$41,891	\$62,417	\$53,973	\$42,752	\$57,377	\$ 47,428	\$49,763
Transportation and Warehousing	\$42,357	\$ 55,365	\$50,680	\$46,690	\$56,050	\$46,990	\$40,650

Notes: U.S. Census data provide annual payroll and employee counts by the North America Industry Classification System codes. The average annual wages were calculated by dividing the total annual payroll by the number of employees.

Source: U.S. Census.

Transportation and Warehousing Employment Projections

The BLS predicts that all NAICS 3-Digit sectors in transportation and warehousing increase employment from 2021 to 2031. Employment in couriers and messengers (e.g., delivery truck drivers) is expected to experience the largest increase (170,800 jobs), followed by warehousing and storage (+141,000). The data in Table C.11 for the subsectors where data are available indicate that Clark and the selected counties expect to add more jobs in the transportation and warehousing sectors from 2020 to 2030.

Table C.11: County-level Transportation and Warehousing Employment Projections, 2020-2030

Industry (NAICS)	Clark, NV	Los Angeles, CA	Maricopa, AZ	Riverside, CA	San Bernardino, CA
	Net Change (Percentage Change)				
Transportation and Warehousing (48)	14,448 (28.5%)	103,353 (27.6%)	40,575 (43.6%)	6,502 (7.5%)	10,096 (7.3%)
Air Transportation (481)	1,520 (20.2%)	3,547 (9.2%)	642 (5.1%)	22 (12.3)	17 (7.1%)
Rail Transportation (482)	34 (13.1%)	125 (5.2%)	-14 (-2.8%)	17 (6.5%)	162 (6.3%)
Truck Transportation (484)	1,758 (39.8%)	1,520 (4.3%)	5,386 (30.3%)	713 (4.9%)	2,023 (4.9%)
Couriers and Messengers (492)	854 (17.6%)	286 (6.6%)	8,130 (57.0%)	582 (8.8%)	2,990 (9.0%)
Warehousing and Storage (493)	11,418 (53.5%)	1,005 (6.3%)	17,645 (58.1%)	3,948 (6.6%)	2,708 (5.4%)

Note: NAICS is the acronym for the North America Industry Classification System.

Sources: Arizona Commerce Authority, Nevada Department of Employment, Training and Rehabilitation, and Southern California Association of Governments.

In Clark County, job increases are expected to total 11,418 jobs in warehousing and storage and 1,758 jobs in truck transportation. Maricopa County is expected to have a larger gain compared to Clark County, adding 17,645, 8,130, and 5,386 jobs in warehousing and storage, couriers and messengers, and truck transportation, respectively. Riverside and San Bernardino counties, however, are predicted to have lower gains compared to Clark and Maricopa counties despite the substantial gains for the last five years.

Appendix D: The Flow of Goods

To assess the flow of goods to, from, within, and through Southern Nevada, data from S&P Global Transearch was used to develop a comprehensive analysis of current and future annual freight flows. The Transearch database presents information on the origins and destinations of these flows, categorized by the Standard Transportation Commodity Code (STCC), across seven different modes of transportation for 2015, 2019, 2021, and projected data for 2050. The data consist of freight flows aggregated to the 1995 Bureau of Economic Analysis's Economic Area (EA).

The database reports cargo in net short tons (e.g., 2000 pounds), which refers to cargo weight, excluding the transport vehicle's weight. Cargo is then assigned a value in U.S. dollars indexed to match the corresponding year of the freight flow. These values are measured at their point of origin for domestic and export flows or at their point of entry. The valuation is performed using an estimation methodology that considers the commodity type (as determined by the STCC) and the state from which the commodity originates.

Within the database, there are filters to differentiate the direction of freight flows based upon a load's origin and destination. The outbound filter is for cargo that originates in Clark County and the destination is not Clark County. The inbound filter is for cargo where the destination is Clark County and the origin is not Clark County. The through filter is for freight where neither the origin nor the destination is Clark County. The intra filter is if the origin and destination are in Clark County.

This appendix provides a summary of the analysis that inform the presentation in Part 2 and the recommendations in Part 5.

Clark County Freight Flows

Aggregation of Transearch data generates the freight activity moving to, from, through, and within Clark County. The total commodity flows value for the years 2015, 2019, 2021, and 2050 (projected), respectively, are \$164.3 billion, \$157.9 billion, \$159.6 billion, and \$275.3 billion and the annual total tonnage is 90.6 million tons, 89.5 million tons, 89.2 million tons, and 127.9 million tons. Note the decrease in 2019 and 2021 due to the effects of the pandemic on freight movement through Clark County. For 2021, the value of flows was 2.85 percent below pre-pandemic levels and total tonnage was down 1.59 percent. Between 2015 to 2019, the total annual average miles increased from 446.5 thousand miles to 447.1 thousand miles, while

total units fell from 5.92 million to 5.86 million, indicating goods traveled further, possibly due to businesses finding alternative suppliers extending beyond existing transportation routes, requiring commodities to travel from further locations. Additionally, the supply shortages may have caused the transportation of more partially filled cargo/freight loads.

The value of freight traffic is expected to increase across all categories through 2050. Notably, the value of inbound freight is projected to grow by around 73 percent, from roughly \$28.22 billion in 2015 to \$48.83 billion in 2050. The proportion of inbound value, however, is projected to increase minimally from 17.18 percent to 17.73 percent during the same period. Outbound traffic is expected to nearly double, increasing by 91 percent to reach \$11.85 billion in 2050. Its share also is anticipated to increase from 3.78 percent to 4.30 percent. Through traffic, despite showing a significant increase in total value (about 67 percent, from \$121.71 billion in 2015 to a projected \$202.80 billion in 2050) will decrease as a share of total traffic from 74.08 percent to 73.66 percent. Lastly, the value of intra freight traffic is projected to increase by approximately 45 percent but experience a drop in its proportion of total traffic from 4.97 percent in 2015 to 4.30 percent in 2050.

With respect to freight tonnage, total tonnage is projected to increase by approximately 48 percent, from 50.70 million tons in 2015 to 74.97 million tons in 2050, and slightly expand its share from 55.95 percent to 58.60 percent. Intra traffic is expected to increase by around 16 percent, with a proportion in the total tonnage expected to decrease from 17.77 percent in 2015 to 14.60 percent in 2050. Inbound traffic is projected to grow by approximately 50 percent from about 17.63 million tons in 2015 to 26.52 million tons in 2050. Despite the volume increase, the proportion of inbound tons is expected to remain steady, slightly increasing from 19.45 percent to 20.73 percent of overall trade. The outbound traffic tonnage is expected to increase from around 26 percent, but its share of the total tons will decrease from 6.82 percent in 2015 to 6.07 percent in 2050, perhaps indicative of a decline in local manufacturing/output. The mode of transportation summarized below are for all directions of travel.

Rail Traffic

In 2015, the Rail NEC¹⁸¹ mode accounted for 2,026,542.37 tons, amounting to about \$10.85 billion. This volume increased by 2021, reaching approximately two million tons, valued at roughly \$8.25 billion. In 2050, the tonnage transported by rail is projected to increase significantly to about 4.2 million tons, amounting to around \$13.40 billion.

¹⁸¹ Rail NEC refers to North American Free Trade Agreement activity moving between the U.S. and Canada or Mexico.

Truck Traffic

In 2015 trucks accounted for the most traffic at 44.2 million tons, valued at approximately \$86.93 billion. It decreased by 2021 to 43.2 million tons, with a somewhat lower value of \$84.50 billion. By 2050, it is projected to increase to 61.7 million tons, amounting to around \$142.97 billion. Other truck modes, including Truck L-T-L, Truck PVT, and Truck NEC,¹⁸² also transported significant volumes, with increases expected by 2050.

Air Traffic

In 2015, air traffic accounted for a much lower tonnage of 105.5 thousand tons, valued at approximately \$625 million. The volume slightly increased by 2021, reaching about 107.8 thousand tons valued at roughly \$648 million. In 2050, the tonnage transported by air is projected to increase to approximately 167.7 thousand tons, amounting to about 1.15 billion dollars.

Other Modes¹⁸³

Other transport modes accounted for the smallest share in all years, with tons and value both under 1 million. A small increase, however, is expected by 2050.

Clark County Commodity Flows

An analysis of the total value and total tons of commodities categorized by the STCC for each direction of travel (outbound, inbound, through, and intra) was performed. The following provides a summary of the top five commodities in terms of value and tons for the years 2015, 2019, 2021, and 2050 (projected and their share of the directional flows).

2015 Commodity Freight Flow by Value

The top commodity in terms of value was Food or Kindred Products with a total value of \$28.07 billion. This commodity accounted for 7.52 percent of outbound (OB), 14.83 percent of inbound (IB), 18.88 percent of

¹⁸² Truck NEC refers to North American Free Trade Agreement traffic only. Truck L-T-L refers to shipments that are smaller than what would otherwise be classified under Truck Truckload. Truck L-T-L can also be seen as a share of freight movement handled by local parcel service carriers like FedEx Ground, UPS, or other mail services.

¹⁸³ Other modes refer to a miscellaneous category that encompasses various methods of transportation not classified under the main categories of truck, rail, water, air, and pipeline.

through (Thr), and 5.41 percent of intra (Intr) flows. Food And Kindred Products encompasses establishments primarily manufacturing or processing foods and beverages for human consumption.

The second largest contributor was Transportation Equipment (\$24.14 billion), accounting for 1.35 percent of OB, 8.72 percent of IB, 17.49 percent of Thr, and 3.81 percent of Intr flows. Transportation equipment pertains to the manufacturing sector focused on creating equipment for transporting passengers and cargo across land, air, and water. This encompasses various products, including motor vehicles, aircraft, ships, boats, guided missiles, space vehicles, and related components.

Secondary Traffic ranked third at \$13.77 billion, accounting for 32.66 of the Intr flow. This captures freight moved by distribution centers or warehouses to consuming points like retail stores. This type of freight movement is also referred to as drayage, a term used in the logistics and freight industry to describe the transport of goods over short distances, particularly within the same metropolitan area. This can be part of the journey between different transportation hubs, such as seaports, rail terminals, distribution centers, warehouses, and retail stores.

Machinery ranked fourth and contributed to \$12.44 billion in value and 3.39 percent of IB, 3.66 percent of OB, 9.19 percent of Thr, and almost a negligible amount (0.16 percent) of Intra flows. Machinery encompasses a broad range of machinery, equipment, and computers essential for various industrial and commercial operations. This category is deeply involved with the production of engines, turbines, farm machinery, construction tools, mining devices, metalworking equipment, computers, and office machinery. Note that the majority was passing through instead of in or out bound.

Chemicals or Allied Products rounded out the top 5, with a total value of \$10.50 billion and accounting for with 6.08 percent if IB, 8.57 percent of OB, 6.14 percent of Thr, and 2.95 percent of Intr traffic flows. This category of captures establishments producing basic chemicals, intermediate products, and finished goods. This diverse category includes everything from foundational chemicals like acids, salts, and organic compounds to specialized products such as pharmaceuticals, cosmetics, soaps, and fertilizers. The reach of this sector is vast, providing essential materials for various industries like paints, explosives, and synthetic fibers. Note that most of its value was outbound.

2019 Commodity Freight Flow by Value

The data for 2019 are similar. Food or Kindred Products again was the largest contributor with a total value of \$27.76 billion and accounting for 7.62 percent of OB, 14.84 percent of IB, 19.83 percent of Thr, and 5.08

percent of Intr. flows. Transportation Equipment had a value of \$21.91 billion. Secondary Traffic was valued at \$13.07 billion, showing a significant Intr share of 32.76 percent. Machinery and Chemicals or Allied Products were again fourth and fifth with values of \$11.35 billion and \$9.24 billion, respectively.

2021 Commodity Freight Flow by Value

In 2021, Food or Kindred Products led with \$28.42 billion, followed Transportation Equipment with a value of \$19.36 billion. The value of Secondary Traffic was \$12.95 billion, having a dominant Intr share value of 32.24 percent. Machinery had a value of \$11.48 billion and followed by Electrical Equipment with \$9.57 billion in value. Electrical Equipment includes establishments in the manufacturing of machinery, apparatus, and supplies used in various stages of electrical energy. The products of these establishments range from electricity distribution equipment, electrical devices for industrial and household purposes, lighting, and wiring equipment, to electronic components, radio and television equipment, and communication tools.

2050 Commodity Freight Flow by Value

The projections for 2050 suggest a dominant position for Food or Kindred Products with a value of \$47.98 billion. The values for Transportation Equipment and Machinery are projected to be \$30.66 billion and \$28.23 billion, respectively, while Electrical Equipment will be at \$25.47 billion. Secondary Traffic is expected to surge to \$19.97 billion with a very high Intr share of 35.56 percent.

2015 Commodity Freight Flow by Weight

Food or Kindred Products was the top commodity at 17,180,525.82 tons, accounting for 6.63 percent of OB, 14.22 percent of IB, 27.36 percent of Thr, and 2.44 percent of Intr flows. Nonmetallic Minerals was second with 16,969,000.31 tons, accounting for 34.12 percent of OB, 17.73 percent of IB, 10.24 percent of Thr, and 40.62 percent of Intr flows. Nonmetallic Minerals are mainly products for mining, quarrying, developing mines, or exploring nonmetallic minerals, barring fuels. This group also comprises specific operations linked to wells and brines and primary preparation plants that engage in activities like crushing, grinding, washing, or concentrating. Clay, Concrete, Glass, or Stone contributes 8,187,315.89 tons with 8.69 percent OB, 7.45 percent IB, 5.4 percent Thr, and 22.35 percent Intr flows. Clay, concrete, glass, or stone pertains to establishments that produce items from stone, clay, glass, and concrete. They specifically manufacture products such as flat glass, cement, pottery, concrete, gypsum items, cut stone, abrasive, and asbestos products, among others. These products are mainly derived from natural resources like stone, clay, and sand. Secondary Traffic was fourth with 7,463,501.14 tons and accounted for 6.51 percent of OB, 23.92 percent of IB, 4.75 percent of Thr, and 2.72 percent of Intr flows. Finally, Waste or Scrap Materials at 7,121,455.25

tons was fifth and contributed 24.01 percent of OB, 6.67 percent of IB, 5.54 percent of Thr, and 10.26 of percent Intr flows.

2019 Commodity Freight Flow by Weight

Food or Kindred Products ranked first with 16,964,334.85 tons, accounting for 7.39 percent of OB, 13.47 percent of IB, 28.05 percent of Thr, and 2.37 percent of Intr flows. Nonmetallic Minerals was second with 15,275,740.32 tons, accounting for 22.27 percent of OB, 19.13 percent of IB, 8.96 percent of Thr, and 37.01 percent of Intr flows. Clay, Concrete, Glass or Stone was third with 8,384,671.21 tons, accounting for 11.45 percent of OB, 6.37 percent of IB, 6.16 percent of Thr, and 21.6 percent of Intr flows. Farm Products ranked fourth at 7,647,703.20 tons, accounting for 0.48 percent of OB, 5.86 percent of IB, 13.43 percent of Thr, and 0.01 percent of Intr flows. Waste or Scrap Materials at 7,552,150.99 tons ranked fifth and accounted for 27.29 percent of OB, 6.35 percent of IB, 5.92 percent of Thr, and 11.49 percent of Intr flows.

2021 Commodity Freight Flow by Weight

In 2021, Food or Kindred Products retained its top spot with 17,100,814.62 tons, accounting for 7.89 percent of OB, 13.66 percent of IB, 28.17 percent of Thr, and 2.49 percent of Intr flows. Second was Nonmetallic Minerals at 14,210,603.94 tons, accounting for 21.92 percent of OB, 17.51 percent of IB, 8.04 percent of Thr, and 35.8 percent of Intr flows. Clay, Concrete, Glass or Stone was third at 8,655,717.14 tons, accounting for 12.77 percent of OB, 6.27 percent of IB, 6.34 percent of Thr, and 22.69 percent of Intr flows. Ranking fourth was Farm Products at 8,070,614.40 tons, accounting for 0.58 percent of OB, 6.11 percent of IB, 14.2 percent of Thr, and 0.01 percent Intr of flows. Fifth was Waste or Scrap Materials at 7,567,336.29 tons, accounting for 25.54 percent of OB, 6.65 percent of IB, 6.06 percent of Thr, and 11.55 percent of Intr flows.

2050 Commodity Freight Flow by Weight

The top commodity by tons is projected to be Food or Kindred Products, with 26,427,903.63 tons and is expected to account for 10.34 percent of OB, 13.76 percent of IB, 28.57 percent of Thr, and 2.98 percent of Intr traffic flows. Nonmetallic Minerals is projected to rank second with 15,010,450.18 tons contributing 10.25 percent of OB, 14.33 percent of IB, 6.3 percent of Thr, and 30.47 of percent Intr flows. Clay, Concrete, Glass, or Stone is expected to be third with 12,847,076.09 tons, accounting for 11.85 percent of OB, 7.09 percent of IB, 6.45 percent of Thr, and 27.91 percent of Intr flows. Farm Products is projected at 12,356,751.99 tons, accounting for 0.58 percent of OB, 6.06 percent of IB, 14.28 percent of Thr, and 0.01 percent of Intr flows. Secondary Traffic is expected to rank fifth at 11,543,270.20 tons, accounting for 13.49 percent of OB, 22.73 percent of IB, 4.16 percent of Thr, and 7.24 percent of Intr flows.

Trade Partner Freight and Commodity Flows

The prior sections detailed the mode, value, tonnage, and direction of freight movement in Clark County for the 2015, 2019, 2021 and 2050 (projected). This section considers Southern Nevada's trading partners.

The tables below summarize the value and direction (Table D.1) and the tonnage and direction (Table D.2) of Clark County's freight with the rest of the U.S. as well as Canada, and Mexico. Note that the tables differentiate freight that moves through Clark County such that Through Origin Value (Tons) measures the value or weight from where the through traffic comes and Through Destination (Tons) measures the value of weight of where the traffic goes. While they are not additive components of the total traffic that passes through Southern Nevada, they represent two distinct ways (e.g., where it is coming from and where it is going) to understand this movement. Intra trade that measures trade within Clark County is omitted.

Table D.1: Country-level Direction of Travel and Value of Goods, 2015-2050

Year	Country	Outbound Value	Inbound Value	Through Origin Value	Through Destination Value
2015	Canada	\$274.07M	\$378.98M	\$14.22B	\$5.88B
2015	Mexico	\$569.48M	\$467.43M	\$1.41B	\$1.72B
2015	U.S.	\$5.36B	\$27.38B	\$106.08B	\$114.1B
2019	Canada	\$278.24M	\$495.03M	\$13.04B	\$5.33B
2019	Mexico	\$351.77M	\$620.26M	\$1.34B	\$694.78M
2019	U.S.	\$6.04B	\$27.15B	\$99.53B	\$107.90B
2021	Canada	\$345.65M	\$722.13M	\$12.32B	\$6.20B
2021	Mexico	\$390.13M	\$793.17M	\$1.52B	\$700.64M
2021	U.S.	\$6.24B	\$27.65B	\$100.58B	\$107.52B
2050	Canada	\$593.60M	\$1.52B	\$21.66B	\$12.23B
2050	Mexico	\$1.25B	\$2.00B	\$4.81B	\$1.61B
2050	U.S.	\$10.01B	\$45.30B	\$176.33B	\$188.96B

Note: M is the abbreviation for million and B is the abbreviation for billion.
Source: Transearch.

In summary, the majority of Clark County's commodity flows from other locations in the U.S., Canada, and Mexico is through traffic. For both value and weight, Through Origin and Through Destination constituted the bulk of trade and are projected to do so in 2050. For example, in 2015, flows from within the U.S.

accounted for \$106.1 billion and 48.2 million tons in in through origin value and weight respectively and \$114.1 billion and 48.6 million tons in through destination value and weight.

Table D.2: Country-level Direction of Travel and Weight of Goods, 2015-2050

Year	Country	Outbound Value	Inbound Value	Through Origin Value	Through Destination Value
2015	Canada	69.7K	258.6K	2.4M	1.3M
2015	Mexico	97.8K	118.2K	152.8K	842.2K
2015	U.S.	6.0M	17.2M	48.2M	48.6M
2019	Canada	61.8K	285.7K	2.1M	1.3M
2019	Mexico	65.3K	154.7K	159.0K	426.0K
2019	U.S.	5.8M	18.1M	46.3M	46.9M
2021	Canada	67.5K	416.3K	2.5M	1.4M
2021	Mexico	72.2K	207.0K	183.1K	471.4K
2021	U.S.	5.9M	17.8M	45.9M	46.7M
2050	Canada	139.5K	867.2K	5.5M	2.7M
2050	Mexico	232.0K	535.7K	531.1K	823.5K
2050	U.S.	69.7K	258.6K	2.4M	1.3M

Notes: Values are in tons. M is the abbreviation for million and K is the abbreviation for thousand.
Source: Transearch.

To understand trade flows between Southern Nevada and the adjacent areas of Arizona and Utah, we analyzed the EA for Las Vegas. This area encompasses Clark County and Esmeralda, Lincoln, Mineral, and Nye counties (i.e., the Nevada Portion of the Las Vegas EA), Mohave County in northern Arizona (i.e., the Arizona Portion of the Las Vegas EA), and Beaver, Garfield, Iron, Piute, and Washington counties in southern Utah (i.e., the Utah Portion of the Las Vegas EA). These data allow for comparisons of outbound, inbound, through by destination and origin traffic as well as intra trade. What follows are summaries of the values and tonnage of these flows, followed by a commodities comparison.

Value Summary

The Nevada Portion of the Las Vegas EA showed a mixed pattern. Outbound values increased from \$109.4M in 2015 to \$128.8M in 2019, decreased slightly to \$127.1M in 2021, and then are projected to decrease further to \$125.4M in 2050. Inbound values decreased to \$33.0M in 2021 with an expected increase to \$44.8M in 2050.

In Mohave County, the value of outbound freight increased from \$206.6M in 2015 to \$245.6M in 2019 and then slightly decreased to \$241.1M in 2021 and is projected to further decrease to \$219.6M in 2050. The inbound freight values followed a similar pattern for 2015, 2019, and 2021, but are expected to increase from \$57.8M in 2021 to \$96.2M in 2050. The through-origin values are expected to increase from \$80.2M in 2015 to \$119.1M in 2050 and the through-destination values are projected to increase an increase from \$120.0M in 2015 to \$225.5M in 2050. Interestingly, the total value of freight is expected to increase increased from \$468.2M in 2015 to \$660.5M in 2050. This increase in total values, combined with the decreasing outbound and slight increases in inbound values, suggests that through traffic will command a larger share.

The Utah Portion of the Las Vegas EA is expected to see a sharp uptick in outbound values, increasing consistently from \$320.9M in 2015 to \$430.0M in 2050, despite a minor (0.8 percent) dip in 2021 from 2019. Inbound freight values also are expected to increase in 2050. Combined, the five Utah counties were expected to account for a considerable amount of trade compared roughly \$3 billion in total flows compared to the other parts of the Las Vegas EA.

Weight Summary

The Nevada Portion of the Las Vegas EA's outbound weight decreased slightly from 237,131.3473 tons in 2019 to 228,227.899 tons in 2021, almost near 2015 levels, and is projected to further increase to 253,339.3132 tons in 2050. Inbound weight increased considerably, and tons varied through the origin and destination. Through origin and inbound tons showed a significant amount of one-sided trade by weight, coming from this region and going to others or incoming to Clark County.

Mohave County outbound tons increased from 377,110.8448 tons in 2015 to 381,995.9702 tons in 2019 and then decreased to 378,786.0884 tons in 202. The outbound tons are estimated to decrease to 369,151.4215 by 2050 slightly. Although through traffic dominates the totals for values, there is variation in the in the direction of commodity traffic flows. Most of the Mohave County's trade by weight based on our collection area is either destined for the county or coming from Clark County.

The Utah Portion of the Las Vegas EA is anticipated to have consistent growth in both outbound and inbound tons, increasing from 303,219.9476 tons in 2015 to 352,274.0906 tons in 2050 for outbound freight and from 1,123,575.515 tons in 2015 to 1,493,620.532 tons in 2050 for inbound freight. Through origin and destination tons also follow a similar pattern to the Nevada Portion of the Las Vegas EA, with the exception that the Utah

Portion of Las Vegas EA saw a large share of traffic passing through Clark County, to the five counties in the Utah region.

Commodities

In the Nevada Portion of the Las Vegas EA, the top commodities by value and tons include Petroleum Refining Products, Clay Ceramic or Refractory Minerals, Gold Ore, Miscellaneous Waste or Scrap, and Warehouse and Distribution Center. The data shows a significant presence of Petroleum Refining Products, with the value ranging from around \$77 million in 2105 to a projected \$100 million in 2050 and tons from 92,945 in 2015 to 124,019 2050 (projected). Gold Ore also is notable. In 2050 it is expected to have a value around \$79 million and 6,745 tons. The region also sees a significant amount of Miscellaneous Waste or Scrap and Clay Ceramic or Refractory Minerals.

In the Mohave County, Arizona portion of Las Vegas EA, the top commodities by value and tons include Rail Intermodal Drayage from Ramp, Miscellaneous Mixed Freight, Petroleum Refining Products, Electronic Machinery, and Aluminum Ore. Rail Intermodal Drayage from Ramp is the largest, with values ranging from approximately \$60 million to an expected \$73 million and from 15,038 tons to 18,163 tons between 2015 and 2050. Petroleum Refining Products also play a significant role, with values ranging from around \$22 million in 2015 to an anticipated \$29 million in 2050 and tons increasing from 53,684 in 2015 to 70,759 in 2050. Other prominent commodities include Miscellaneous Mixed Freight, with values between \$11 million and \$13 million, and Electronic Machinery with an expected value of around \$12 million in 2050. Aluminum Ore will increase to 13,598 tons in 2050.

In the Utah portion of the Las Vegas EA, the top commodities by value and tons include Rail Intermodal Drayage from Ramp, Petroleum Refining Products, Pickled Fruits or Vegetables, Livestock, and Drugs. Rail Intermodal Drayage from Ramp dominates in both value and tons, with the value ranging from around \$176 million in in 2015 to an expected \$213 million and tons from 43,628 in 2015 to an anticipated 52,688 in 2050. Petroleum Refining Products will also increase to approximately \$150 million in 2050. Drugs, Processed Milk, and Livestock contribute to the diverse commodities in this region, with values ranging from thousands to millions and tons ranging from the low thousands to tens of thousands.

Appendix E: Ports and Economic Development

Ports are essential for U.S. coastal and Great Lakes regional economic and industrial development. Consider the best-known port authority: the Port Authority of New York and New Jersey. Before the Erie Canal was opened in 1825,¹⁸⁴ New York City was an important but small center of commerce serving the lower Hudson Valley. It was smaller than Boston or Philadelphia. With an advantageous shipping location along the Gulf Stream allowing goods to be shipped with favorable winds and currents from New Orleans, Savannah, Georgia, and Charleston, South Carolina, to New York, the city was able to build its port infrastructure.

When the Erie Canal opened, however, the entire export economy of the Great Lakes region flowed down the lakes to the Erie Canal eastward to Albany, New York, and then southward along the Hudson River to the New York and then smaller New Jersey ports. By 1835, New York City was the nation's busiest port.¹⁸⁵ By 1850, it was the nation's largest city. To this day, the New York City metropolitan area is the nation's largest, being half again larger than Los Angeles and twice as large as Chicago.

To sustain the region's economic prominence, the states of New York and New Jersey created the bistate Port of New York and New Jersey in 1921, which included congressional action creating an interstate compact. Its jurisdiction comprises 1,500 square miles.¹⁸⁶ Its 12-member board is comprised of six gubernatorially appointed members from each state.¹⁸⁷ In addition to operating ports, it manages bridges, airports, a heliport, interstate commuter rail services, and real estate projects such as the 1776 Tower that replaced the terrorist-destroyed World Trade Center. The port enjoys special governance status from both states and can issue bonds, assume other forms of debt, and even police its infrastructure. As it has no tax base, it is self-sufficient financially.¹⁸⁸ Needless to say, it is a model of facilitating economic and industrial development in the U.S. The next two sections summarize west coast seaports and introduce the concept of inland ports.

¹⁸⁴ New York State Canal Corporation, "Canal History," 2023 (www.canals.ny.gov/history/history.html).

¹⁸⁵ *Ibid.*

¹⁸⁶ Port Authority of New York and New Jersey, "History of the Port Authority," 2023 (www.panynj.gov/port-authority/en/about/History.html).

¹⁸⁷ Port Authority of New York and New Jersey, "Governance, Ethics and Integrity," 2023 (www.panynj.gov/corporate/en/government-ethics.html).

¹⁸⁸ Port Authority of New York and New Jersey, "Budget Process and Financial Policies," 2023 (www.panynj.gov/corporate/en/financial-information.html).

West Coast Seaports

All major metropolitan areas on the ocean and gulf coasts, as well as the Great Lakes have important ports. In the West, they include the major port reviewed below, all of which are located in megapolitan areas.

The Port of Seattle is a countywide special district that manages ports, the Seattle-Tacoma International Airport, parks, and waterfront real estate. It was created by King County voters in 1911. Its five-member Port Commission are elected at large by King County voters and serve four-year terms. The board oversees a professional staff managed by an executive director. The port has a countywide property tax base that is used to retire bonds as well as invest in and manage numerous projects throughout the county.¹⁸⁹ An important feature of the Port of Seattle is its role as a provider of parks, fishing piers, and preserved habitats.

The Port of Tacoma was created by a vote of Pierce County citizens in 1918. The port's marine cargo operations were merged with the Port of Seattle in 2015 to form the Northwest Seaport Alliance. This reduced the practice of port-related firms playing one port off the other. The port is headed by a five-member commission, elected by Pierce County voters, that oversees an executive director who manages operations. The port is supported in part by a countywide property tax base.¹⁹⁰

The Port of Portland is unique among this group in four important respects. First, it is technically an *inland port*. While the other western ports are on oceans, bays, or sounds, the Port of Portland operates about 100 miles inland along the Columbia and Willamette rivers. Operating since the early 1840s, it could be considered the West's first inland port. Second, its jurisdiction is an entire multi-county region, in this case comprised of Clackamas, Multnomah, and Washington counties in Oregon. The reason is that many of the port's activities are spread throughout the region in the form of airports, docks for shipping and transshipment, and business parks. Third, it is supported in part by a multi-county regional property tax base. Although property taxes account for only about four percent of current revenues, they accounted for a much larger share when the port was formally organized as a regional entity in 1970.¹⁹¹ Fourth, it is the only west coast port where the governing board is appointed by the governor.¹⁹² With a regional jurisdiction, the Port of Portland has the authority to build facilities anywhere provided they are consistent with its mission, being to

¹⁸⁹ Port of Seattle, "Economic Impact and Tax Levy," 2023 (www.portseattle.org/page/economic-impact-and-tax-levy).

¹⁹⁰ Port of Tacoma, "Financial Information," 2023 (www.portoftacoma.com/about/financial-information).

¹⁹¹ Oregon Encyclopedia, "Port of Portland," 2023 (www.oregonencyclopedia.org/articles/port_of_portland/).

¹⁹² Port of Portland, "Leadership," 2023 (www.portofportland.com/Leadership).

“[b]uild shared prosperity for the region through travel, trade, economic development” and vision, being “A prosperous region, where quality jobs, multi-generational wealth, and access to markets are equitable and shared.”¹⁹³

The Port of San Francisco oversees the port facilities that extend along the City’s waterfront from the Golden Gate Bridge to the city line just south of Candlestick Point. It is overseen by a five-member commission, appointed by the mayor and approved by the Board of Supervisors.¹⁹⁴ The Port does not have a tax base per se. It has the authority to: capture a share of state and local property tax increment revenues that would otherwise be paid to them; create Infrastructure Finance Districts (IFDs) and issue IFD bonds against incremental property tax revenues; and initiate Community Facility Districts to finance the public portion of selected public-private development projects.¹⁹⁵

The Port of Oakland is located in Oakland, California, fronting the San Francisco Bay. It is overseen by a seven-member commission nominated by the mayor and appointed by the City Council. The commission oversees an executive director who manages operations.¹⁹⁶ It has no tax base.¹⁹⁷

The Port of Los Angeles is managed by the Los Angeles Harbor Department, a unit of the City of Los Angeles. It is comprised of 7,500 acres of land along more than 40 miles waterfront.¹⁹⁸ It adjoins the separate Port of Long Beach. Between 2000 and 2022, with the Port of Long Beach, it has been the Western Hemisphere’s busiest container port. However, the Port of New York and New Jersey is on track to overtake the western ports.¹⁹⁹ The Port of Los Angeles has no tax base.²⁰⁰

The Port of Long Beach adjoins the Port of Los Angeles and shares the same body of water, the San Pedro Bay. Because of this, they are often considered a single entity. The port includes 3,200 acres of land. The Port of Long Beach is governed by a five-member Board of Harbor Commissioners appointed by the mayor

¹⁹³ Port of Portland, “Strategic Plan, 2022-2025,” <https://cdn.portofportland.com/pdfs/StrategicPlan-Values.pdf>.

¹⁹⁴ Port of San Francisco, “Port Commission,” 2023 (<https://sfport.com/about/port-commission>).

¹⁹⁵ MGO, “Independent Auditor’s Report,” Port Commission, Port of San Francisco, December 2021, pg. 16, <https://sfport.com/files/2022-01/Port%20of%20San%20Francisco%20BFS%20-%20FY%202021.pdf>.

¹⁹⁶ Port of Oakland, “Board of Commissioners,” 2023 (www.portoakland.com/port/board-of-commissioners/).

¹⁹⁷ Port of Oakland, “Business,” 2023 (www.portoakland.com/business/).

¹⁹⁸ Port of Los Angeles, “About,” 2023 (<https://www.portoflosangeles.org/about>).

¹⁹⁹ Vanessa Yurkevich, “The busiest port in America is no longer on the West Coast,” CNN, December 9, 2022, www.cnn.com/2022/12/09/business/port-los-angeles-new-york-supply-chain/index.html.

²⁰⁰ Port of Los Angeles, “Annual Facts and Figures Card,” 2023, (www.portoflosangeles.org/business/statistics/facts-and-figures).

that is approved by the City Council.²⁰¹ Like other California ports, it has no tax base. It is also important to note that whereas the Port of Los Angeles is based in Los Angeles County and run by the City of Los Angeles, the Port of Long Beach is based in Orange County.

The Port of San Diego is a self-supporting district established in 1962 by the California Legislature.²⁰² It is governed by a seven-member Board of Port Commissioners with one commissioner each appointed by the city councils of Chula Vista, Coronado, Imperial Beach, and National City, and three appointed by the San Diego City Council. The Board establishes policies that guide the executive director who manages operations.²⁰³

Unfortunately, the west coast ports are not considered efficient. Despite being among the busiest ports in the western hemisphere, the ports of Los Angeles and Long Beach are considered the least efficient container ports in the world according to the World Bank, ranking #369 and #370 respectively.²⁰⁴ Other west coast ports fare only slightly better: Seattle ranks #336, Tacoma ranks #345, and Oakland ranks #359. Portland and San Diego do not meet the World Bank's definition of being container ports. In the United States as a whole, only eight container ports are ranked among the top 100 and all are on the East Coast. However, recently, the state of California budgeted \$2.3 billion to improve the efficiency of its major ports.²⁰⁵

Except for Los Angeles, the west coast ports are overseen by governing boards with the California boards appointed by their city councils, the Washington boards elected by their respective county voters, and the Port of Portland appointed by the governor. All are managed by an executive director with professional and support staff. Except for the California ports, the ports have a property tax base albeit reflecting a very small share of revenues. The Port of San Francisco receives a novel "value added" share of property taxes that in a sense is a performance-based financial invention.

²⁰¹ Port of Long Beach, "Commission," 2023 (<https://polb.com/commission>).

²⁰² See Port of San Diego, "Economic Impact," 2023 (<https://www.portofsandiego.org/about-port-san-diego/economic-impact>).

²⁰³ Port of San Diego, "Board of Port Commissioners," 2023 (www.portofsandiego.org/people/board-port-commissioners).

²⁰⁴ World Bank, *The Container Port Performance Index 2021: A Comparable Assessment of Container Port Performance*, <https://thedocs.worldbank.org/en/doc/66e3aa5c3be4647add01845ce353992-0190062022/original/Container-Port-Performance-Index-2021.pdf>.

²⁰⁵ Port of Long Beach, "Port Commands Historic State Investment in Goods Movement," July 1, 2022, <https://polb.com/port-info/news-and-press/port-commands-historic-state-investment-in-goods-movement-07-01-2022/>.

Inland Ports

Over the past quarter century inland ports have been a growing trend. But what is an “inland port”? Cambridge Systematics characterizes them as follows:²⁰⁶

There is not a consistent or formal global definition of the term “inland port.” In some parts of the world a term of art used to describe inland logistics hubs is “dry port.” Particularly in the United States, the term “inland port” is typically used to describe a (typically maritime-connected) logistics market that is located at a non-maritime inland location. Inland ports are typically planned around rail intermodal facilities, but not all intermodal locations are inland ports.

The commercial real estate firm CBRE suggests that inland ports have several if not all of these features: direct connection to major seaport via Class I railroad; access to at least one and ideally several major transportation modes such as rail, interstate highway or inland waterway; access to at least 10 million people within 300 miles; significant supply of Class A warehouse and distribution space; access to a large, affordable and trained labor pool; local or state economic development incentives; and in or ability to create a Foreign Trade Zone.²⁰⁷

Inland ports can be hundreds of miles from seaports and there is the special consideration of inland ports dedicated to container cargo. As characterized by Ramezani and Carr: “[a]n inland container port is an intermodal terminal facility that handles containerized shipments at a site away from a seaport(s). Such a facility is typically linked to a deep-water port by highways and rail and operates as a container transfer point between different transportation modes.”²⁰⁸

Ramezani and Carr make the case for a series of inland ports to support the ports of Los Angeles and Long Beach by noting:²⁰⁹

²⁰⁶ Cambridge Systematics and GLD Partners, *Utah Inland Port - Feasibility Analysis*

²⁰⁷ CBRE Research, *North American Inland Ports Logistics Annual Report 2016*, <https://bloximages.newyork1.vip.townnews.com/stltoday.com/content/tncms/assets/v3/editorial/d/09/d091b2c7-d677-5068-bb5c-ab5debe688a2/57a8ca8884173.pdf.pdf>.

²⁰⁸ Cyrus Ramezani and Chris Carr, “The Prospects for Developing Inland Logistics Ports in California,” Report prepared for the U.S. Department of Agriculture, Agriculture Marketing Services, July 2022, pg. 9, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4175841.

²⁰⁹ *Ibid*, pg. 7

California inland facilities can play an important role in improving the efficiency of the U.S logistics system, but there are significant impediments for their development, and it may take several years before such facilities become operational. This is also the case for similar projects in Arizona and Nevada, because both locations lack sufficient population density, frequent intermodal rail service, and have not yet secured sufficient public and private investments. There are stronger prospects for Utah's inland port to enhance the performance of (the ports of Los Angeles and Long Beach) and increase cargo fluidity in the Western Mountain region; the Utah Inland Port Authority has secured major funding from private investors, has strong public support, and has entered long-term agreements with the Port of Long Beach and the Union Pacific Railroad for bidirectional cargo transport. It is also likely that the Port of Los Angeles will follow with similar arrangements in the future, once the Utah facility has expanded its warehousing and intermodal logistics capacities.

Inland ports need not be public ventures. For instance, the self-styled Port Colorado located near the Denver International Airport is a 6,500-acre master-planned business and industrial park funded and managed entirely as a private venture.²¹⁰ Inasmuch as railroads are a key element of container shipping, the UP's privately operated, 1,600-acre industrial park advertised as an inland port in Coolidge, Arizona, south of Phoenix seems to be a natural venture for a railroad. In addition, the privately operated 400-acre Mohave Inland Port located near Bakersfield, California, has started operations.²¹¹

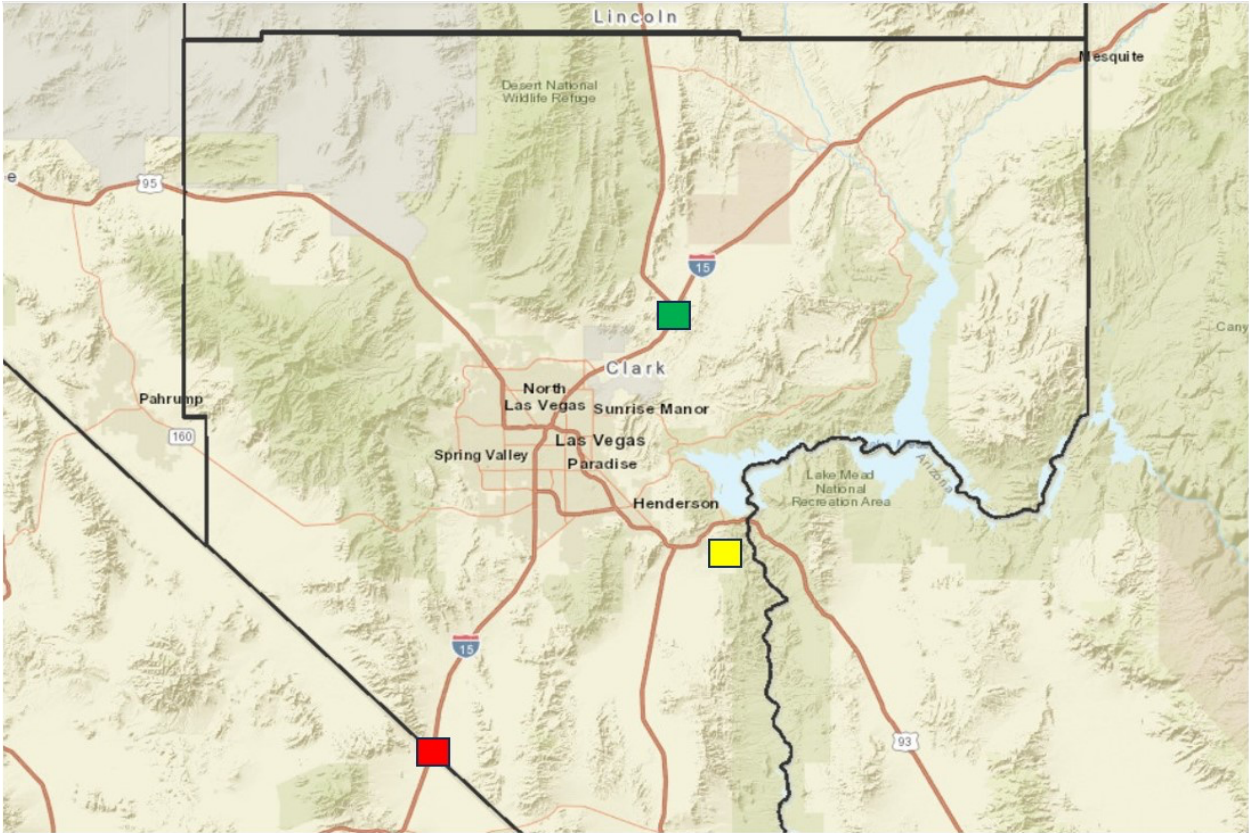
²¹⁰ Port Colorado, "About," 2023 (<https://portcolorado.com/about/>).

²¹¹ Mojave Inland Port, "The Project," 2023 (www.mojaveinlandport.com/).

Appendix F: Estimates of Future Traffic and Congestion

The estimates presented in Part 4 are derived primarily from traffic count data collected by NDOT at locations along the I-15 in North and South County and I-11 at south of Hoover Dam.²¹² Figure F.1 illustrates these traffic count data collections stations.

Figure F.1: Traffic Count Data Locations



Notes: Station at I-15 in the South County area; station at I-15 in the North County area, and station at Nevada point of origin for I-11.

Prediction Models of Traffic Growth

The analysis of traffic growth is conducted by performing a regression analysis of the available average annual daily traffic (AADT) collected from NDOT. Because these data suggest a decrease in AADT in 2020 due to the effects of COVID-19, the traffic data for 2020 were excluded from our estimates for 2023, 2030, 2040, and 2050. Table F.1 presents the traffic data for each location from 2011 to 2021 (excluding 2020). The

²¹² Nevada Department of Transportation, "Traffic Information Systems," 2023 (<https://ndot.maps.arcgis.com/apps/webappviewer/index.html?id=278339b4605e4dda8da9bdd2fd9f1e90>).

number of trucks is calculated using data from NDOT’s Vehicle Classification Distribution Reports at 16.4 percent for the I-15 South County location; 22.4 percent at the I-15 North County location; and 6.2 percent for I-11.²¹³

Table F.1: Traffic Count Data, 2011-2021

Year	I-15 South County		I-15 North County		I-11 at Hoover Dam	
	Annual Average Daily Traffic	Trucks	Annual Average Daily Traffic	Trucks	Annual Average Daily Traffic	Trucks
2011	40,000	6,600	27,000	6,000	12,000	700
2012	42,000	6,900	26,000	5,800	11,500	700
2013	42,500	7,000	25,000	5,600	12,500	800
2014	42,000	6,900	24,500	5,500	15,000	900
2015	44,500	7,300	27,000	6,000	16,500	1,000
2016	45,000	7,400	29,000	6,500	16,000	1,000
2017	45,000	7,400	30,000	6,700	16,000	1,000
2018	45,000	7,400	30,500	6,800	20,700	1,300
2019	45,000	7,400	31,500	7,000	20,500	1,300
2021	47,000	7,700	34,000	7,600	18,300	1,100

Note: Data for 2020 omitted.
Source: Nevada Department of Transportation.

The traffic growth predictions were conducted for three scenarios. The first scenario provides a baseline and assumes that the Brightline West high-speed rail from Southern California to Las Vegas will not materialize and the UP Railroad will not increase its capacity to move more freight by rail to and from Southern Nevada. The second scenario assumes that the Brightline West high-speed rail starts as scheduled in 2028 and this will reduce 20 percent of the passenger vehicles along the I-15 South County corridor. The final scenario assumes that the Brightline West high-speed rail starts as scheduled and UP doubles its capacity along the I-15 corridor. The following section presents the traffic growth analysis based on these scenarios.

²¹³ See Nevada Department of Transportation, “2022 Vehicle Classification Distribution Report,” June 2023, www.dot.nv.gov/home/showpublisheddocument/21748/638206020257870000

Prediction of Normal Traffic Growth

The AADT traffic data were plotted against the year and a regression equation for each location was generated to predict the AADT and truck traffic for 2023, 2030, 2040, and 2050. Table F.2 presents these estimates.

Table F.2: Predicted Traffic Count Data, 2023-2050

Year	I-15 South County*		I-15 North County**		I-11 at Hoover Dam***	
	Annual Average Daily Traffic	Predicated Trucks	Annual Average Daily Traffic	Predicated Trucks	Annual Average Daily Traffic	Predicated Trucks
2023	48,000	7,900	34,300	7,700	22,300	1,400
2030	52,500	8,600	40,500	9,100	29,300	1,800
2040	58,900	9,700	49,500	11,100	39,100	2,400
2050	65,300	10,700	58,400	13,100	49,000	3,000

* Derived from regression model: $y = 40,267 + 642.42x$ ($R^2 = .87$).

** Derived from regression model: $y = 23,533 + 893.94x$ ($R^2 = .78$).

*** Derived from regression model: $y = 10,460 + 989.09x$ ($R^2 = .88$).

The Impact of High-Speed Rail on I-15 South County Traffic

If Brightline West high-speed rail begins operating as scheduled in 2028, then it is estimated that about 20 percent of passenger vehicles will be reduced on the South County section of I-15. Its implementation will not impact traffic growth on the I-15 North County section or I-11 at Hoover Dam. Table F.3 reports the South County traffic volumes on I-15 for 2030, 2040, and 2050 under this scenario.

Table F.3: The Impact of High-Speed Rail on I-15 South County Traffic, 2030-2050

Year	Total Annual Average Daily Traffic	Passenger Cars	Trucks
2030	43,700	35,100	8,600
2040	49,100	39,400	9,700
2050	54,400	43,700	10,700

The Impact of High-Speed Rail and Increased Rail Capacity on I-15 Traffic

If the Brightline high-speed rail starts running in 2028 and the UP doubles its capacity of moving freight to and from Las Vegas, then the number of passenger cars and trucks will be reduced on the I-15 South. The number of trucks on the I-15 North will also be reduced. Table F.4 presents the AADT for the I-15 in South and North County for 2030, 2040, and 2050.

Table F.4: The Impact of High-Speed Rail and Increased Rail Capacity on I-15 Traffic, 2030-2050

Year	Total Annual Average Daily Traffic	Passenger Cars	Trucks
I-15 South County			
2030	43,200	35,100	8,100
2040	48,600	39,400	9,200
2050	53,900	43,700	10,200
I-15 North County			
2030	40,100	31,400	8,700
2040	49,100	38,400	10,700
2050	58,000	45,300	12,700

Prediction Models of Congestion Levels

Highway congestion levels can be measured using the level of service (LOS). The LOS is designated using letters A through F, with A being the least amount of congestion and F being the most congested highway conditions. The LOS can be calculated using the Highway Capacity Manual and the Geometric Design of Highways and Streets developed by the American Association of State Highway and Transportation Officials. To calculate the LOS using these data require variables that are beyond the scope of this study. Instead, we use data measuring the free-flow speed and the AADT to estimate the LOS for the two sections of the I-15 and I-11 of interest. As is detailed below, some of the parameters were assumed, meaning that the LOS estimates should be viewed as approximate values. The LOS in each of the three locations on the I-15 and I-11 were calculated considering the three scenarios defined in the previous section.

Level of Service due to Normal Traffic Growth

The following summarizes the LOS calculations for the I-15 in South and North County and at Hoover Dam on the I-11.

Sample LOS Calculations for I-15 at South County. The LOS calculation is very complex. If data were available, then the LOS for each of the three areas of interest would be calculated by dividing it into several sections. However, since we only have access to data at one location along the I-15 in the South County area, the LOS of the section along Primm area is used for the as LOS for the entire I-15 South.

Required Input Data

Annual Average Daily Traffic (AADT) = 48,000

Base Free Flow Speed (BFFS) = 75.4 mph (HCM suggested value)

Number of lanes in freeway segment (N) = 4 (I-15 South has only two lanes in each direction after Primm area)

Lateral clearance of right shoulder (f_{lc}) = 0.0 (Assuming clearance is more than 6 ft)

Adjustment for lane width (f_{LW}) = 0.0 (Assuming lane width is more than 12 ft)

TRD = Total ramp density within +/- 3 miles of midpoint of segment = 2 (There are two on and off ramp in the vicinity of 3 miles of Primm)

Estimate Free-Flow Speed (FFS)

$$FFS = BBFS - f_{LW} - f_{lc} - 3.22 \text{ TRD}^{0.84}$$

$$FFS = 75.4 - 0.0 - 0.0 - 3.22 \times (2)^{0.84}$$

$$FFS = 64.2 \text{ mph}$$

Estimate and Adjust Capacity

$$\text{Capacity } (c) = 2,200 + 10 (FFS-50) \text{ pc/h/l}$$

$$c = 2,200 + 10 (69.64-50) = 2,396.4 \text{ pc/h/l (less than 2,400 pc/h/l - ok)}$$

Adjustment factor (CAF) for driver population, weather, work zones, and incidents is taken as default value of 1

$$\text{Adjusted capacity } (c_{adj}) = c \times CAF = 2,396.4 \times 1 = 2,396.4 \text{ pc/h}$$

Adjust Demand Volume

Demand flow rate under equivalent base conditions (v_p) is calculated using following formula

$$v_p = \frac{V}{PHF \times N \times f_{HV}}$$

Where:

V = Demand under prevailing condition (veh/h)

Peak hour factor (PHF) = 0.80 (On multilane highways, the value is in between 0.75 to 0.95, so the average value of 0.80 is considered for the calculations.)

Number of lanes (N) = 4

f_{HV} = Adjustment factor for heavy vehicle presence. The following equation is used to determine it

$$f_{HV} = \frac{1}{1 + P_T (E_T - 1)}$$

Percentage of truck traffic (P_T) = 16%

Passenger car equivalent (E_T) = 2 (level terrain type)

$$f_{HV} = \frac{1}{1 + 0.16(2-1)} = 0.86$$

$$V \text{ (veh/h)} = K \times D \times \text{AADT}$$

Where:

K = Factor for proportion of daily traffic occurring at peak hour

= 0.135 (For suburban facility, the value ranges from 0.12 to 0.15 and the average value is taken)

D = Factor for proportion of traffic peak direction

= 0.60 (For rural facility, the value ranges from 0.55 to 0.65 and the lower value is taken)

AADT = 48,000

$$V = 0.135 \times 0.60 \times 48,000 = 3,888 \text{ veh/h}$$

$$v_p = \frac{3,888}{0.80 \times 4 \times 0.86}$$

$$v_p = 1,409 \text{ pc/h/ln}$$

Estimate Speed and Density

Density can be determined using the following formula

$$D = \frac{v_p}{S}$$

Where:

D = Density (pc/h/ln)

v_p = Demand flow rate (pc/h/ln)

S = Mean speed of traffic stream under base condition (mi/h)

Capacity (c) = 2396.4 pc/h/l

Breakpoint (BP) = 1,000 + 40 (75-FFS) pc/h/l = 1,000 + 40(75-69.4) = 1215 pc/h/l

If v_p is higher than BP, then use the following equation to determine the mean speed (S)

$$S = \text{FFS} - \left[\frac{\left(\text{FFS} - \frac{c}{4.5} \right) (v_p - \text{BP})^2}{(c - \text{BP})^2} \right]$$

$$S = 69.64 - \left[\frac{\left(69.64 - \frac{2396.4}{4.5} \right) (1409 - 1215)^2}{(2396.4 - 1215)^2} \right] = 69.2 \text{ mph}$$

$$D = \frac{v_p}{S}$$

$$D = \frac{1,409}{69.2} = 20.4 \text{ pc/mi/ln}$$

Based on the Table F.5 summarizing the relationship between density and LOS tier, the LOS for this section of the I-15 South is C, which is the threshold for acceptable congestion levels. Specifically, in 2030, the AADT

will be 52,500 and the LOS will still be C. In 2040, the projected AADT will be 58,900 and the LOS will remain C. In 2050. The projected AADT will be 65,300 and the LOS of the I will be D.

Table F.5: Relationship between Traffic Density and Level of Service Value

Density (D) pc/mi/ln	Level of Service (LOS)
< 11	A
> 11 - 18	B
> 18 - 26	C
> 26 - 35	D
> 35 - 45	E
> 45	F

Sample LOS Calculations for I-15 at North County. Like the previous section, the LOS for the I-15 North County section through Apex is calculated and this LOS is used as LOS for the entire I-15 North County corridor.

Required Input Data

Annual Average Daily Traffic (AADT) = 34,300

Base Free Flow Speed (BBFS) = 75.4 mph (HCM suggested value)

Number of lanes in freeway segment (N) = 4 (I-15 North has two lanes each direction after Nellis Air Force Base)

Lateral clearance of right shoulder (f_{lc}) = 0.0 (Assuming clearance is more than 6 ft)

Adjustment for lane width (f_{lw}) = 0.0 (Assuming the lane width is more than 12 ft)

TRD = Total ramp density within +/- 3 miles of midpoint of segment = 2 (There are two on and off ramp in the vicinity of 3 miles of Apex)

Estimate Free-Flow Speed (FFS)

$$FFS = BBFS - f_{lw} - f_{lc} - 3.22 \text{ TRD}^{0.84}$$

$$FFS = 75.4 - 0.0 - 0.0 - 3.22 \times (2)^{0.84}$$

$$FFS = 69.64 \text{ mph}$$

Estimate and Adjust Capacity

$$\text{Capacity (c)} = 2,200 + 10 (FFS-50) \text{ pc/h/l}$$

$$c = 2,200 + 10 (69.64-50) = 2,342.4 \text{ pc/h/l (less than 2,400 pc/h/l - ok)}$$

Adjustment factor (CAF) for driver population, weather, work zones, and incidents is taken as default value of 1

$$\text{Adjusted capacity } (c_{adj}) = c \times \text{CAF} = 2,396.4 \times 1 = 2,396.4 \text{ pc/h}$$

Adjust Demand Volume

Demand flow rate under equivalent base conditions (v_p) is calculated using following formula

$$v_p = \frac{V}{\text{PHF} \times N \times f_{\text{HV}}}$$

Where:

V = Demand under prevailing condition (veh/h)

Peak hour factor (PHF) = 0.80 (On multilane highways, the value is in between 0.75 to 0.95, so the average value of 0.80 is considered for the calculations.)

Number of lanes (N) = 4

f_{HV} = Adjustment factor for heavy vehicle presence. The following equation is used to determine it

$$f_{\text{HV}} = \frac{1}{1 + P_T (E_T - 1)}$$

Percentage of truck traffic (P_T) = 22%

Passenger car equivalent (E_T) = 2 (level terrain type)

$$f_{\text{HV}} = \frac{1}{1 + 0.22 (2-1)} = 0.82$$

$$V \text{ (veh/h)} = K \times D \times \text{AADT}$$

Where:

K = Factor for proportion of daily traffic occurring at peak hour

= 0.135 (For suburban facility, the value ranges from 0.12 to 0.15 and the average value is taken)

D = Factor for proportion of traffic peak direction

= 0.60 (For rural facility, the value ranges from 0.55 to 0.65 and the average value is taken)

$$\text{AADT} = 34,300$$

$$V = 0.135 \times 0.60 \times 34,300 = 2,778 \text{ veh/h}$$

$$v_p = \frac{2,778}{0.80 \times 4 \times 0.82}$$

$$v_p = 1,059 \text{ pc/h/l}$$

Estimate Speed and Density

Density can be determined using the following formula:

$$D = \frac{V_p}{S}$$

Where:

D = Density (pc/h/ln)

V_p = Demand flow rate (pc/h/ln)

S = Mean speed of traffic stream under base condition (mi/h)

Capacity (c) = 2396.4 pc/h/l

Breakpoint (BP) = 1,000 + 40 (75-FFS) pc/h/l = 1,000 + 40(75-69.64) = 1215 pc/h/l

If v_p is higher than BP, then use the following equation to determine the mean speed (S)

$$S = \text{FFS} - \left[\frac{\left(\frac{\text{FFS} - c}{45} \right) (v_p - \text{BP})^2}{(c - \text{BP})^2} \right] = 69.4 \text{ mph}$$

$$D = \frac{V_p}{S}$$

$$D = \frac{1,059}{69.4} = 15.3 \text{ pc/mi/ln}$$

Based on Table E.5, the analysis indicates that in 2030, the AADT will be 40,500 and the LOS will be B. In 2040, the projected AADT will be 49,500 and the LOS will be C. In 2050. The projected AADT will be 58,400 and the LOS will be D.

Sample LOS Calculations for I-11. Similar to the previous section, the LOS of the I-11 at Hoover Dam will be calculated, and this LOS will be considered as LOS for the entire I-11 corridor in Nevada.

Required Input Data

Annual Average Daily Traffic (AADT) = 22,300

Base Free Flow Speed (BFFS) = 75.4 mph (HCM suggested value)

Number of lanes in freeway segment (N) = 4

Lateral clearance of right shoulder (f_{lc}) = 0.0 (Assuming clearance is more than 6 ft)

Adjustment for lane width (f_{lw}) = 0.0 (Assuming lane width is more than 12 ft)

TRD = Total ramp density within +/- 3 miles of midpoint of segment = 0 (There are no on and off ramp in the vicinity of 3 miles of this location)

Estimate Free-Flow Speed (FFS)

$$\text{FFS} = \text{BBFS} - f_{lw} - f_{lc} - 3.22 \text{ TRD}^{0.84}$$

$$\text{FFS} = 75.4 - 0.0 - 0.0 - 3.22 \times (0)^{0.84}$$

FFS = 75.4 mph

Estimate and Adjust Capacity

Capacity (c) = 2,200 + 10 (FFS-50) pc/h/l

c = 2,200 + 10 (75.4-50) = 2,454 pc/h/l (higher than 2,400 pc/h/l, so use 2,400 pc/h/l)

c = 2,400 pc/h/l

Adjustment factor (CAF) for driver population, weather, work zones, and incidents is taken as default value of 1

Adjusted capacity (c_{adj}) = c x CAF = 2,400 x 1 = 2,400 pc/h

Adjust Demand Volume

Demand flow rate under equivalent base conditions (v_p) is calculated using following formula:

$$v_p = \frac{V}{PHF \times N \times f_{HV}}$$

Where:

V = Demand under prevailing condition (veh/h)

Peak hour factor (PHF) = 0.80 (On multilane highways, the value is in between 0.75 to 0.95, so the average value of 0.80 is considered for the calculations.)

Number of lanes (N) = 4

f_{HV} = Adjustment factor for heavy vehicle presence. The following equation is used to determine it

$$f_{HV} = \frac{1}{1 + P_T (E_T - 1)}$$

Percentage of truck traffic (P_T) = 0.60%

Passenger car equivalent (E_T) = 2 (level terrain type)

$$f_{HV} = \frac{1}{1 + 0.06 (2-1)} = 0.94$$

V (veh/h) = K x D x AADT

Where:

K = Factor for proportion of daily traffic occurring at peak hour

= 0.135 (For suburban facility, the value ranges from 0.12 to 0.15 and the average value is taken)

D = Factor for proportion of traffic peak direction

= 0.60 (For rural facility, the value ranges from 0.55 to 0.65 and the average value is taken)

AADT = 22,300

V = 0.135 x 0.60 x 22,300 = 1,806 veh/h

$$v_p = \frac{1,806}{0.80 \times 4 \times 0.94}$$

$$v_p = 598 \text{ pc/h/ln}$$

Estimate Speed and Density

Density can be determined using the following formula:

$$D = \frac{v_p}{S}$$

Where:

D = Density (pc/h/ln)

V_p = Demand flow rate (pc/h/ln)

S = Mean speed of traffic stream under base condition (mi/h)

Capacity (c) = 2400 pc/h/l

Breakpoint (BP) = 1,000 + 40 (75-FFS) pc/h/l = 1,000 + 40(75-75.4) = 984 pc/h/l

v_p is less than BP. Therefore, use free flow speed (FFS) as the mean speed (S).

$$D = \frac{v_p}{S}$$

$$D = \frac{598}{75.4} = 7.9 \text{ pc/mi/ln}$$

Based on the density values presented in Table F.5, the analysis indicates that in 2030 will be 29,300 and the LOS of the I-11 will be A. In 2040, the projected AADT will be 39,100 and the LOS will be B. In 2050, the projected AADT will be 49,000 and the LOS of the I-11 will be still B. Table F.6 presents the LOS in the three locations of the I-15 and the I-11 for 2023, 2030, 2040, and 2050.

Table F.6: Summary of Level of Service for I-15 South and North County and I-11, 2023-2050

Year	Level of Service		
	I-15 South County	I-15 North County	I-11 at Hoover Dam
2023	C	B	A
2030	C	B	A
2040	C	C	B
2050	D	D	B

The Impact of High-Speed Rail on I-15 South County Level of Service

If Brightline West high-speed rail begins operations as scheduled in 2028, then the number of passenger vehicles will be reduced in the South County portion of I-15, altering the LOS in that location for 2030, 2040, and 2050. Table F.7 compares the LOS in the Primm area with and without the Brightline West high-speed rail starting in 2028. These estimates are derived from the same process detailed above. Note that consistent with the prior analyses, we assume that introduction of high-speed rail will not impact the LOS in the I-15 in North County and at the Hoover Dam section of the I-11.

Table F.7: I-15 South County Level of Service with and without High-Speed Rail, 2030-2050

Year	Level of Service	
	Without High-Speed Rail	With High-Speed Rail
2030	C	B
2040	C	C
2050	D	C

The Impact of High-Speed Rail and Increased Rail Capacity on I-15 Traffic

If Brightline West high-speed rail begins service in 2028 and that the UP doubles its capacity by 2030, then these factors will affect the LOS along the South and North County sections of I-15. However, we anticipate no direct effect on traffic and the LOS on I-11 at Hoover Dam under this scenario. Data from the Freight Analysis Framework²¹⁴ indicates that the UP is moving loads to and from Southern Nevada by rail at about 900 equivalent trucks daily. Considering that 56 percent of these loads (500 truckloads) are to and from Southern California and the rest are to and from Utah, we can calculate the LOS impact on the I-15 in South and North County using the same process detailed above. Using these estimates, Table F.8 provide a comparison the LOS with and without these interventions.

²¹⁴ Bureau of Transportation Statistics, “Freight Analysis Framework,” 2023.

Table F.8: Impact of High-Speed Rail and Increased Rail Capacity on I-15 Level of Service, 2030-2050

Year	Level of Service			
	I-15 South County		I-15 North County	
	Original *	Revised **	Original *	Revised **
2030	C	B	B	B
2040	C	C	C	C
2050	D	C	D	D

* Assumes normal traffic increases.

** Assumes high-speed rail begins service in 2028 and rail capacity doubles to and from Southern Nevada.

Appendix G: Estimates of Highway Construction Costs

The cost estimate for construction of a highway lane mile is calculated for 2023 based on the typical concrete pavement dimensions (see Table G.1). The estimated cost is preliminary because a detailed estimate can only be calculated after a highway’s design is finalized. In our estimate, the construction cost of interstate highway is calculated assuming a typical section with nine-inch-thick reinforced concrete, base course, and subbase course.

Table G.1: Values for Construction of a Highway Lane Mile, 2023

Measurement	Value
Width of lane	12 feet
Length of lane	5,280 feet
Total concrete area	63,360 square feet
Total concrete area	7,040 square yards
Total concrete volume	2,347 cubic yards
Reinforcement bars	96.15 tons

To consider the cost of other items like earthwork excavation, structures, retaining walls, bridges, and interchanges, the percentage of total pavement cost is used. These estimated costs are calculated to determine the rough cost required for highway lane expansion (see Table G.2). The estimated cost is increased up to 100 percent for earthwork, structures, retaining walls, bridges, and interchanges during highway expansion. Adjusting for inflation, using the National Highway Construction Cost Index cost adjustment factor, the estimates increase from \$6,824,400 in 2030 to \$7,998,400 in 2040 and to \$9,172,400 in 2050.

Based on the estimated cost and LOS (see Appendix F) calculations, the I-15 South County section will need to be expanded by one lane in each direction by 2050 to bring the LOS to an acceptable level. The total cost to expand the I-15 South between Primm and Sloan (25.3 miles) by one lane in each direction in 2050 will be \$232,061,720 (25.3 miles at \$9,172,400 per mile). For the North County section of I-15, based on the estimated cost and LOS calculations (see Appendix F), the I-15 North County section will need to be expanded by one lane in each direction by 2050 to bring LOS to an acceptable level. The total cost for this expansion between Nellis Air Force Base and Mesquite (64.9 miles) in 2050 will be \$595,288,760 (64.9 miles * \$9,172,400 per mile).

Table G.2: Estimated Construction Costs of a Highway Lane Mile, 2023

Measurement	Value
Concrete laying	\$373,500
Concrete finishing	\$36,800
Subbase course	\$392,700
Base course	\$392,700
Reinforcement	\$305,000
Including drainage and excavation	\$1,500,600
Cost per lane mile (one lane on each direction) in Nevada	\$6,002,400

Note: Costs estimated using RS Means Cost Guide (www.rsmeans.com/).

Appendix H: Estimates of Annual Highway Pollution

Growth in highway traffic will generate additional emissions and air pollution. To estimate these quantities we use future traffic data derived in previous appendices. As with the analyses presented in appendices D and E, estimates are derived for the baseline scenario; a scenario that assumes that Brightline West high-speed rail begins service in 2030; a scenario that assumes that Brightline West high-speed rail begins service in 2030 and the Union Pacific (UP) doubles its capacity through Southern Nevada; and a scenario that assumes electric semi-truck lanes are constructed along the I-15 corridor (see Appendix G).

Estimation Strategy

To calculate the Hydrocarbon (HC), Carbon Monoxide (CO), Nitrogen Oxide (NO_x) and Carbon Dioxide (CO₂) emitted by cars and trucks, emission data for each type of vehicle is collected from Bureau of Transportation Statistics²¹⁵ and the U.S Environmental Protection Agency.²¹⁶ The sample calculations shown below are for 2023 for the baseline scenario for the South County section of I-15.

Number of passenger vehicles in 2023 at location Primm in I-15 south = 40,100

Number of trucks in 2023 at location Primm in I-15 south = 7,900

Total length from California border to Las Vegas = 44 miles

HC emissions for passenger vehicle per mile travel = 0.33g

CO emissions for passenger vehicle per mile travel = 2.81g

NO_x emissions for passenger vehicle per mile travel = 0.20g

CO₂ emissions for passenger vehicle per mile travel = 268.5g

HC emissions for truck per mile travel = 0.85g

CO emissions for truck per mile travel = 17.14g

NO_x emissions for truck per mile travel = 1.08g

CO₂ emissions for truck per mile travel = 379.5g

²¹⁵ Bureau of Transportation Statistics, "Estimated U.S. Average Emissions Rates," 2023, (www.bts.gov/).

²¹⁶ U.S. Environmental Protection Agency, "Carbon Pollution from Transportation," 2023 (www.epa.gov/transportation-air-pollution-and-climate-change/carbon-pollution-transportation).

Total HC emission in year 2023 = No of passenger cars x miles x HC emission per car + No. of trucks x miles x HC emission per truck

$$= 40,100 \times 44 \times 0.33\text{g} + 7,900 \times 44 \times 0.85\text{g} = 0.88 \text{ Tons per day}$$

$$\text{Annual HC Emission} = 365 \times 0.88 \text{ tons} = 321 \text{ Tons}$$

Total CO emission in year 2023 = No of passenger cars x miles x CO emission per car + No. of trucks x miles x CO emission per truck

$$= 40,100 \times 44 \times 2.81\text{g} + 7,900 \times 44 \times 17.14\text{g} = 10.92 \text{ Tons per day}$$

$$\text{Annual CO Emission} = 365 \times 10.92 \text{ tons} = 3,986 \text{ Tons}$$

Total NOx emission in year 2023 = No of passenger cars x miles x NOx emission per car + No. of trucks x miles x NOx emission per truck

$$= 40,100 \times 44 \times 0.20\text{g} + 7,900 \times 44 \times 1.08\text{g} = 0.74 \text{ Tons per day}$$

$$\text{Annual NOx Emission} = 365 \times 0.74 \text{ tons} = 270 \text{ Tons}$$

Total Co2 emission in year 2023 = No of passenger cars x miles x Co2 emission per car + No. of trucks x miles x Co2 emission per truck

$$= 40,100 \times 44 \times 268.5\text{g} + 7,900 \times 44 \times 379.5\text{g} = 605.66 \text{ Tons per day}$$

$$\text{Total Annual Co2 Emission} = 365 \times 605.66 \text{ tons} = 221,066 \text{ Tons}$$

$$\text{Total Annual Emissions} = 321 + 3,986 + 270 + 221,066 = 225,643 \text{ Tons}$$

Using these estimations, Table H.1 presents the total annual emissions in tons in Nevada due to traffic increases in 2023, 2030, 2040, and 2050 for the four scenarios outlined above. Emissions are presented in tons and the percent change values are relative to 2023.

Table H.1: Estimates of Annual Pollution, 2023-2050

Year	Hydrocarbon	Carbon Monoxide	Nitrogen Oxide	Carbon Dioxide	Total Emissions	% Change
Normal Traffic Increase						
2023	876	11,140	750	597,900	610,672	-
2030	1021	12,942	872	697,682	712,518	16.7
2040	1,229	15,548	1,048	840,720	858,546	40.6
2050	1,435	18,127	1,222	983,158	1,003,942	64.4
High-Speed Rail Service Begins in 2028						
2023	876	11,140	750	597,900	610,672	-
2030	974	12,545	843	659,736	674,099	10.4
2040	1,177	15,106	1,016	798,462	815,761	33.6
2050	1,378	17,635	1,186	936,156	956,356	56.6
High-Speed Rail Service Begins in 2028 and Rail Capacity Doubles						
2023	876	11,140	750	597,900	610,672	-
2030	958	12,207	822	350,504	666,243	9.1
2040	1,160	14,768	995	429,346	807,905	32.3
2050	1,316	17,297	1,165	507,394	948,500	55.3
High-Speed Rail Service Begins in 2028, Rail Capacity Doubles, and Construction of I-15 Electric Semi-Truck Lanes						
2023	876	11,140	750	597,900	610,668	-
2030	632	4,162	406	506,480	513,140	-16.0
2040	770	4,930	496	616,339	624,483	2.3
2050	907	5,691	586	725,776	735,401	20.4

Note: Emissions are in tons and percent change is calculated relative to 2023.

Estimates of Pollution on I-15

Table H.2 presents the total annual emissions in tons in Nevada due to traffic increases in 2023, 2030, 2040, and 2050 for the four scenarios outlined above for the South County area of I-15. Emissions are presented in tons and the percent change values are relative to 2023.

Table H.2: Estimates of Annual Pollution for the South County Section of I-15, 2023-2050

Year	Hydrocarbon	Carbon Monoxide	Nitrogen Oxide	Carbon Dioxide	Total Emissions	% Change
Normal Traffic Increase						
2023	321	3,986	270	221,066	225,643	-
2030	350	4,349	294	241,717	246,710	9.3
2040	393	4,892	331	271,275	276,890	22.7
2050	435	5,411	366	300,655	306,867	35.9
High-Speed Rail Service Begins in 2028						
2023	321	3,986	270	221,066	225,643	-
2030	303	3,952	265	203,770	208,291	-7.8
2040	341	4,449	298	229,016	234,105	3.8
2050	377	4,919	330	253,653	259,279	14.9
High-Speed Rail Service Begins in 2028 and Rail Capacity Doubles						
2023	321	3,986	270	221,066	225,643	-
2030	296	3,815	256	200,723	205,090	-9.2
2040	334	4,311	290	225,969	230,904	2.3
2050	371	4,781	321	250,606	256,079	13.9
High-Speed Rail Service Begins in 2028, Rail Capacity Doubles, and Construction of I-15 Electric Semi-Truck Lanes						
2023	321	3,986	270	221,066	225,643	-
2030	186	1,584	115	151,355	153,241	-32.1
2040	209	1,779	130	169,897	172,014	-23.7
2050	232	1,973	144	188,439	190,787	-15.4

Note: Emissions are in tons and percent change is calculated relative to 2023.

Table H.3 presents the total annual emissions in tons in Nevada due to traffic increases in 2023, 2030, 2040, and 2050 for the three scenarios outlined above that are applicable to the North County section of I-15. Emissions are presented in tons and the percent change values are relative to 2023.

Table H.3: Estimates of Annual Pollution for the North County Section of I-15, 2023-2050

Year	Hydrocarbon	Carbon Monoxide	Nitrogen Oxide	Carbon Dioxide	Total Emissions	% Change
Normal Traffic Increase						
2023	447	6,038	403	293,876	300,764	-
2030	528	7,132	476	347,023	355,159	18.1
2040	645	8,708	581	424,067	434,001	44.2
2050	761	10,276	685	500,327	512,049	70.2
Rail Capacity Doubles						
2023	447	6,038	403	293,876	300,764	-
2030	518	6,932	463	342,590	350,504	16.5
2040	635	8,508	568	419,635	429,346	42.8
2050	751	10,075	673	495,895	507,394	68.7
Rail Capacity Doubles and Construction of I-15 Electric Semi-Truck Lanes						
2023	447	6,038	403	293,876	300,764	-
2030	303	2,577	188	246,182	249,250	-17.1
2040	370	3,152	230	301,064	304,815	1.3
2050	436	3,718	271	355,161	359,586	19.6

Note: Emissions are in tons and percent change is calculated relative to 2023 base year.

Estimates of Pollution on I-11

Table H.4 presents the total annual emissions in tons in Nevada due to traffic increases in 2023, 2030, 2040, and 2050 for I-11 at Hoover Dam. The percent change values are relative to 2023.

Table H.4: Estimates of Annual Pollution on the I-11 at Hoover Dam, 2023-2050

Year	Hydrocarbon	Carbon Monoxide	Nitrogen Oxide	Carbon Dioxide	Total Emissions	% Change
2023	109	1,117	78	82,961	84,265	-
2030	143	1,461	102	108,943	110,649	31.1
2040	191	1,949	137	145,378	147,654	73.1
2050	239	2,441	171	182,176	185,027	119.6

Note: Emissions are in tons and percent change is calculated relative to 2023 base year.

Appendix I: Estimates of Electricity Requirements to Charge Electric Semi-Trucks

One of the scenarios presented in Appendix F assumes the construction of an electric semi-truck lane along the I-15 corridor. The daily electricity consumption required to charge electric semi-trucks is calculated based on the vehicle miles travelled by the trucks along the I-15 section located in Nevada in gigawatt hours (gWh).

Estimation Strategy

To calculate the daily electricity requirements for the semi-trucks' electricity consumption data is collected using data provided by Tesla.²¹⁷ The 2023 sample calculations for the base scenario for the I-15 in South County are shown below.

Number of trucks in 2030 at Primm = 8,600

Total length from Primm to Las Vegas = 44 miles

Electricity consumption per truck per mile travel (kWh) = 2

Total daily electricity required by trucks to travel from Las Vegas to Primm = No. of trucks x miles x electricity consumption per mile

= 8,600 x 44 x 2

= 756,800 kWh

= 756,800/1,000,000 gWh

= 0.757 gWh

Electricity Requirements for the I-15 South County and North County Sections

Table I.1 below presents the daily electricity requirements in units of gWh to charge the semi-trucks that operate on the I-15 in Nevada for 2030, 2040, and 2050. Electricity use is calculated for two scenarios: one scenario assumes normal traffic growth and the other assumes the Union Pacific (UP) doubles its capacity by 2030. The estimates are presented separately for the I-15 South (Primm to Las Vegas; 44 miles) and North (Las Vegas to Mesquite; 80 miles) County sections.

²¹⁷ See Tesla, "Semi," 2023 (www.tesla.com/semi).

Table I.1: Estimates of Electricity Requirements to Charge Electric Semi-Trucks, 2030-2050

Year	Electricity Requirements based on Normal Traffic Growth	Electricity Requirements based on Union Pacific Doubling Capacity
I-15 South County		
2030	0.757	0.713
2040	0.854	0.810
2050	0.942	0.898
I-15 North County		
2030	1.456	1.392
2040	1.776	1.712
2050	2.096	2.032

Note: Values are in gigawatts per hour.

Appendix J: Timeline of Key Events

This report and its recommendations are bound by several key events at the regional, state, and federal levels that should inform policy development and implementation. To guide this process a summary of the milestones that are relevant to the recommendations developed in Part 5 is presented below.

American Rescue Plan Act (2021-2026)

Appropriated funds are required to be spent between March 3, 2021, and December 31, 2024. Award funds for obligations incurred by the end of 2024 may be expended through 2026.

Apex Area Technical Corrections Act (2023-2025)

Legislation carried by Sen. Cortez Masto in the current Congress proposes to expedite BLM permitting within Apex. Currently, each project proposal is individually evaluated through a process that may last three years.

Brightline West High-Speed Rail (2023-2028)

The project is intended to provide an alternative to air and automobile travel between Southern California and Las Vegas. Construction on the route is expected to begin in 2024 with service scheduled to commence prior to the 2028 Summer Olympics in Los Angeles.

California Transportation Electrification (2020-2045)

After gaining a waiver that will allow the state to exceed federal requirements, California is implementing a two-decade long transition to zero-emission vehicles. By 2035 sales of new cars and trucks will be zero-emission. Between 2024 and 2035 the state is requiring that delivery and local, state, and federal fleets transition to zero-emission vehicles. In 2039 the mandate will apply to work and day cab trucks and where feasible, by 2042 new semi-trucks sold in the state must be zero-emission.

CHIPS and Science Act (2022-2031)

The 2022 CHIPS and Science Act directs \$280 billion over 10 years to support U.S. innovation competitiveness by supporting research and development geared towards the commercialization of technologies, invigorating domestic semiconductor manufacturing, creating regional tech hubs, and training a more inclusive workforce supporting these initiatives.

Colorado River Reductions (2023-2026)

In the spring of 2023, the Biden Administration and Arizona, California, and Nevada announced an agreement to protect the Colorado River's water supply through 2026. In exchange for \$1.2 billion to be directed to local irrigation districts, communities, and tribes, the three Lower Basin states agreed to voluntarily conserve about three million acre-feet of water by 2026 or roughly 13 percent of total water available in the Lower Colorado. However, the 2023 snowfall was large enough that the reductions were reduced.

Greenlink (2024-2026)

The most relevant development of the Greenlink project for Southern Nevada is the Greenlink West segment, a 525-kilovolt transmission line that will span approximately 350 miles, linking Yerington, Nevada, and Las Vegas. The Public Utilities Commission of Nevada has approved the project and NV Energy is completing design and permitting. Construction on Greenlink West is likely to start in 2024, with completion estimated by 2026.

Inflation Reduction Act (2022-2031)

The legislation seeks to reduce the federal deficit and lower inflation while promoting increased domestic clean-energy production and transmission, lowering health care premiums, and allow Medicare to negotiate drug prices. The legislation's \$433 billion in spending is offset by changes in tax policy that are projected to yield \$739 billion in revenue, generating \$300 billion in deficit reduction,

Infrastructure Investment and Jobs Act (2022-2026)

In 2022, \$550 billion was appropriated by Congress to support a wide range of infrastructure initiatives. Notice of funding for specific programs are ongoing and are being administered by several federal agencies. Legislative authorization expires at the end of 2026.

I-11 (2014-indefinite)

Plans for the southern section of I-11, which would run from Las Vegas to Nogales, Arizona, have been in the works for years, but it may be many more years before Arizona completes its section. The only existing segment of I-11 is the 22.8-mile portion that runs concurrently with U.S.-93 from Henderson to Hoover Dam. In 2021, Arizona completed a study for the segment between Nogales and Wickenburg, Arizona, but Congress has not allocated funding for I-11 in Arizona. The project still requires approval under the National Environmental Policy Act. In the meantime, Arizona is spending more than \$263 million to expand three segments of the U.S.- 93 between Wickenburg and I-40 in Kingman, Arizona, from two to four lanes.

Nevada Net-Zero Emissions (2019-2050)

As part of a larger effort to mitigate climate change, Nevada is requiring the state to be a net-zero producer of emissions by 2050.

Nevada Renewable Energy Requirement (2019-2030)

Current legislation requires half of the energy in Nevada to be produced by renewable sources by 2030.

Southern Nevada Supplemental Airport (2000-2037)

The project is currently going through technical reviews, with construction expected to begin by 2029 and be completed by 2037. As part of this process, the Clark County Commission will determine when and where a town to support the airport and adjacent development is incorporated.

UNLV North Campus (2015-indefinite)

In 2015 federal legislation conveying 2,085 acres of federal land in North County on behalf of UNLV was approved. Formal conveyance will occur after munitions are removed from the site. Once this process is completed UNLV will be able to begin formal planning and development. To facilitate public-private partnerships to assist this process will require additional federal legislation as the current language only allows for public-public partnerships (see Part 5).

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Brookings Mountain West is a partnership between UNLV and the Washington, D.C.-based Brookings Institution. The purpose of Brookings Mountain West is to bring the Brookings tradition of high-quality, independent, and impactful research to the issues facing the dynamic and fast-growing Intermountain West region. Building upon work at Brookings and UNLV, our community engagement and research initiatives focus on helping metropolitan areas like Las Vegas grow in robust, inclusive, and sustainable ways. Brookings Mountain West provides a platform to bring ideas and expertise together to enhance public policy discussions at the local, state, and regional level.

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For 48 years, UNLV's Center for Business and Economic Research has been Nevada's premier applied research entity that provides economic and business research to leaders in public, private, and nonprofit sectors across Nevada. CBER conducts applied research that can be used for strategic business decisions, policy analysis, and economic forecasting. Its goal is to help Nevada's businesses, community leaders, and policy makers make informed decisions through data-driven research and analysis. The Center also contributes to public understanding and discussion of economic and business issues in Nevada, the metropolitan Las Vegas area, and the Mountain West region. CBER often publishes reports and forecasts for sectors such as tourism, gaming, and regional economics.

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The Transportation Research Center (TRC) endeavors to promote and facilitate transportation related research, education, and outreach activities at the University of Nevada, Las Vegas (UNLV) to address current, emerging, and long-term needs and challenges for a vibrant transportation system. TRC strives to develop innovative solutions that enhance safety, improve accessibility and mobility for passenger and freight transportation systems. TRC serves as a focal point at UNLV to facilitate multi-disciplinary initiatives by bringing together assets and resources from across UNLV, and developing partnerships with public and private sector entities and not-for-profit organizations. This included leveraging the expertise and experience at various organized research units and centers and academic program across UNLV. The collective expertise and initiatives facilitated by TRC include topics across the transportation system life cycle (policy, planning, design, construction, operations, maintenance, rehabilitation, and management) and across various transportation modes.

