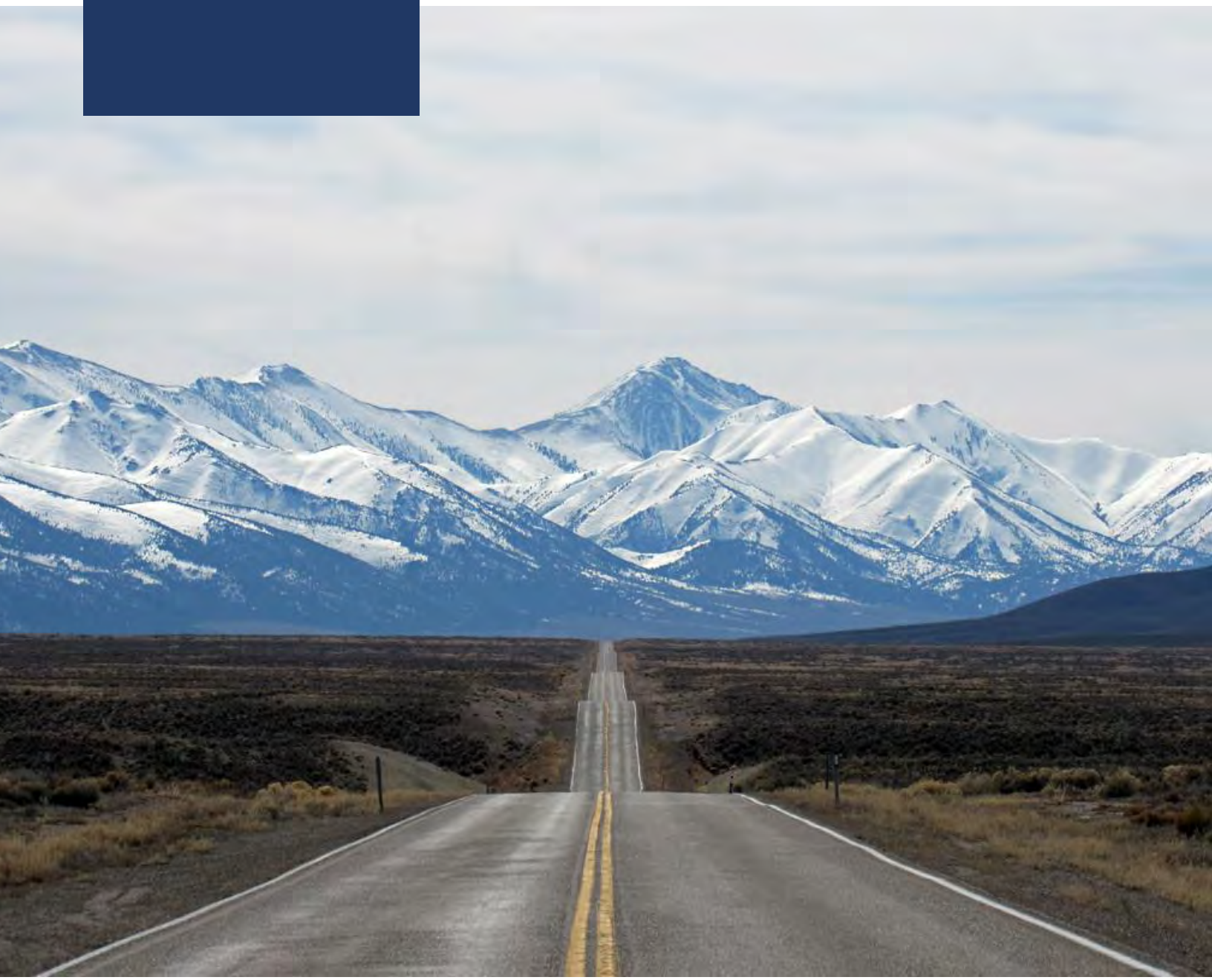
The Future Beyond the Pandemic

Nevada's Plan for Recovery & Resilience

NEVADA GOVERNOR'S OFFICE OF ECONOMIC DEVELOPMENT

Prepared by SRI International, in collaboration with
RCG Economics and Brookings Mountain West



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Authors

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Note

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Executive Summary

Nevada's Plan for Recovery & Resilience

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Vision

> *A diverse, innovative, and sustainable economy*

Mission

> *Good jobs today, better jobs tomorrow*

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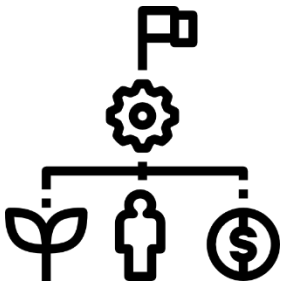
Executive Summary

Priority Areas for Immediate Intervention

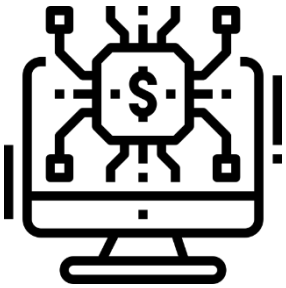
GOED has targeted a variety of coordination, information, and leadership challenges in order to accelerate immediate recovery.



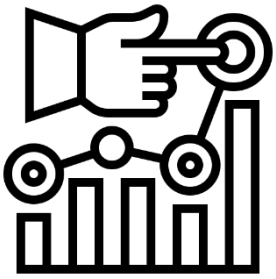
Resources for People and Businesses

Business Support and Expansion

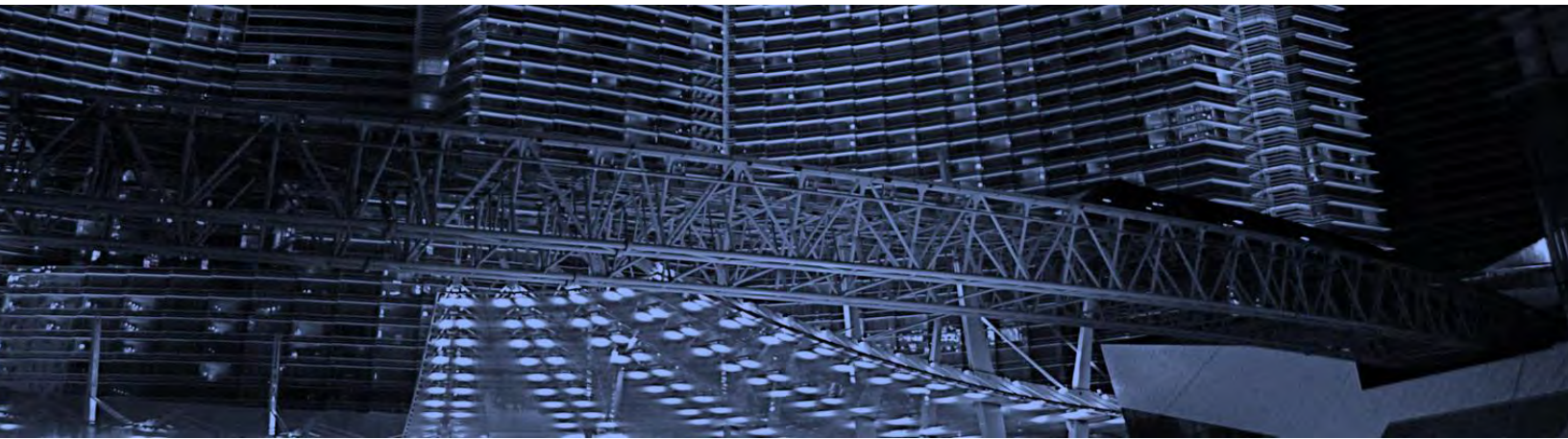
Workforce for the Next Economy



New Technology Businesses



Data and Integrated Planning for Decision-Making



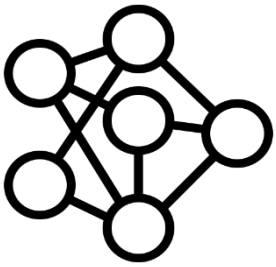
Executive Summary

Visionary Strategies and Initiatives

GOED works with stakeholders to pursue visionary policies that set Nevada apart for the future.

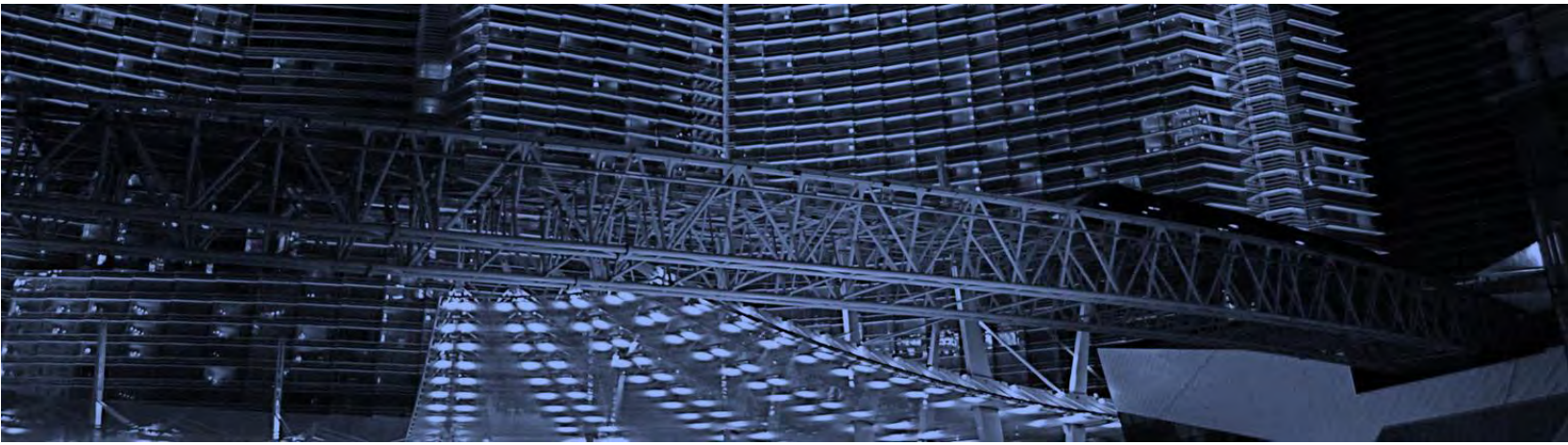
Regionally Designed Industrial Clusters

1. Develop New Approaches to Cluster Identification and Development
2. Integrate into Regional and Global Value Chains
3. Enable Further Diversification of Southern Nevada's Economy



Statewide Integration and Connectivity

1. Integrate and Expand Capabilities between Northern and Southern Nevada
2. Expand Broadband Accessibility

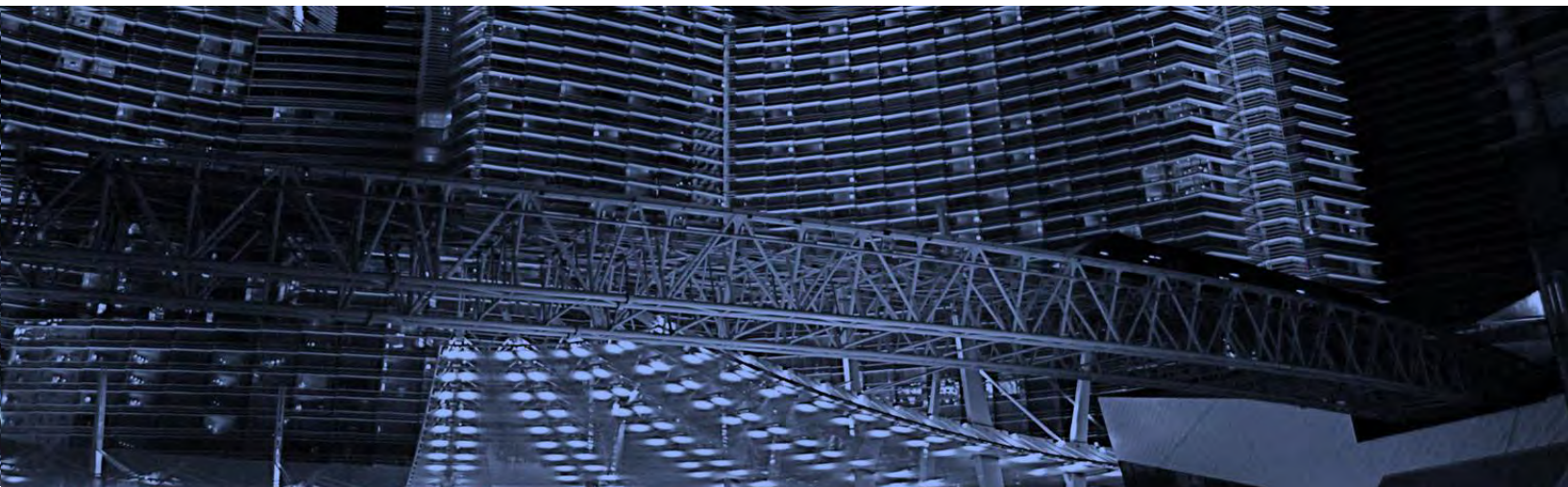


Technology Driven Development

1	Establish Southern Nevada as a World Data Hub
2	Recruit Automation and Digital Technologies Firms
3	Enable Technology-Based Entrepreneurship

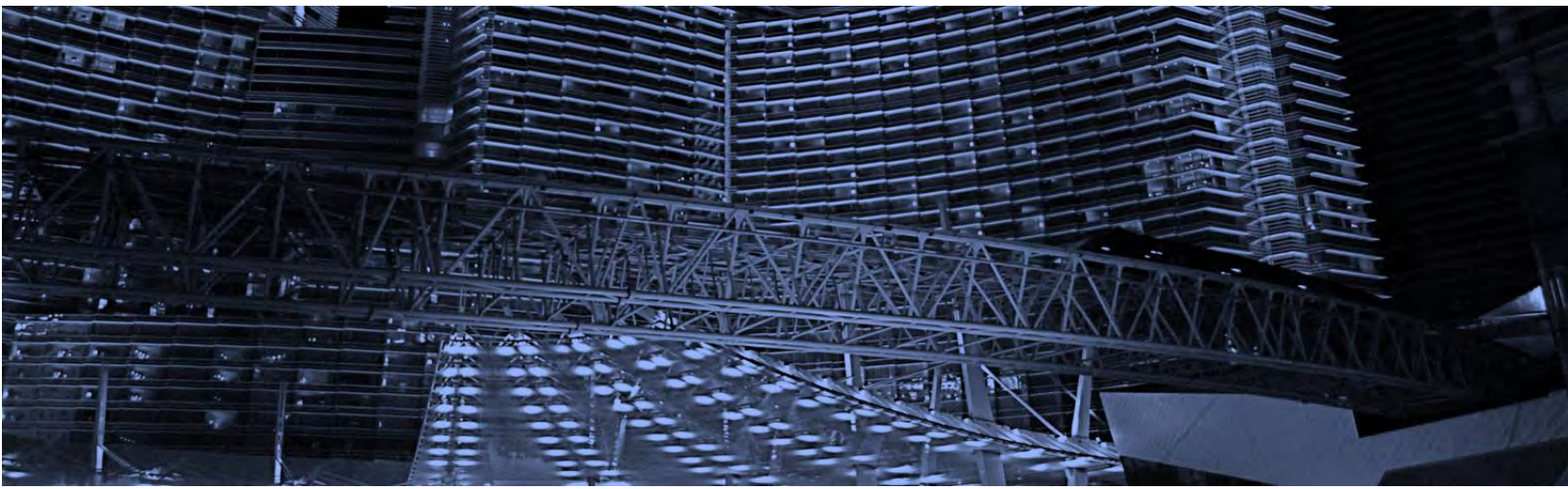
Responsible and Sustainable Growth

1	Lead the Global Development of Energy Storage Supply Chains
2	Transition to a Low-Carbon, Low-Emission Economy
3	Transition to a Water-Wise Economy



Comprehensive Placemaking

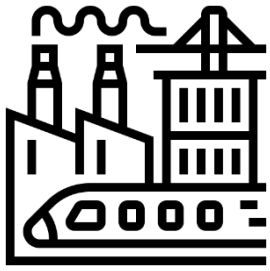
1. Remove Barriers to Increased Healthcare Access across Nevada
2. Encourage Purposeful Residential Zoning and Development
3. Increase Engagement with Outdoors for Business and Leisure
4. Support Entrepreneurship in Digital Arts and Esports



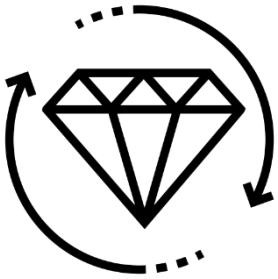
Executive Summary

Capabilities to Realize the Vision

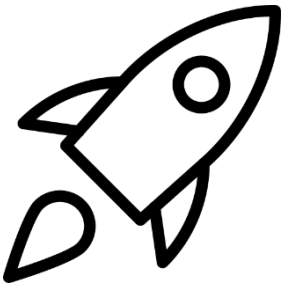
Nevada will need to build or rebuild key financial and institutional capabilities and develop realistic statutory actions.



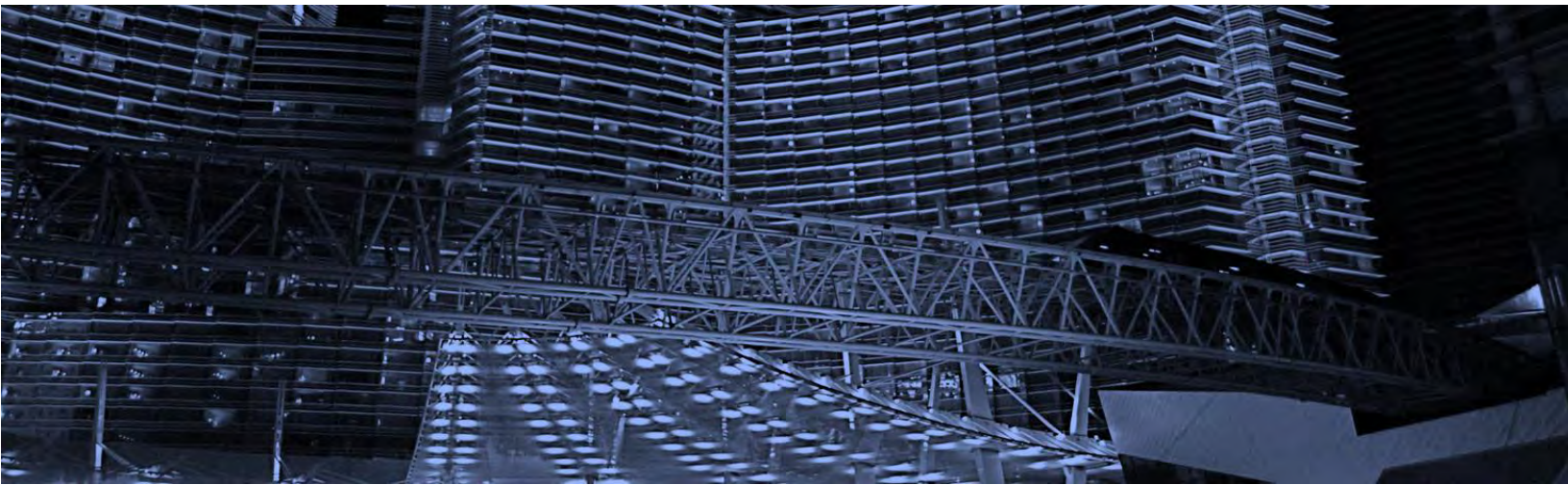
Fund the State Infrastructure Bank



Establish a Sovereign Wealth Fund

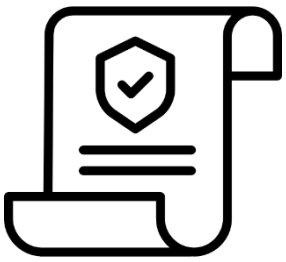


Establish the Nevada Innovation Fund



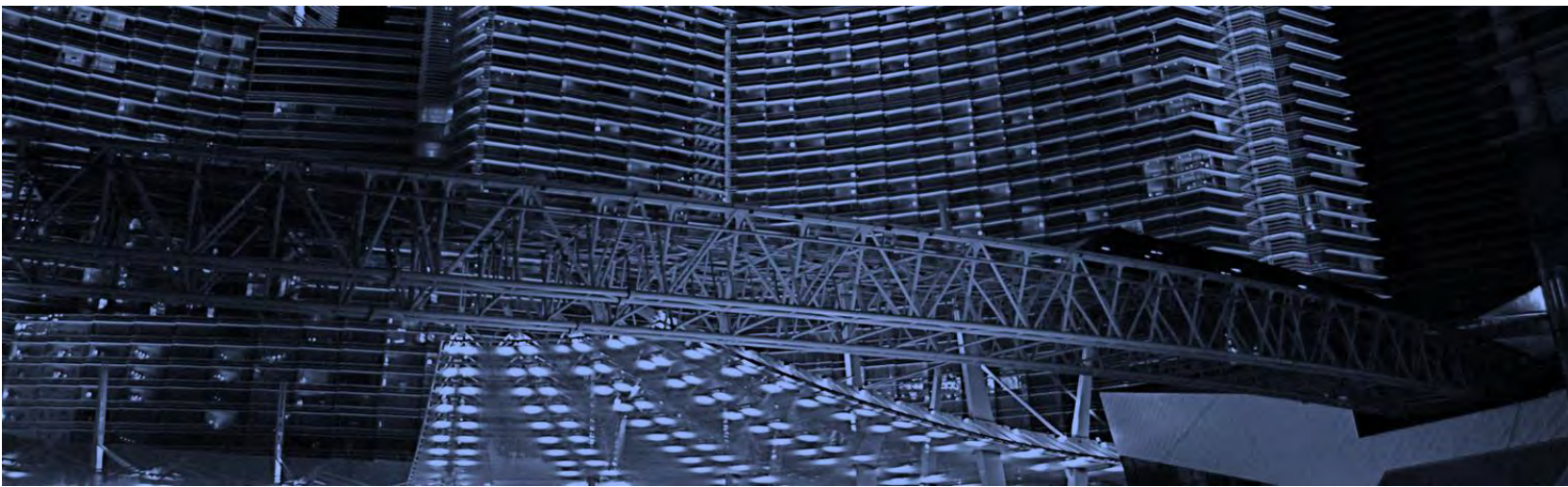
Establish an Office for Micro-, Small-, and Medium-Sized Enterprises

Grow Nevada's Community Banking Network



Modernize Public Policy and Governance

Reinvent Nevada's Workforce Institutions



Executive Summary

Nevada's Assets

Innovation Ecosystem and Economy

In 2018, SRI International conducted a statewide assessment of Nevada's assets, examining those within the domains of the innovation ecosystem, economy, physical infrastructure, quality of life, governance, and natural resources.

Innovation Ecosystem

+ Entrepreneurial and risk-taking population
– Coordination lacking among the state's innovation system

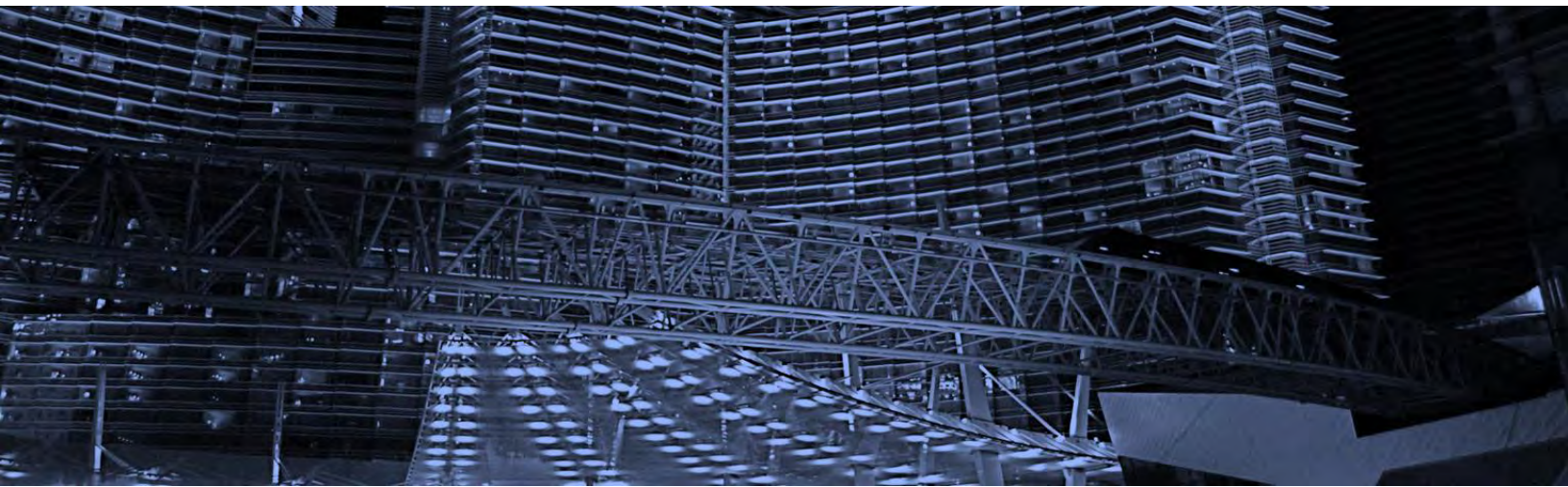
Economy

Diversification of Economic Base

+ Shift from tourism and gaming towards high-skill industries
– Many jobs added in lower-skill elements of high-skill industries

Skilled Workforce Attraction/Retention

+ Attraction of many historically underrepresented occupations
– Highly educated spouses unable to find jobs in some areas



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Nevada's Assets

Physical Infrastructure

Physical Infrastructure

Energy

+ Significant renewable energy integration into electrical grid
– Dependent on imports for fuel to meet energy needs

Broadband

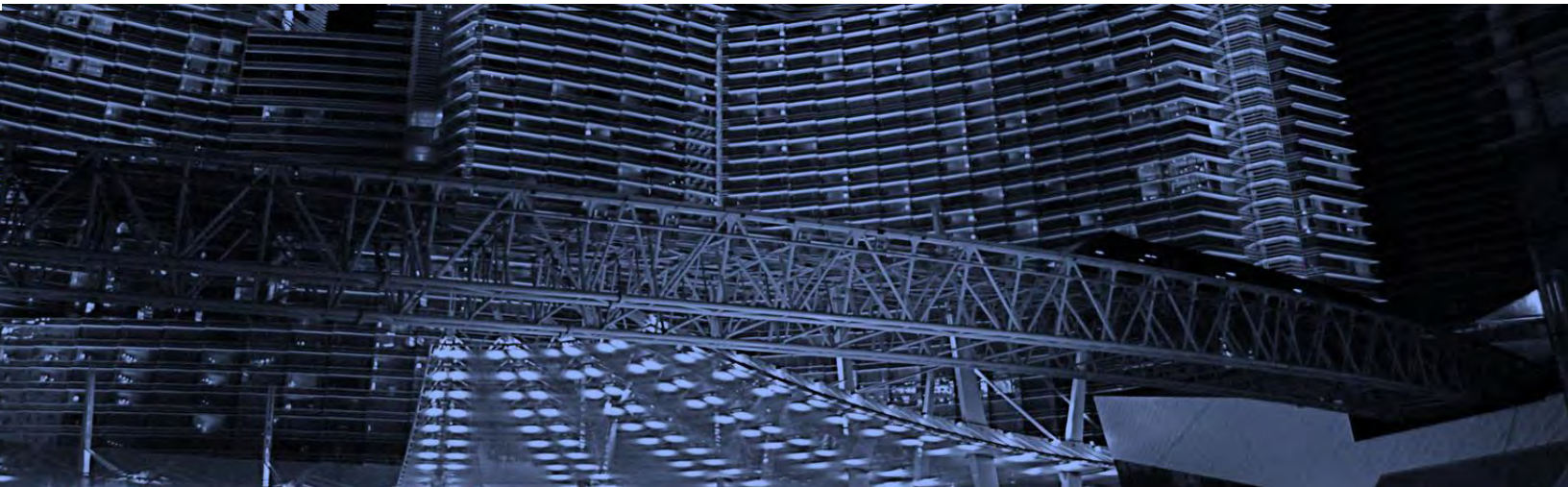
+ Strong connectivity and high speeds in metropolitan areas
– Weak connectivity and lack of redundancy in rural communities

Transportation

+ Strong air and road connectivity in major metropolitan areas
– Lack of consistent funding for roads that require significant repairs

Housing

+ New home builds increasing throughout the state
– New homebuyers increasingly priced out in metropolitan areas



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Nevada's Assets

Quality of Life

Quality of Life

Health

+ Positioned for significant growth in healthcare
– Continuing shortage of medical professionals

Safety

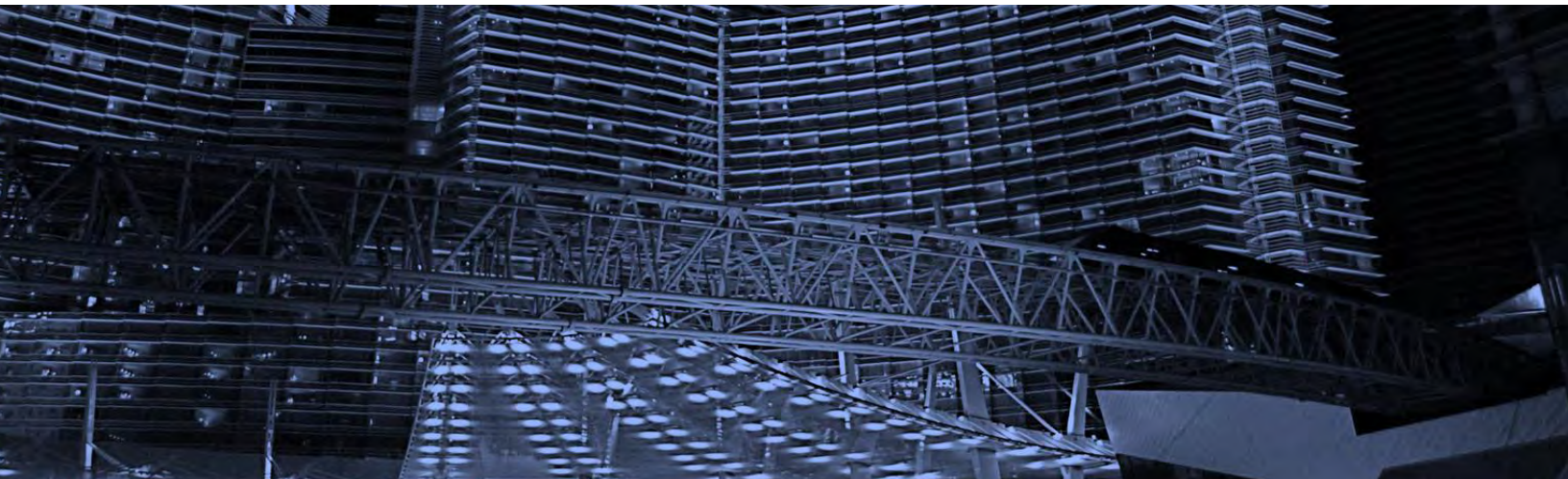
+ Significant progress in reducing property and violent crime
– Crime still a pervasive issue in many communities

Education

+ K-12 education system contains nationally-ranked high performers
– Underperformance a result of underfunding and overcrowding

Recreation

+ Open land for exploration and outdoor recreation
– Ability to attract families harmed by an incomplete image of the state ("Sin City")



Executive Summary

Nevada's Assets

Governance

Governance

Institutional Assets

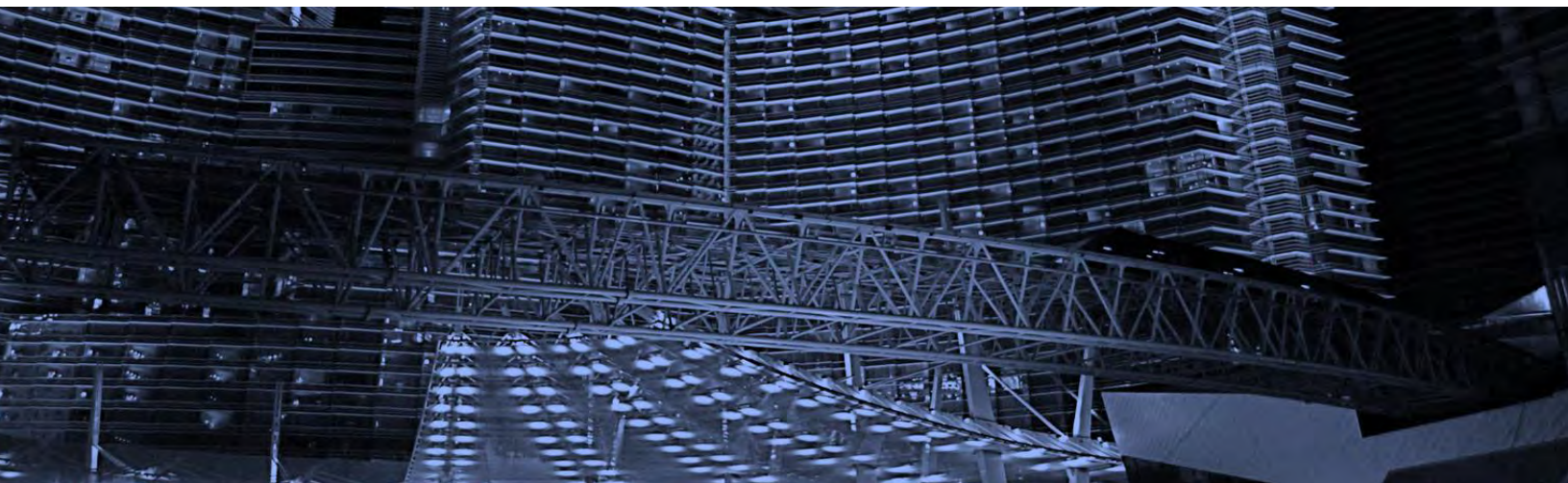
+ Responsive state and local offices for economic development
– Weak enterprise technologies and limited financial capacity

Taxation

+ Low-tax environment attractive to business
– Low-tax environment limiting to investments that could attract businesses

Business-Friendly Environment

+ Easy access to decisionmakers
– Tax abatements not meeting the needs of technology companies
– Limited banking sector



Executive Summary

Nevada's Assets

Natural Resources

Natural Resources

Land

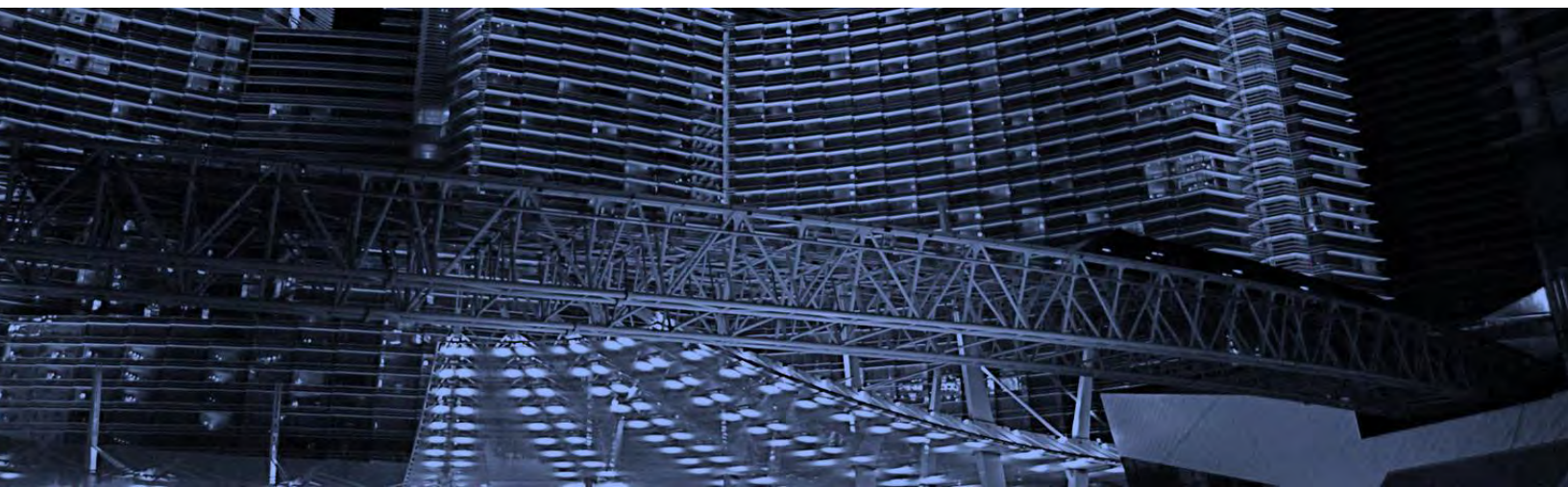
+ Majority of the state's land open to the public for recreation
– Extensive federal land ownership problematic for expanding cities and land usage

Minerals

+ Lithium a new opportunity for the state's mining industry
– Mining industry and its technology not well-understood

Water

+ Experienced in conservation efforts to save water
– Current water resources threatened by rapid growth



Executive Summary

SWOT Analysis

Strengths

The SWOT analysis highlights sources of strength and weakness that may be addressed, opportunities to be realized, and dangers and difficulties to be avoided.

Strength

Culture and Quality of Life
- Enterprising migrants
- Frontier spirit
- Artists, musicians, and performers
- Outdoor enthusiasts

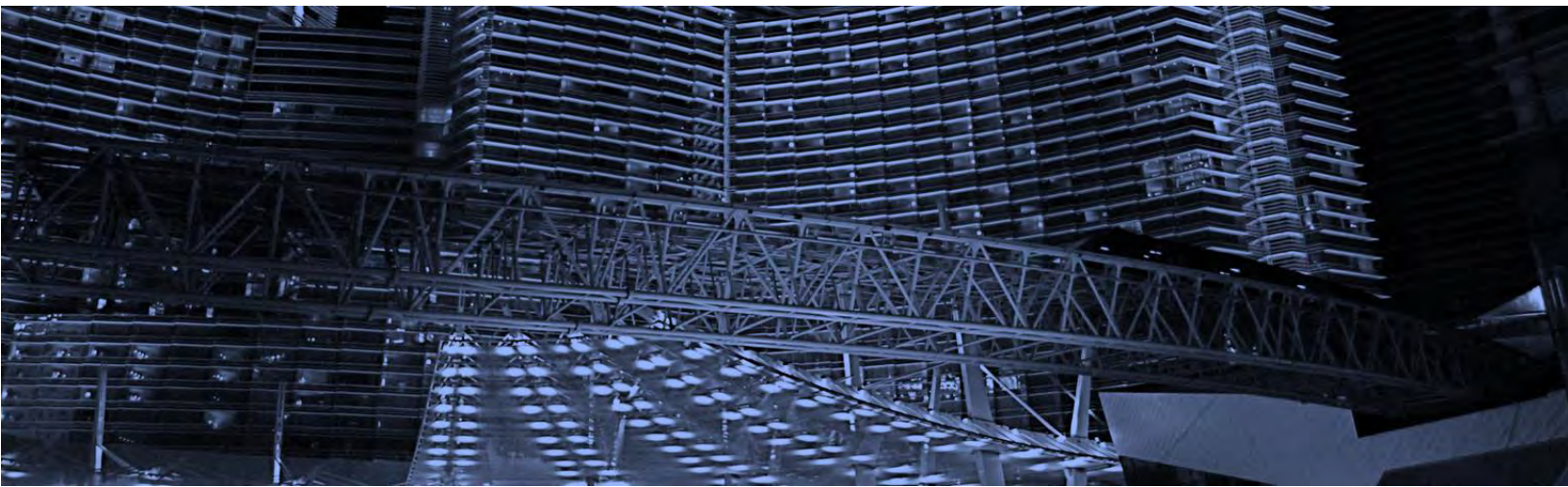
Governance
- Low taxes and regulation
- "Small state" advantage

Industry
- Increasing diversification
- Value-chain opportunities

Infrastructure
- Inexpensive energy
- Increasing use of renewable energy
- Advanced water management
- Urban connectivity
- Stable environment

Innovation
- Connections to the West Coast
- Low barriers for new businesses
- Pervasive small business ethic

Workforce and Education
- Established models of success
- Workforce Innovations for a New Nevada (WINN) and other career and technical education (CTE) booster programs



Executive Summary

SWOT Analysis

Weaknesses

Weakness

Innovation
- Immature mentor networks
- Lack of early-stage funding
- Underutilized tools and programs
- Weak connections to research institutions

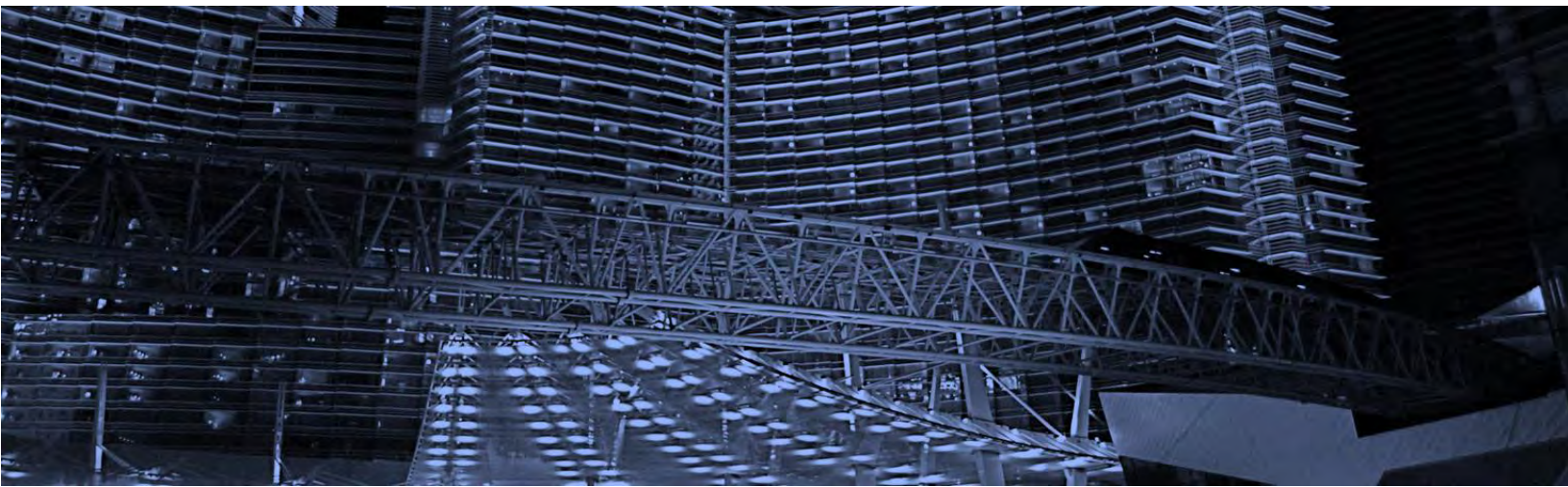
Infrastructure
- Energy market uncertainty
- Water rights
- Rural broadband connectivity
- Congestion in suburban and urban areas
- Federal land ownership

Governance
- Tax abatements
- Property tax limitations
- Impact of the Knowledge Fund
- Economic development collaboration

Culture and Quality of Life
- Housing affordability
- Low trust in government institutions
- Lack of collaboration
- Poor health indicators
- Harsh desert climate

Workforce and Education
- Weak institutional performance
- Lack of K-12 and higher education funding
- Low educational attainment
- Poor career guidance for mid-skill workers
- Shortages in building and other skilled trades

Industry
- Persistently low wages



Executive Summary

SWOT Analysis

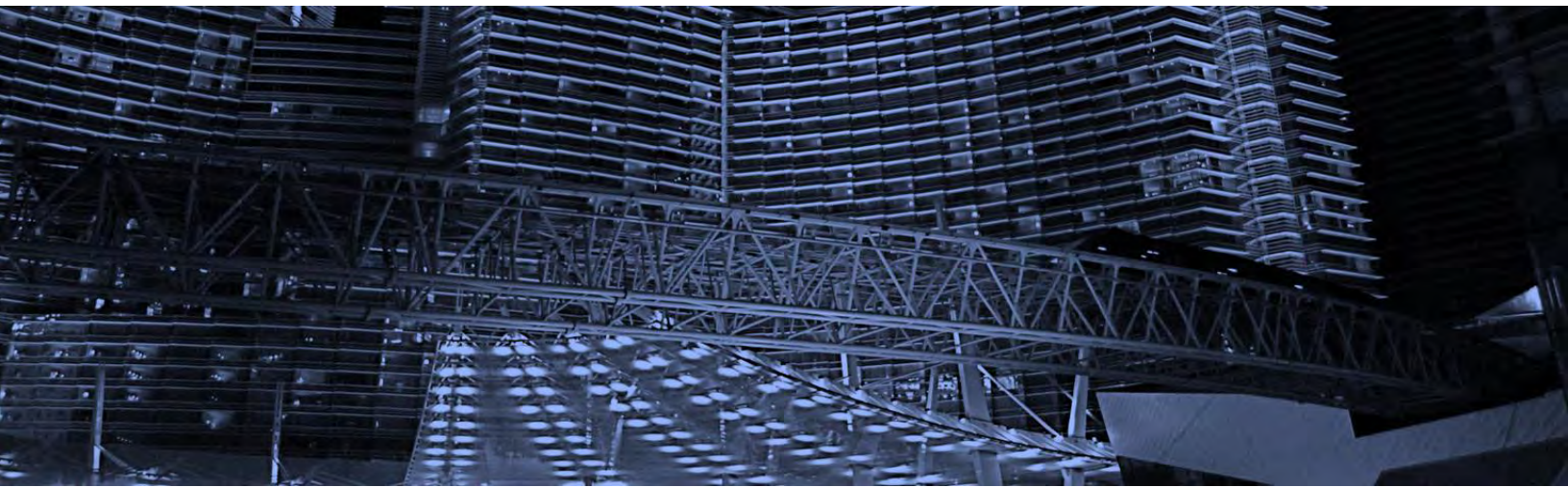
Opportunities and Threats

Opportunity

- Access to West Coast networks
- Access to Mountain West markets
- Las Vegas world brand
- Opportunities for mining diversification
- Testbed for new technologies
- Mobile Millennials and Generation Z
- West Coast costs and congestion

Threat

- Impact of climate change
- Exposure to economic cycles
- Uncertain federal policies
- Competition from Mountain West states
- Costs and congestion



Nevada's Plan for Recovery & Resilience

Overview

The Future Beyond the Pandemic

Photo Courtesy of Bob Wick/BLM/Flickr

Overview

The report that follows contains the following components:

- An economic forecast from RCG Economics on the situation expected for Nevada—GDP and employment—in the fall of 2021 (subject to all the present uncertainties faced by Nevada and the country as a whole).
- A series of immediate actions, in which GOED plays a leadership role, to shelter and prepare for recovery key components of Nevada's economy. The particular focus is on "Main Street" and small and medium sized businesses.
- A set of visionary strategies, firmly grounded in Nevada's underlying assets, that will accelerate the diversification of the state's economy and the transition towards technology intensive and skill intensive employment.
- An inventory of necessary capabilities that must be developed or upgraded in order to realize the vision of a diversified, innovative, and sustainable economy.

The report constitutes an agenda for the whole state, urban and rural, for which GOED plays a critical coordinating role. However, GOED operates only as a partner with other stakeholders, within each region and across the state. As the SWOT analysis above suggests, policy fragmentation is an

enduring challenge for Nevada. The plan is designed to address this challenge directly by providing a high-level agenda that will coordinate the actions of a broad set of partners, public and private.

Over the last 10 years, Nevada has made significant strides in recovering from the Great Recession of the late 2000s, exceeding expectations and growing new industries that provide opportunities for all Nevadans. This is in no small part due to the statewide economic development strategic plan released in 2011, *Moving Nevada Forward: A Plan for Excellence in Economic Development*, and the supporting 2011 assessment *Unify. Regionalize. Diversify: An Economic Development Agenda for Nevada*, both of which aimed to modernize the state's approach to economic development and lift it out of the Great Recession.

Under the direction of this plan and the leadership of the Governor's Office of Economic Development (GOED), Nevada has made significant progress in diversifying its economy. However, the COVID-19 pandemic has put an extraordinary strain on public health and economic systems, in Nevada and around the world, and brought about another recession. Once again, Nevada is uniquely exposed. The state's economy is historically procyclical, and the impact of the pandemic on travel and hospitality worsens this exposure.

While recommendations for social distancing and stay-at-home orders have been highly effective at limiting the spread of the virus and saving lives, the impact on consumer spending has been severe. In particular, the leisure and hospitality industries have experienced unprecedented contraction, with most resorts and venues closed for many weeks, and workers facing prolonged uncertainty.

The reality is that some of Nevada's workers will not return to the same job that they had before the COVID-19 pandemic—either because of business closure, lack of customers, or drop in demand for certain industries. Small- and medium-sized businesses have been especially hard hit, and their losses will delay a strong recovery. On the other hand, other industry sectors will see growth as Nevada and the nation recover from the economic impact.

Economic activity over the next 18 to 24 months will require close collaboration between the state's employers and state and local government to ensure that the gradual lifting of pandemic restrictions does not lead to an uncontrolled increase in COVID-19 cases. In addition, state and local leaders must understand the challenges the state will face in the medium term. As with the Great Recession, consumer confidence—which sustains travel, hospitality, and entertainment—will be slow to return no matter what political leaders say. Fostering this confidence will require a visible change in business practices.

Nevada needs an economic Dunkirk: Economic development initiatives and workforce programs must rescue businesses and workers immediately by mobilizing all available state and private sector resources.

In order to support this reopening, GOED will work with stakeholders, elected officials, business organizations, workers, and employers to target immediate recovery and long-term resilience. As Nevada's leaders begin to reopen the state's economy, GOED's actions should serve the immediate needs of business in order to accelerate the reopening in line with the public health response. At the same time, GOED will start to map key changes for the future for which business will need to be prepared.

In short, GOED will target **immediate recovery** and **long-term resilience**. This plan, along with immediate and long-term efforts to recover and reimagine Nevada's economy, will be completed through collaborative efforts between state and local leaders, stakeholders from the business community, higher education, and workers. Importantly, with an ongoing pandemic, there can be no "return to normal" or economic recovery without a public health recovery.

Immediate Recovery

The reopening will be driven by the reasonable urgency of businesses trying to get back on their feet. A variety of coordination, information, and leadership challenges are being addressed to make it as fast and smooth as possible, and GOED has a critical role to play in meeting these challenges.

Long-Term Resilience

Once reopening has occurred, the "new normal" will be different. State and local government has a special responsibility to support business under these changed conditions, as well as a responsibility to design and pursue policies that set Nevada apart for the medium term.

Photo Courtesy of Trevor Bexon/Flickr

Economic Forecast

The plan that follows is grounded in a high-level 12- to 24-month economic and fiscal analysis and projection for the state of Nevada and its two metropolitan statistical areas (MSAs) based on three economic/fiscal scenarios and projections: Best, Most Likely, and Worst Case. (Tables depicting these projections not included below are made available in Appendix D). Several datasets were utilized to generate the model's results, including:

- Total employment
- Initial unemployment claims
- Visitor volume
- Taxable retail sales
- U-3 (headline) unemployment rate and workforce participation rate
- Sales and use tax collections
- Aggregation of other relevant tax revenues

Results

In this section, RCG Economics presents and discusses its forecast results for this study's selected indicators. The discussion here is also focused on how the forecasts relate to the assumptions used

in their formulation (assumptions outlined below). For a deeper discussion of these assumptions and how the forecasts were produced, please see *Methodology*. The indicators discussed in this section relate to:

- Gross domestic product (GDP)
- Employment
- Unemployment
- Visitor volume
- Taxable sales
- Property tax
- Gaming tax
- Room tax
- Sales & use tax
- Consolidated tax
- Modified business tax
- Marijuana excise taxes

RCG has developed three forecast scenarios for each indicator. They are listed below, based on RCG's research. Additionally, the study discusses and compares the forecast results against a no-pandemic scenario—a hypothetical forecast that assumes that the COVID-19 pandemic did not occur:

- No Pandemic
- Worst Case
- Most Likely Case
- Best Case

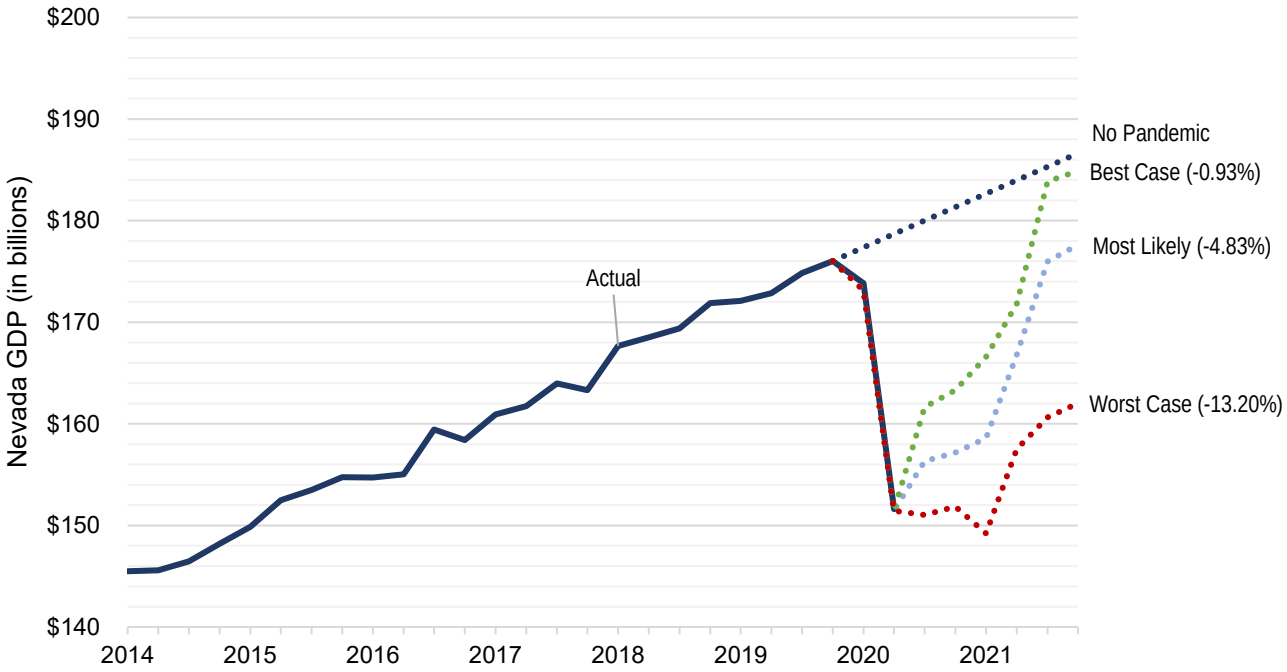
GDP

Total GDP

The Most Likely scenario of RCG's Nevada GDP model is based on a 12.5% decline in Q2 2020 compared to Q1 2020. This large drop is not surprising considering that Nevada has been hit hard by the pandemic compared to most other states because of its largely tourism-driven economy,[1] especially the Las Vegas MSA. The statewide economic lockdown in the early months of the pandemic especially affected the tourism industry (about 23% of the state's economy[2]). Seasonally adjusted jobs in the industry dropped by 43%, or by 152,800 jobs from 356,400 to 203,600, between April 2019 and April 2020 as result of the lockdown that began on March 17. By June, the industry had regained 90,200 of the jobs lost in April.

The COVID-19 Pandemic Severely Impacts GDP Growth in Nevada

Figure 1: Nevada Real GDP Forecasts, by Scenario, 2014 to 2021. Source: RCG Economics and U.S. Bureau of Economic Analysis.



Note: *Data are in 2020 U.S. Dollars. The solid blue line ("actual") represents historical GDP data from Q1 2014 to Q2 2020. The dotted dark blue line provides the results of the authors' no-pandemic scenario, a forecast that assumes that the pandemic had never occurred. The dotted light blue line provides the results from the study's Most Likely case scenario, the most likely outcome based on the authors' research. The dotted green line represents the Best-Case scenario. In this case, the factors included in the model generally see relatively optimistic outcomes. The dotted red line shows the Worst-Case scenario, in which the model's factors were given relatively poor outcomes. Data in parentheses represent the forecasted change in GDP from the expected GDP under the no-pandemic scenario in Q4 2021. Forecasted GDP change by sector can be found in Table 1.*

In the Most Likely scenario, by the end of 2021, it is expected that the state's GDP will be $177.6 billion (in 2020 dollars), or 4.8% less than what it hypothetically would have been had the pandemic not occurred. However, in the Worst Case, it is projected that Nevada GDP could fall to as low as $162.0 billion, similar to the state's GDP in Q2 2017. This represents a 13.2% loss in GDP compared to the no-pandemic scenario. Such a drop in GDP would significantly impact the state's economy. It would potentially take years, possibly a decade[3] or more, for the economy to return to its pre-pandemic growth path.

On the other hand, the Best-Case scenario projects that the pandemic does not ravage the state's economy. In this scenario, state GDP in Q4 2021 is projected to be $185.0 billion, or only 0.9% below the no-pandemic scenario. In this case, Nevada's economy would be able to recover from the COVID-19 pandemic in a relatively short period of time.

For the Best-Case scenario to actually occur, Nevada (like other states) would require the federal government to provide an additional tranche of virus-related financial relief, including continued and substantive unemployment benefits to workers, direct aid to states and local governments,

additional paycheck protection program dollars to small businesses and, at some point, large-scale infrastructure investments.[4] This would require the federal government to add several trillion dollars to the national debt but would likely protect the U.S. economy from a continued free-fall[5] and accelerate its recovery[6] from possibly decades to a few years. Such a scenario would also require the severity of COVID-19 in Fall and Winter 2020 to remain constant relative to the summer months. This will allow governments to continue to reopen the economy more fully and safely and lessen consumer fears and uncertainty about leaving their homes and self-quarantining. However, based on the experiences of New England in early-2020 and southern Brazil in mid-2020, this is not a given.

The Worst-Case scenario for the state assumes a series of negative events to happen. First, COVID-19 hospitalizations and deaths in the state would increase, such that the Las Vegas metropolitan area would potentially look like New York City in March 2020: almost overwhelmed by infections. This would likely trigger a second lockdown. It is suspected that this would also heighten fears relative to COVID-19 and lead to higher levels of sheltering in place, compounding the effects of a potential lockdown. The Worst-Case scenario also assumes a continued deadlock on Capitol Hill and no further enhanced federal unemployment insurance benefits to workers. The continued absence of these benefits would represent a significant loss of personal income and, therefore, potential GDP.[7] On the positive side, a potential political stalemate of this order would be unlikely—even in an election year—should COVID-19 deaths spike nationwide. Other factors, such as the Paycheck Protection Program, were included in the scenario assumptions and are described in greater detail in the *Methodology* section.

In the Most Likely scenario, it is assumed that Q4 2020 will experience a minor surge in COVID-19 deaths. In this case, Nevada will probably return to Governor Sisolak's Phase 1 guidelines for three months but not experience a full lockdown, also referred to as Phase 0. It is assumed that the preference by a large share of Nevada residents to shelter in place will remain relatively unchanged compared to Summer 2020 levels and will again decline further in Spring 2021. This also assumes that the COVID-19 vaccine will be widely manufactured and distributed at an affordable price by the middle of 2021. Should the Most Likely scenario evolve, the economic forecast for Nevada will look a lot more like the Best-Case scenario than the Worst-Case scenario.

Forecasts for the MSAs have not been included in this analysis because the Nevada sub-state data for the most recent year appear to have problems. The Reno-Sparks MSA shows negative growth, which does not appear accurate. According to GOED, the issue stemmed from certain accounts being recorded as located in the Las Vegas MSA, while the activity actually took place in the Reno-Sparks MSA.[8]

Sector GDP

In terms of GDP by sector, a range of various outcomes was found that can be seen in the following tables. Accommodation and Food Services shows the widest possible range of outcomes at the end of 2021, from 3.2% less than the No-Pandemic scenario in the Best Case to 37.3% less in the Worst Case. The Most Likely scenario shows a 15.7% change. Table 1 provides the forecasted change for selected sectors of Nevada's economy based upon the expected growth under the No-Pandemic scenario. As can be seen, though Accommodation and Food Services experiences the largest variation in possible outcomes, Arts, Entertainment, and Recreation, which represents a significant portion of Nevada's economy, also demonstrates high levels of variation between the best and worst cases.

The Most Likely Scenario Forecasts a Moderate Reduction in Most Sectors, but Sharp Contractions Remain for Nevada's Dominant Sectors

Table 1: Forecasted Change in Sector GDP in Q4 2021 Compared to Expected Growth Under No-Pandemic Scenario. Source: RCG Economics.

Sector	Best Case	Most Likely	Worst Case
Accommodation and Food Services	-3.2%	-15.7%	-37.3%
Arts, Entertainment, and Recreation	-4.3%	-20.4%	-46.3%
Construction	-0.3%	-1.3%	-3.7%
Healthcare and Social Assistance	-1.2%	-5.9%	-15.3%
Professional, Scientific, and Technical Services	-0.7%	-3.8%	-10.0%
Total GDP	-0.9%	-4.8%	-13.2%

Taxable Sales

For taxable sales, the three geographies analyzed showed similar outcomes at the end of 2021 (see Table 2). Statewide, the Worst-Case forecast shows a drop in taxable sales of about 18%, worse than the drop in Washoe County (3.6%) but not as severe as the drop in Clark County (25.4%). In the Most Likely scenario, however, the drops are much less severe for Nevada (6.6%), Clark County (10.1%), and Washoe County (1.4%), though still notable, particularly for Clark County. In the Best Case, neither Nevada, Clark County, nor Washoe County experience a drop in taxable sales greater than 2.1%.

Washoe County's Reduced Dependence on Tourism and Entertainment Softens the Comparative Impact of the Pandemic on the Region's Taxable Sales

Table 2: Forecasted Change in Taxable Sales in Q4 2021 Compared to Expected Taxable Sales Under No-Pandemic Scenario. Source: RCG Economics.

Geography	Best Case	Most Likely	Worst Case
Nevada	-1.4%	-6.6%	-17.9%
Clark County, NV	-2.0%	-10.1%	-25.4%
Washoe County, NV	-0.3%	-1.4%	-3.6%

Employment

The results for employment show outcomes for 2021 that look much like those for taxable sales. In this case, the Las Vegas MSA would fare worse than the Reno-Sparks MSA in each case. In the Worst-Case scenario, the state would experience a 14.7% decline relative to the No-Pandemic case. The Las Vegas MSA would see an 18.0% drop and the Reno-Sparks MSA an 11.6% drop. In the Most Likely scenario, the regions ranged from a drop of 4.4% to 7.0%. Table 3 below provides an overview of the changes in employment for each of the three geographies.

Forecasted Changes in Employment Demonstrate the Comparative Resiliency of Northern Nevada's Economy Compared to Other Regions of the State

Table 3: Forecasted Change in Employment in Q4 2021 Compared to Expected Employment Under No-Pandemic Scenario. Source: RCG Economics.

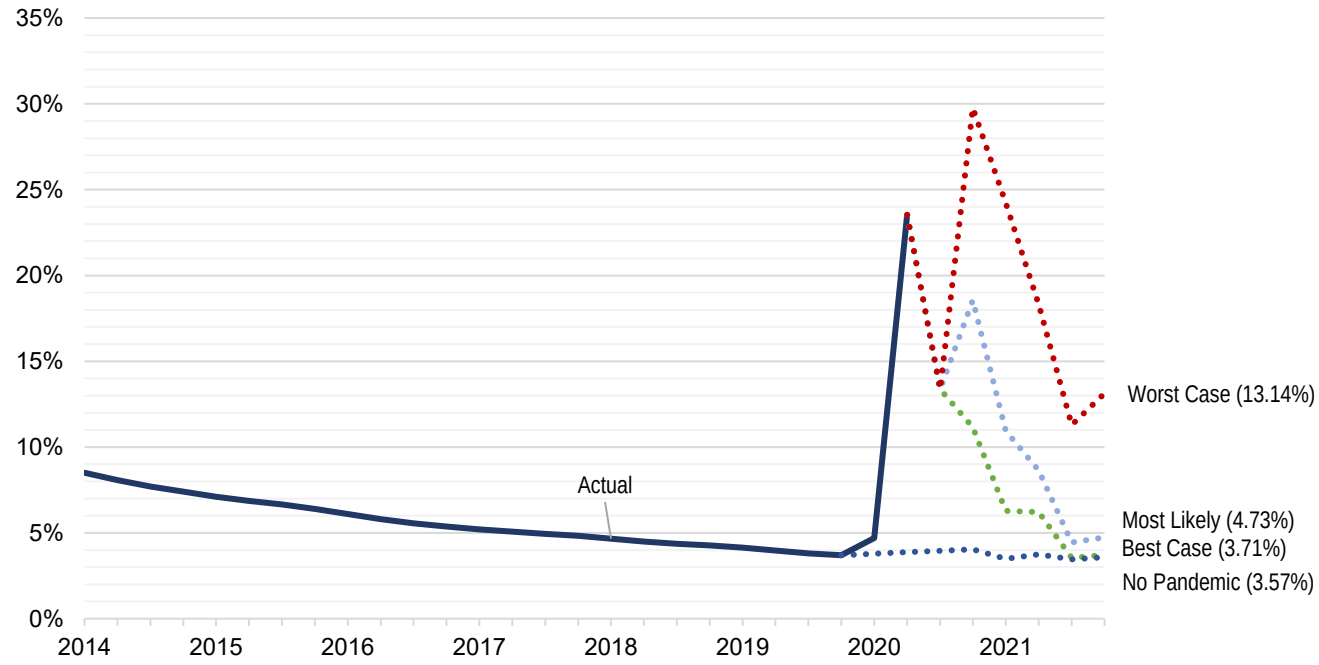
Geography	Best Case	Most Likely	Worst Case
Nevada	-1.1%	-5.7%	-14.7%
Las Vegas MSA	-1.4%	-7.0%	-17.9%
Reno-Sparks MSA	-0.9%	-4.4%	-11.6%

Headline Unemployment Rate

With respect to the unemployment rates, the limitations of the model are more visible. However, the results still provide a reasonable look at the relative effects of the possible outcomes. While the No-Pandemic and Best-Case scenarios show extremely low unemployment rates of around 3.5% for Nevada, the Most Likely case shows that unemployment is expected to be about one to one and a half points higher (Figure 2). The Worst-Case unemployment rates range between 6.0% for the Reno-Sparks MSA to 15.1% for the Las Vegas MSA.

Nevada's Unemployment Rate Varies Drastically Based upon the Scenario

Figure 2: Forecasted Nevada Unemployment Rate. Source: RCG Economics.
Note: *Data in parentheses represent the forecasted unemployment rate in Q4 2021.*



Unemployment Claims

Initial unemployment claims for Nevada in the Worst Case (about 120,800) are close to three times higher than in the Best Case (about 47,300), while the Most Likely case (about 63,700) is only

marginally worse than the Best Case. Relative to continuing claims, the results look fairly reasonable. The Best-Case estimates monthly average claims of around 27,600, while the Most Likely case is about three times higher (about 103,900). Continuing claims for the Worst Case are about 10 times greater (about 267,500) than in the Best Case.

The Impact of the Pandemic Will Likely Continue to Suppress Statewide Employment through the End of 2021

Table 4: Forecasted Change in Initial and Continuing Unemployment Claims in Q4 2021 Compared to Expected Claims Under No-Pandemic Scenario. Source: RCG Economics.

	Best Case	Most Likely	Worst Case
Nevada Initial Unemployment Claims	+3,250	+63,700	+76,800
Nevada Continuing Unemployment Claims	+18,200	+94,500	+258,100

Visitor Volume

Estimates show a significant hit to visitor volume in every scenario. The Best-Case scenario would be least impacted by the pandemic, experiencing a 7.0% hit to visitation compared to the No-Pandemic scenario. The Most Likely scenario sees a drop of 32.7%, while the Worst Case suggests a 71.5% drop. This is plausible considering that visitation dropped 99.0% year-over-year in April during lockdown.

Methodology

In this section, medical and economic background information about COVID-19 is discussed. Certain biological traits of this virus directly affect the inputs of the economic analysis herein and are, therefore, important to be discussed in some detail.

Novel Coronavirus and Economic Shutdown

On December 31, 2019, Chinese authorities informed the World Health Organization (WHO) of an outbreak of pneumonia of unknown origin in Wuhan, Hubei Province.[9] In March 2020, the WHO concluded that the rapidity and breadth of the spread of this disease constituted a global pandemic.[10] This disease is named COVID-19 based on established naming conventions. It is caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), a novel coronavirus.[11] As of July 2020, it appears that a newer, more virulent strain of SARS-CoV-2 has replaced the original virus and become the dominant strain circulating around the world.[12]

Following the WHO's declaration of the pandemic, as well as the closure of several school districts across the country in the preceding days,[13] the economic dominos immediately started falling. The result was an economic downturn without precedent in modern times.[14]

In the United States, the private sector initiated a series of events that quickly escalated into state-level shutdown orders. States all over the country began shutting down non-essential businesses.[15] On March 19, California became the first to issue a statewide shutdown order.[16]

In Nevada, on March 10—a day before the WHO's declaration—MGM Resorts International (MGM) announced that it would be shutting down their Strip buffets within days.[17] A few days later, on March 15, MGM also announced that it would be shutting down all of its Las Vegas properties on

March 17.[18] On March 17, Nevada Governor Steve Sisolak announced the closure of all non-essential businesses, including hotel-casino resorts.[19] The Governor extended these closures and issued a stay-at-home order on April 1.[20]

A timeline of major governmental declarations relevant to Nevada COVID-19 policy, according to the Nevada Independent[21] and Nevada Health Response[22] as well as other sources where noted, is provided in the appendix.

Information on SARS-CoV-2

There is building evidence that COVID-19 may be a vascular disease with respiratory symptoms rather than a respiratory disease.[23] This helps explain why the disease can cause widespread blood clotting as well as damage in other parts of the body.[24]

According to the U.S. Centers for Disease Control and Prevention (CDC), the virus is mainly spread via the exchange of contaminated respiratory droplets in close quarters.[25] Furthermore, the WHO has stated that the virus appears to be airborne, meaning that it can linger in small droplets over long periods and still infect people.[26] Additionally, Dr Roger Shapiro of the CDC and Harvard T.H. Chan School of Public Health said that the virus is easier to spread indoors than outdoors.[27]

Infections appear to be driven by people showing mild,[28] unnoticed symptoms,[29] which include the majority of those infected.[30] Additionally, they may be contagious prior to showing symptoms.[31] One major means of virus spread appears to be through "super-spreader events." According to Scientific American, "between 10 and 20% of infected people are responsible for 80% of the coronavirus's spread."[32]

Mortality rates published thus far compare deaths to confirmed cases, but this does not produce precise measurements of real mortality rates because it is unknown how many people have actually been infected, as most cases are mild and do not require medical attention. However, it is clear that older people are at a vastly higher risk of death than younger people. The CDC reported that 8 out of 10 deaths related to COVID-19 occur in people aged 65 years and older. Additionally, the CDC has also found that the rate of hospitalizations of those aged 85+ is more than 150 times greater than for the least hospitalized age group, 5- to 17-year-olds.

It is possible that recovery from COVID-19 only confers partial immunity or no immunity at all, meaning that someone can be re-infected with the disease after some period.[33,34] Additionally, there may be life-long complications from secondary effects of COVID-19.[35] These possibilities have helped stoke fears regarding the virus, even given the apparent relatively low mortality rate.[36]

Despite, the low fatality risks, it is important to note that the coronavirus is still dangerous, especially to older people, in part because we know so little about it. What we do know, however, is that the COVID-19 pandemic is already the fourth deadliest event in U.S. history compared to wars and previous pandemics.

These fears at an individual level can be understood by a well-known branch of economic theory. "Cumulative prospect theory," predicts that people tend to overweight probabilities associated with unlikely negative outcomes. As a result, many people who face a small risk of death from COVID-19 assign a greater subjective assessment of their health risk. The same theory is applicable to financial risks as well, which helps to explain some of the backlash to the state-level shutdown orders.

Exaggerated fears of the risk to an individual's health, especially if generally shared across the country, will weigh heavily on the economy until widespread, effective vaccinations have occurred.

Mitigating the Outbreak

Government Strategies

The main goal of government policies thus far appears to be reducing or eliminating the spread of COVID-19 through public policy interventions until the availability of a safe and effective vaccine.[37] However, whether the state can attain this goal is questionable.

For example, contact tracing is a form of surveillance likely to face resistance in adoption. There are several methods of accomplishing this, but technology-based methods require residents to install an application on their phones. The app tracks all those who have come near another person with the app installed. When someone tests positive for a disease, the contact tracing app notifies any individual that came into proximity to that person. Ideally, persons notified will practice heightened social distancing for some time and get tested for the disease. However, contact tracing must be adopted by about 60% of a population to be effective. As of mid-April, the most-used contact tracing app is in Iceland and even they had only achieved a 40% adoption rate.[38] Additionally, the success of such a program relies on quick and accurate viral testing, which is not yet available.[39]

Policies of this kind will not be widely enacted before widespread vaccination becomes available. For this reason, RCG will assume that mitigation policies will have a very limited impact.

Individual Actions

Despite the difficulties in mitigating the effects of the virus on the economy, reducing the spread of the virus may be enabled by the widespread use of masks. Recent studies suggest that there is likely a connection between widespread use of masks and lower levels of virus spread.[40] [41]

YouGov polling has found that countries with high rates of mask adoption generally are correlated with lower levels of spread.[42] In Asia, China, India, and Singapore all have mask adoption rates of over 80%, as do France, Italy, and Spain in Europe. Germany is slightly behind at over 60%.

Unfortunately, wearing masks has become politicized in the United States.[43] Nevertheless, there may be change coming, President-elect Biden will encourage the wearing of masks for 100 days following his inauguration.

Current State of the Pandemic

The major determinants regarding the future economic situation in the United States and Nevada in the wake of the pandemic are COVID-19 case load and deaths. Comparing the most recent data on infections and deaths across nations, states, and over time within the United States and Nevada

better informs the assumptions within the model. This report offers used in the model that describe the Best-Case, Most Likely, and Worst-Case outcomes relative to the Nevada economy.

COVID-19 Statistics

In this section, various statistics concerning COVID-19 are analyzed, comparing the United States to other nations as well as comparing Nevada to other states. A timeline of pandemic-related interventions and milestones can be found in Appendix B. A discussion of the pandemic's implications for Nevada's state and local economies within the model can be found in Appendix F.

Among all countries, the United States is ranked eighth in cases per 100,000 as of August 31. This is made worse when considering that five out of the top 10 nations are essentially high-density city-states, such as Qatar, Bahrain, and San Marino. Since then, the virus has spread quickly and largely unimpeded.

The United States also leads the world in total deaths. In terms of deaths per 100,000 persons, the United States was 11th globally. At the end of August, among high-population countries, the United States had the fourth highest death toll per 100,000 in the world, 56 deaths per 100,000. This rate compared poorly relative to countries like Germany (11 deaths per 100,000 persons), Japan (1.0) and South Korea (0.6), one of the first countries hit by COVID-19. By any measure, the United States has done a poor job responding to the pandemic compared to other nations, and it has negatively affected the economy, according to officials at the Federal Reserve.[44]

At the state-level, relative to case load, Nevada appears to be middle-of-the-pack. However, as a state with a moderately-sized population, that does not convey much information. The states are better compared per 100,000 persons. In this case, caseloads in Nevada appear to be among the fastest growing, and Nevada is one of the worst-performing states overall as well. As of August, Nevada sits at ninth out of 52, including Washington D.C. and Puerto Rico.

Regarding COVID-19-related deaths, at the end of August Nevada was 21st out of 52 states and territories in terms of deaths per 100,000, just in the upper half of the rankings. The country's hardest hit region has been the Northeast. New Jersey and New York are the hardest hit states with Massachusetts and Connecticut ranking third and fourth. The first state outside of this region, Louisiana, was fifth.

Generally, the data relative to the United States and Nevada indicate that as of August, the United States is doing a poor job of containing the pandemic compared to other countries, while at the state-level, Nevada is doing a mediocre job of containing the virus compared to other states. However, luckily, despite the high rate of spread of the disease, Nevada has been thus far spared from a relatively high death toll.

Additionally, there has been some evidence that people have been heeding mitigation advice. One study showed that infection rates fell dramatically after an initial surge in regions all over the world.[45]

Nevada's Plan for Recovery & Resilience

Priority Areas for Intervention

The Future Beyond the Pandemic

Photo Courtesy of Richie Bednarski, BLM Nevada, and TravelNevada/Flickr

Priority Areas for Intervention

The COVID-19 pandemic and its effect on Nevada's economy has required swift action by GOED and supporting organizations and agencies. At a high level, GOED has focused its interventions within five broad priority areas, which can be found below. Importantly, GOED's response to the pandemic does not occur within a vacuum. Other state agencies, such as the Department of Business and Industry and local government organizations, provide support within these functional areas and, in some instances, lead their own interventions where relevant.

Resources for People and Businesses

Modernize Nevada's financial, technological, and administrative capabilities.

Immediate recovery: GOED must actively support any Nevada agency that is part of the flow down of federal funds. It will be necessary for all businesses, especially small- and medium-sized enterprises (SMEs), to receive guidance and advocacy assistance to secure the funding they need to keep employees on the roster. Capacity has been increased at the state's career centers to help process individuals' unemployment claims. Gig workers and other independent contractors (a significant population in Southern Nevada) who can participate in programs that can be confusing. Direct support for SMEs through federal loan programs is also critical—an important lever for reducing the unequal economic impact of the crisis.

Longer-term resilience: 31% of Nevadans are unbanked or underbanked, according to a 2017 FDIC report. Without a bank account, it is difficult for individuals to receive stimulus checks and other government assistance. In the medium term, there is a role for public action to build an appropriate financial infrastructure for workers that will help shelter them from future shocks. This could take a variety of forms, including a one-stop public assistance program with digital accounts and mobile payments (TANF, WIC, unemployment payments, and other benefits could be integrated into one system). Success in this area is contingent on success with initiatives targeting connectivity and the digital divide, addressed below.

Specific areas of interest for GOED and supporting organizations could include:

1	Update and integrate all state administrative and financial systems, including payment systems to residents such as UI, TANF, WIC, Medicaid, etc. (see below for longer-term initiatives in this policy area).
2	Build a community banking network. Community banks were essential to the success of the PPP program. Community banks with $10 billion or less in assets made about 40 percent of the overall number and value of PPP loans.
3	Employ a "Buy Nevada" tactic in which local purchases are steered toward local firms when possible.

Business Support and Expansion

Increase support for entrepreneurship and micro-, small-, and medium-sized enterprises (MSMEs) and investment in new technology applications. Review of target sectors, onshoring, foreign investment attraction, and export opportunities.

Immediate recovery: While large corporate enterprises can develop protocols for operating within the context of the new normal, main street businesses (MSMEs) will need guidance on the protocols and practices required to operate under these new conditions. They will need guidance on how to use open spaces, enforce social distancing, and expand onsite sanitary capabilities. This guidance will be accompanied by onsite training of incumbent workers.

Longer-term resilience: GOED should take deliberate steps to attract greater levels of foreign direct investment to Nevada, while supporting the emergence of export-oriented industries throughout the state. International trade and foreign direct investments drive Nevada's competitiveness, contribute to productivity growth, create jobs and exports, support R&D activities, and fuel innovation. International companies broaden the state's economy and make it more resilient, adding prosperity to workers and communities and investing in workforce training solutions across the state.

Specific areas of interest for GOED and supporting organizations could include:

1	Open business recovery centers within the network of Nevada's Small Business Development Centers. (See the next section regarding new institutional arrangements in support of small business.)
2	Increase funding for technology-based entrepreneurship and provide targeted support for technology-based firms in automation and digital technologies.
3	Develop an ecosystem that enables more entrepreneurship, commercialization, and new business creation, with renewed focus on digital arts and outdoor recreation.
4	Promote international trade and export assistance programs to increase the number of exporters, new market exports, and global supply penetration, especially among rural and women-, veteran-, and minority-owned MSMEs.

5	Identify gaps in support for minority- and woman-owned small businesses and opportunities to increase their establishment and growth.
6	Increase efforts to attract U.S. and foreign businesses to Nevada, particularly those in high-growth and technology-intensive industries.
7	Streamline and centralize the oversight of Nevada's small businesses, with clear direction for ancillary support organizations in preserving, establishing, and expanding Nevada's businesses.

Workforce for the New Normal and Beyond

Full implementation and expansion of existing workforce initiatives.

Immediate recovery: GOED should play a leadership role in the transformation of occupational licensing constraints in critical areas, including the recognition of qualifications from other states. Based on real-time labor market data, GOED will support community colleges in recruiting and graduating students in areas of need. In spite of the general downturn, there will be sectors experiencing high demand that will need newly trained workers (including sectors beyond health services).

Longer-term resilience: In order to accelerate workforce adjustment and preparation in critical areas, GOED should support the design of compressed health services curricula and other curricula for skills in short supply. The entire workforce pipeline should be reworked so that workers from hospitality can be fed into public health and other needed fields, with an emphasis on competencies and skills rather than formal credentials.

Specific areas of interest for GOED and supporting organizations could include:

1	Radically expand health services programs at all levels.
2	Integrate workforce programs with business needs.
3	Allow community colleges to develop accelerated training programs for employers continuing or resuming operations.
4	Broaden training providers to reach disadvantaged populations and apply new technologies through the Nevada State Library by leveraging Nevada's Education Stabilization Fund-Reimagine Workforce Preparation (ESF-RWP) grant.
5	Protect funding streams for in-demand and growing occupations' academic programs at Nevada's four-year institutions.
6	Accelerate the use of "badges," competence bundling, and credit aggregation in building workforce skills.
7	Provide incentives to U.S. citizens who work remotely to relocate to Nevada, as well as for startup founders doing all or most of their business online.

New Technology Businesses

Review and redesign Nevada's approach to retention and business development that provides wrap-around support to technology adoption by MSMEs.

Immediate recovery: The state will identify the most appropriate technologies and formulate plans for deployment at an extraordinary scale by state and local government. It will provide guidance to Nevada businesses looking for reliable information on useful technologies.

Longer-term resilience: If Nevada succeeds in mobilizing technologies at scale, it will have laid the groundwork for repositioning the state in the national and world marketplace. Consumers may be reluctant to travel at present, but the desire for recreation will endure. Nevada can be the recreational haven of the future, fortified by best-in-class measures in public health. Nevada's regional economic development authorities will continue to recruit companies to Nevada to strengthen the healthcare system.

Specific areas of interest for GOED and supporting organizations could include:

1	Support the development of websites and e-commerce capabilities for MSMEs to expand opportunities for business-to-business and business-to-consumer e-commerce transactions.
2	Aggregate and share vendor information for contactless and online payment systems.
3	Support the increased use of sensors and other technologies for security and safety.
4	Introduce and promote new digital instruments to enable exporting by Nevada's MSMEs.
5	Foster connections and collaboration with local and international stakeholders to prioritize balanced long-term growth and sustainable economic development.

Data and Integrated Planning for Decision-Making

Nevada must complete the transition to smart government at the state and local level.

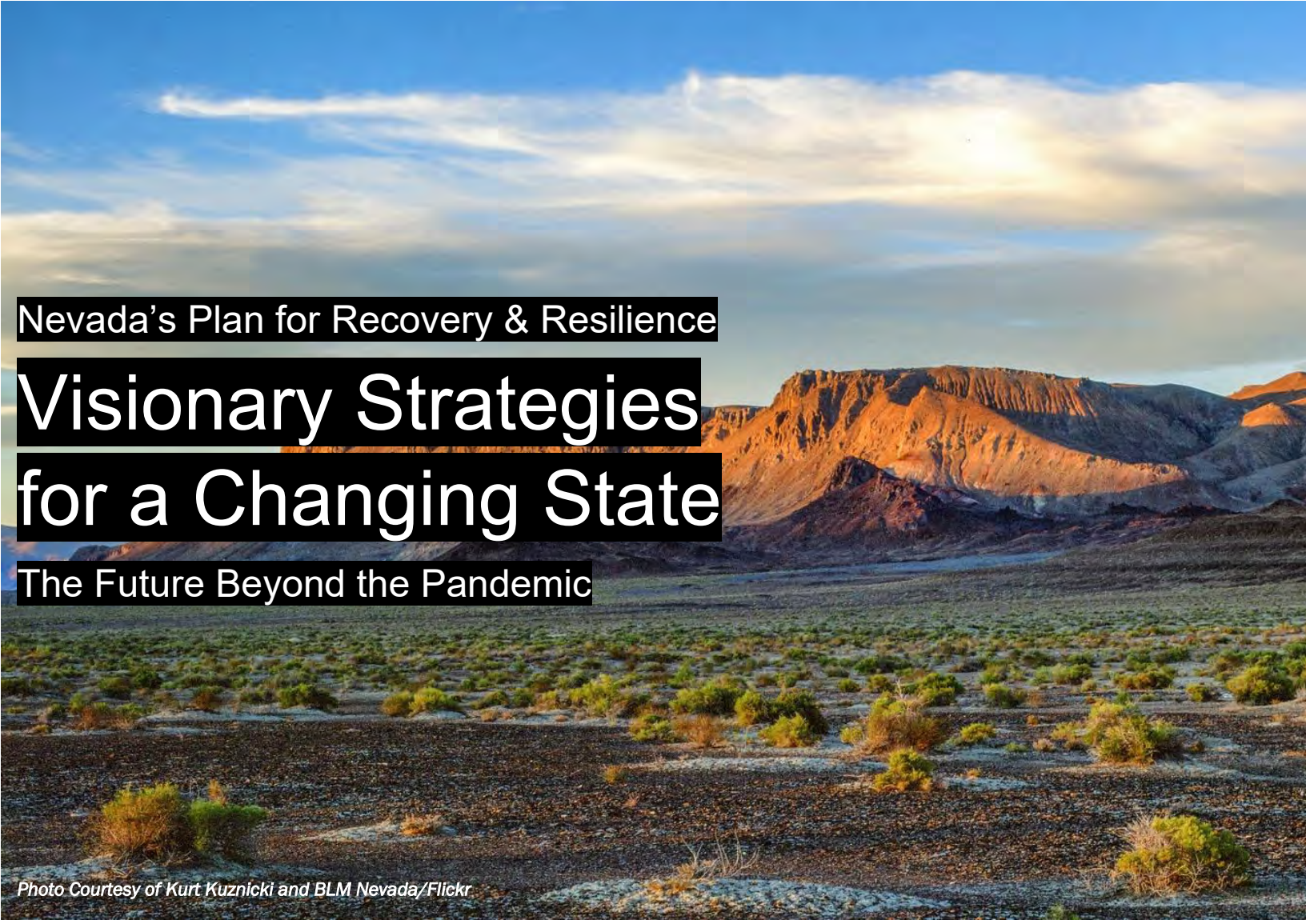
Immediate recovery: Any decisions made on reopening Nevada's economy must be based on all available data and as part of integrated state-wide plans. Coordination, collection, and sharing data is a critical role for GOED. In particular, GOED will be responsible for integrating public health data with economic data and proposed infrastructure initiatives within a single state framework. This will enable GOED to provide reliable advice to Nevada's businesses and workforce institutions.

Longer-term resilience: Confidence in Nevada's future economy will depend more than ever on complete, transparent information that integrates public health, economic, and workforce data. GOED will own this responsibility and become the one-stop data hub for the state with an emphasis on the credible communication of information regarding the health of the state's economy and

society. In addition, GOED will give the Regional Development Authorities (RDA) access to data from EMSI (see the bullet below).

Specific areas of interest for GOED and supporting organizations could include:

1	Integrate regional infrastructure initiatives within overall state financial and planning framework.
2	Provide access to real-time labor market Information using EMSI data via Nevada's regional development authorities.



Nevada's Plan for Recovery & Resilience

Visionary Strategies for a Changing State

The Future Beyond the Pandemic

Photo Courtesy of Kurt Kuznicki and BLM Nevada/Flickr

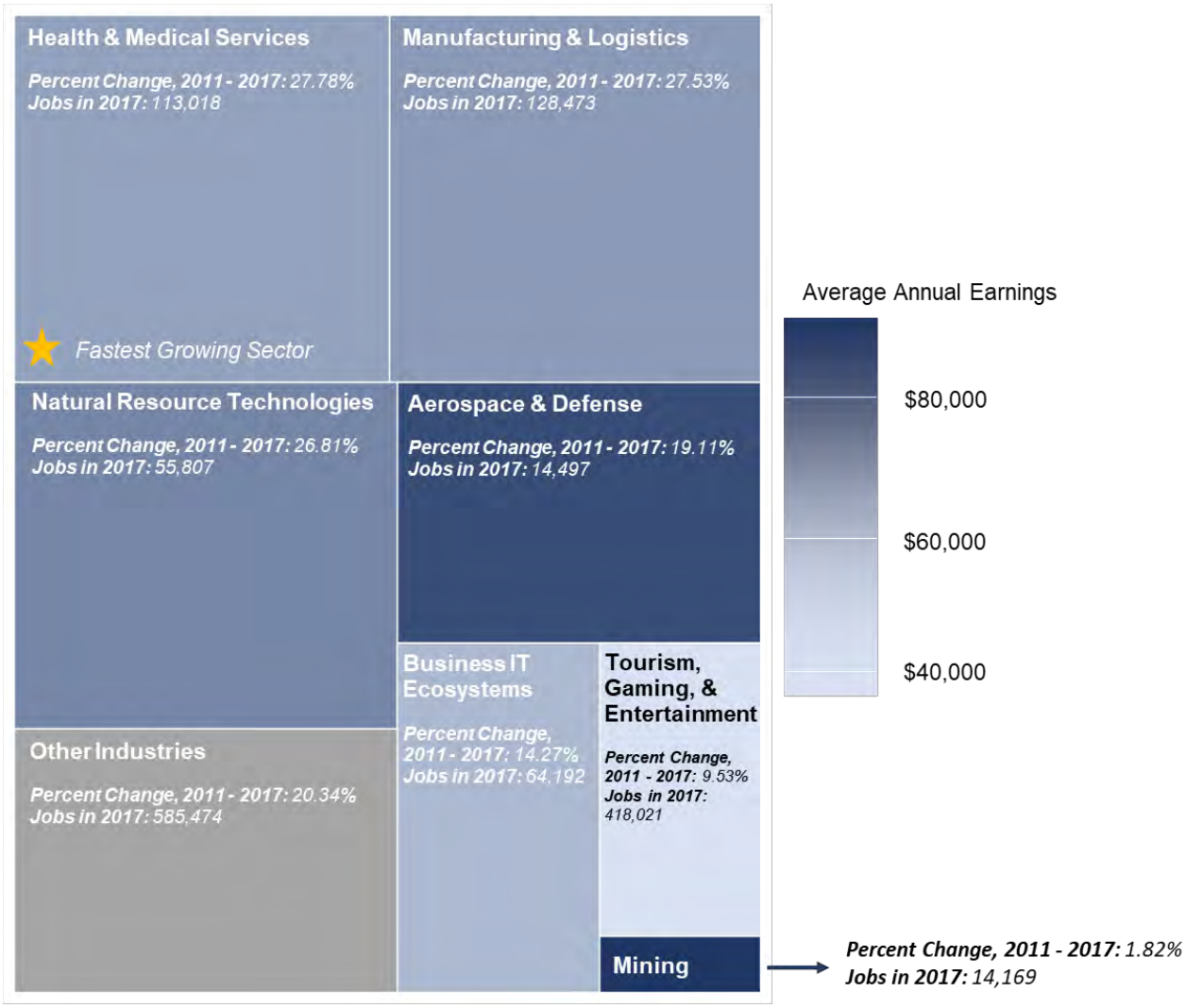
Nevada at the Crossroads

As the immediate actions contained in the recovery and resilience plan are implemented, state leaders must turn their attention to strategic initiatives that ensure Nevada's economic and social resilience into the future. Whatever the timeline for recovery, both in public health and in the economy, Nevada must immediately begin pursuit of these strategies. Only in this way can the state ensure a complete recovery and shape its future growth toward a more resilient and high-value future.

Once again, the state is at a crossroads, especially Southern Nevada. After the Great Recession, new industries grew more quickly in the North and the South than the legacy sectors.

Nevada's Economy Has Seen Considerable Growth in New and Emerging Industries

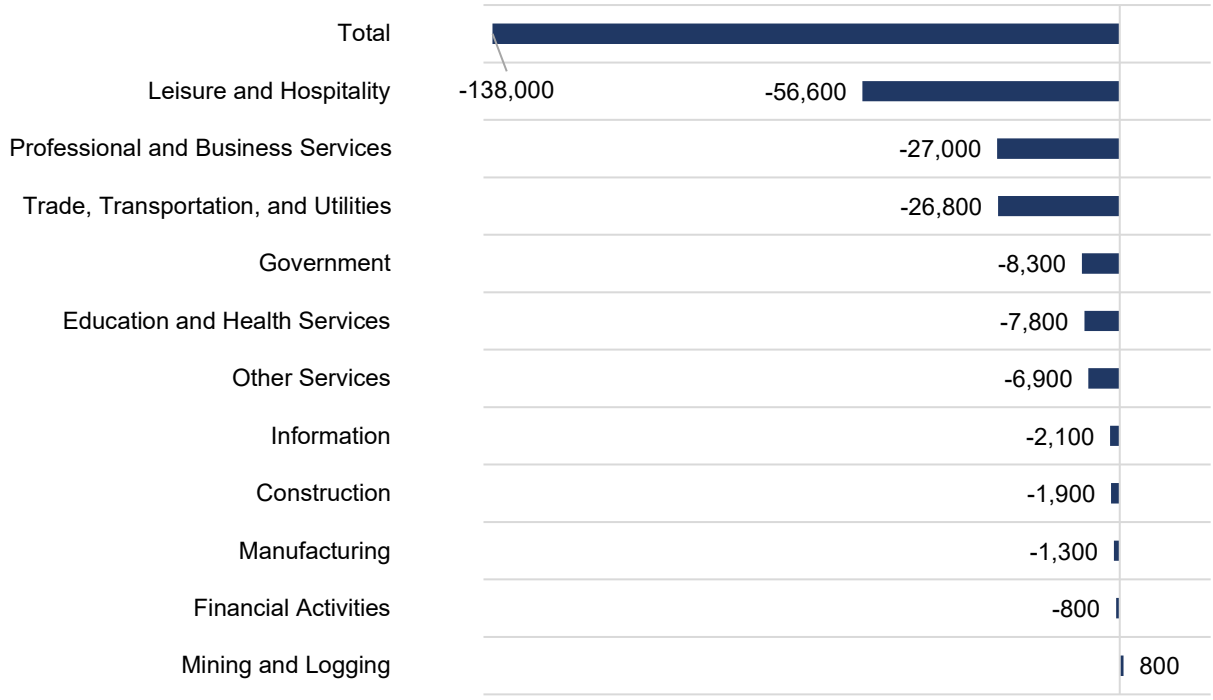
Figure 3: The Changing Industries of Nevada's Economy, 2011 to 2017. Source: EMSI and GOED.



But diversification takes time. The two sidebars below discussing the changing economies of urban and rural Nevada demonstrate the progress that has been made in Northern, Southern, and rural Nevada. While Northern and rural Nevada are beginning to show signs of well-diversified regional economies, Southern Nevada began from a small base, and the present crisis came too soon for the benefits of any nascent diversification to be properly felt. These changes are not negated by the crisis but rather accelerated by it. As Figure 4 below indicates, advanced manufacturing, logistics, health services, clean tech, and information technology proved to be resilient when the downturn came and will be the foundation for the future. The strategies outlined below will underpin growth in these areas. This section is followed by a section on the imperative for building and modernizing the institutions and capabilities that will be necessary to secure the future of the state for the long run.

Statewide Job Loss Remains Concentrated in Nevada's Service Industries

Figure 4: Nevada Job Change, by Industry, July 2019 to July 2020.



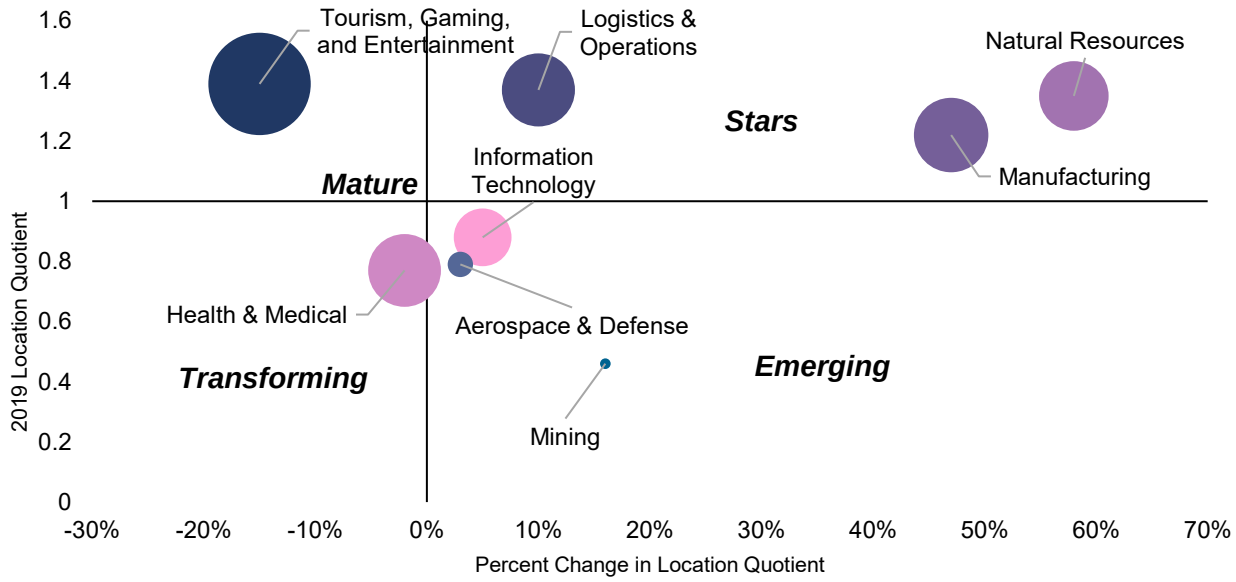
Urban Nevada

Figure 5 and Figure 6 below visualize the location quotient for selected industries and how they have changed between 2010 and 2019 in Northern and Southern Nevada, respectively. As shown, Northern Nevada has seen greater growth in new sectors, particularly Manufacturing and Logistics & Operations, that have worked to diversify the region's economy. In Southern Nevada, however, Tourism & Gaming continues to dominate the region's economy. While other sectors have grown over the last decade, they have yet to grow to resemble a significant portion of Southern Nevada's economy. This is likely a critical component of the comparatively lower impact of the pandemic recession in Northern Nevada than in Southern Nevada. However, the large number of industries that fall into the "emerging" category demonstrate that the region shows promise for future diversification efforts.

Location Quotients (LQ) allow an area's distribution of employment by industry, ownership, and size to be compared to the national average. If an LQ is equal to 1, then the industry has the same share of its area employment as it does in the nation. An LQ greater than 1 indicates an industry with a greater share of the local area employment than is the case nationwide. For example, Las Vegas will have an LQ greater than 1 in the Leisure and Hospitality industry because this industry makes up a larger share of the Las Vegas employment total than it does for the nation as a whole.

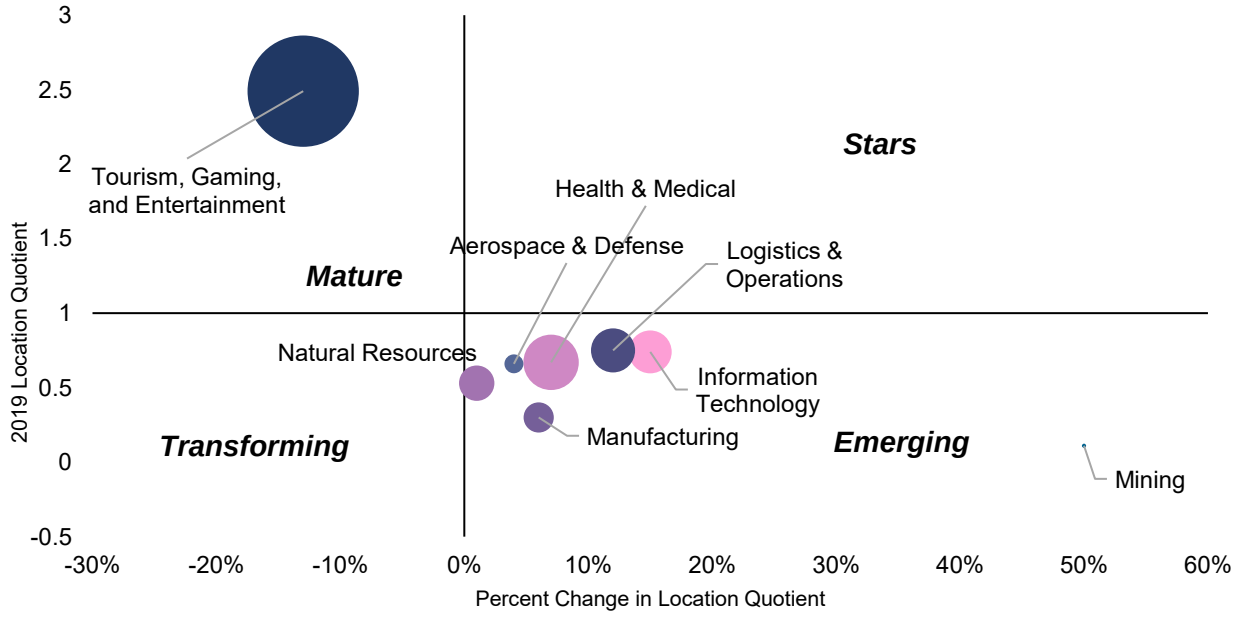
Northern Nevada Has Been Comparatively Successful at Growing New Industries

Figure 5: Percent Change in Location Quotient for Selected Industries in Northern Nevada, 2010 to 2019. Source: GOED.



Southern Nevada Has Seen New Industries Emerge, but Diversification Remains Nascent

Figure 6: Percent Change in Location Quotient for Selected Industries in Southern Nevada, 2010 to 2019. Source: GOED.

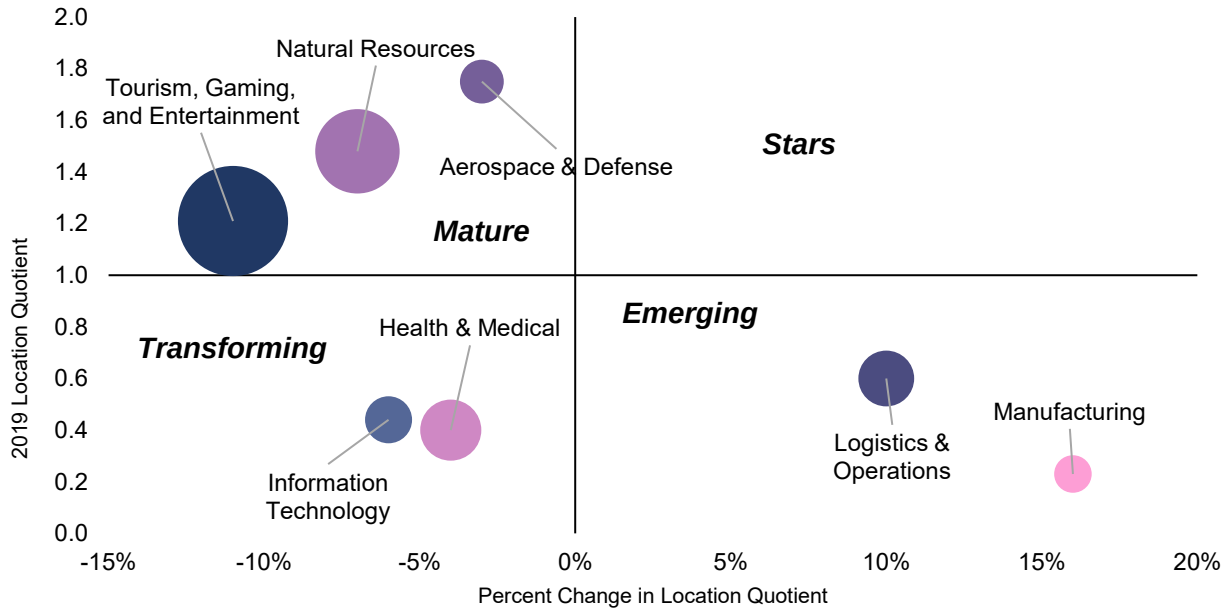


Rural Nevada

Figure 7 and Figure 8 below provide an overview of the industries that comprise rural Nevada's economy. As shown, rural Nevada's economy is notably more diverse than Southern Nevada's economy, though it does remain dependent on industries that typically respond aggressively to economic shocks, particularly Tourism, Gaming, and Entertainment and Natural Resources. However, more stable industries, such as Logistics & Operations and Manufacturing, have begun emerging in the rural economy, providing greater and more consistent employment opportunities to those with post-high school training but perhaps less than a traditional four-year degree. Figure 8, however, shows just how much the mining industry has grown in rural Nevada. While the location quotient for most of rural Nevada's industries range from 0.0 to 2.0, the region's mining industry faces a location quotient of over 40.0, far outweighing the location quotient of industries that have traditionally dominated Nevada's economy, such as Tourism, Gaming, and Entertainment, which has a location quotient of just 1.2 in rural Nevada.

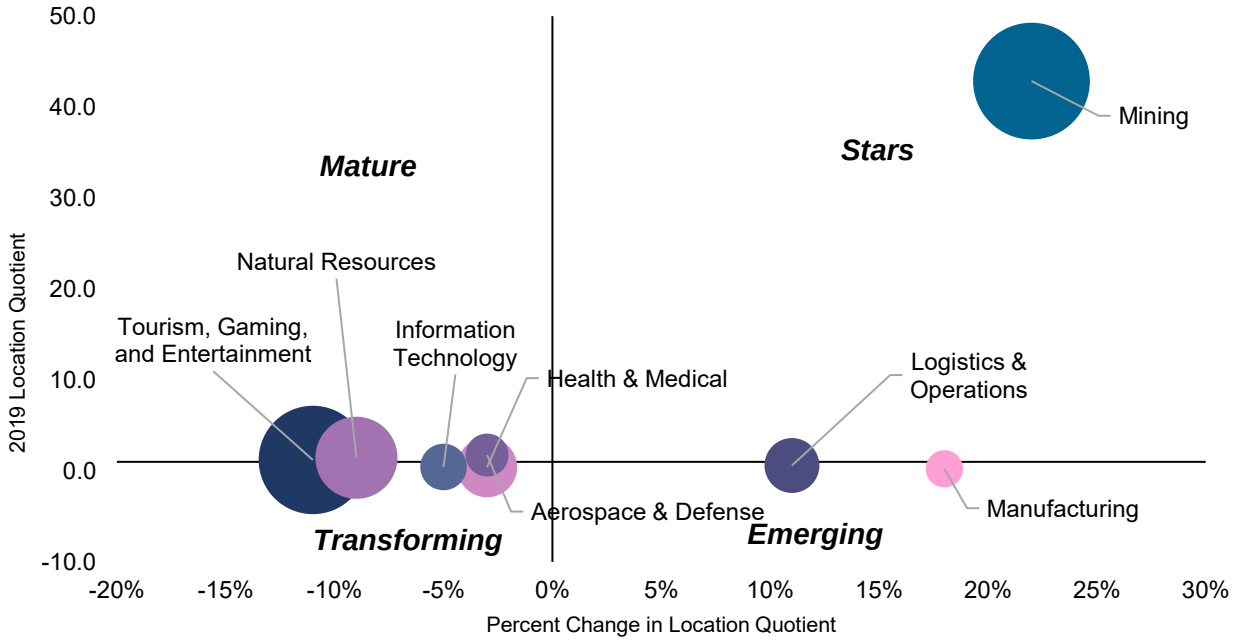
A Healthy Mix of Industries Form Rural Nevada's Economy

Figure 7: Percent Change in Location Quotient for Selected Industries in Rural Nevada, Excluding Mining, 2010 to 2019. Source: GOED.



For Rural Nevada, Mining Has Become an Undeniable Engine in the Regional Economy

Figure 8: Percent Change in Location Quotient for Selected Industries in Rural Nevada, Including Mining, 2010 to 2019. Source: GOED.



Nevada's New Economic Geography: The "Three Nevadas"

Nevada is geographically well-situated between three vibrant economic partners: California, Arizona, and Utah. Each of these states exchanges people, goods, and ideas with Nevada. Despite having a population of just over 3 million, Nevada sits at the center of a trade region that exceeds 53 million residents, a region that exceeds in both population and GDP such nations as South Korea (pop. 51.8 million) and Spain (pop 47.3 million).

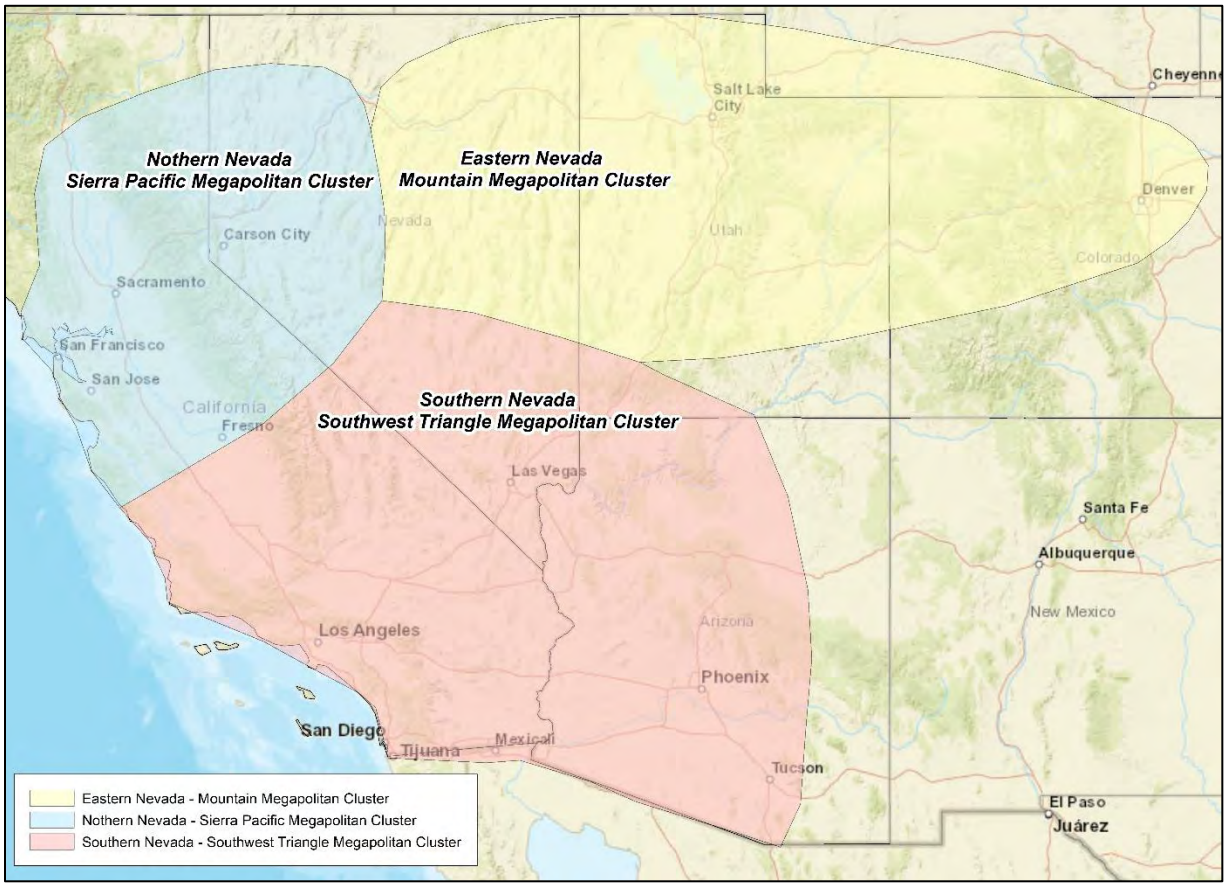
According to the U.S. Census Bureau, Nevada's two largest metropolitan areas—Las Vegas MSA (pop. 2,266,715) and Reno-Sparks MSA (pop.475,642)—join in the two largest urban complexes (or "megapolitan areas"[46]) in the western half of the United States. Las Vegas is part of the "Southwest Triangle megapolitan cluster," which includes Southern California and Arizona's "Sun Corridor" megapolitan area (Phoenix and Tucson).[47] Together these regions now contain about 34 million people and form the second most populous megapolitan cluster behind the "Northeast Megalopolis." Reno lies at the eastern edge of the Sierra-Pacific megapolitan area, which includes the Bay Area and Sacramento metros. The Sierra-Pacific region includes about 13 million residents.

Likewise, Elko, a micropolitan area with 54,463 residents in 2018, maintains extensive economic and trade relations with megapolitan areas in the Mountain West. Elko and much of eastern Nevada connect to the "Wasatch Range" (Salt Lake City) and "Front Range" (Denver) megapolitan areas. By 2020, the regions together contained over seven million residents. Nevada is privileged in that its logistics, tourism, technology, and resources industries are embedded in the western United States—a geographically broad but extensively urbanized and fast-growing region that maintains some of the most innovative and export-driven regional economies in the developed world.

Figure 9 below shows what Brookings Mountain West at UNLV terms "The Three Nevadas." The three zones identified show the approximate area of economic interdependence that links Nevada to California, Arizona, and Utah. Las Vegas falls within a sphere that extends from California's Central Coast to the Mexican border with Arizona. Reno's economic sphere incorporates much of Northern California. Elko's shared economic space stretches across Utah to Colorado's Front Range.

Each of Nevada's Regions Remains Well-Positioned to Megapolitan Areas Throughout the Western United States

Figure 9: Nevada's Megapolitan Clusters. Source: Robert E. Lang and Jaewon Lim, Brookings Mountain West--UNLV, 2020.



These megapolitan areas exhibit an economic integration either approaching or equal to what the U.S. Census Bureau defines as "combined statistical areas" (or CSAs). Being a CSA is significant in that it shows urban space has achieved high levels of economic integration centered on commuting patterns. Nevada is becoming more connected with its neighboring states via a myriad of economic functions. Tech transfers from the Bay Area to metro Reno have transformed Northern Nevada. Las Vegas shares a wide array of trade, patents, highway, air links, and now direct labor markets with California and Arizona. Gold mined in central Nevada is processed in Utah and often managed from Colorado. Nevada's most important economic opportunities lie in deepening its ties to adjacent megapolitan areas. The state can induce both corporate relocation and skilled labor migration from the greater Southwest. Nevada maintains lower costs, less regulation, and less tax burden, especially when compared to California.

Even before the pandemic, technology allowed an increasing share of workers to live in one region while performing jobs in other metropolitan areas. Distance commuting, beginning in many tech and sales sectors, made megapolitan geography possible. Flexible workspaces, where an employee needs to physically be present at a common job location once a week, or even once a month, allowed workers to commute from 50 or more miles away from their actual office. This is especially true for many gig-economy jobs in tech, media, and R&D-intensive sectors.

Nevada, linking to and lying between the largest megapolitan areas in the West, is well positioned to benefit from an explosion in distance commuting as virtual workspaces become the norm following COVID-19. Consider that a tech worker in Silicon Valley can now live at Lake Tahoe and still check in at the "office" every day. Perhaps such a worker needs to attend a sales or all-staff meeting every few weeks and thus cannot simply move to Alaska or Hawaii. Northern Nevada is a lower cost, less congested alternative to the Bay Area, but maintains highway and air connections back to California so that one can physically be present in San Jose or San Francisco on any given day.

Given Nevada's urban geography, which connects the state to large-scale metropolitan systems in California and Arizona, surface transportation improvements between Las Vegas and Reno have a lower priority from the point of view of the workforce. The value from improving this connection is related to the completion of an integrated logistics network across the region, which will involve rail links rather than road and/or air (the complete rail right-of-way is still available). When it comes to the workforce, Nevada must double down on accessing California and Arizona, and in the case of Elko, the Mountain West and Northwest Megapolitan areas.

Visionary Strategies

Strategic initiatives to ensure medium-term prosperity have been organized into the following five categories and are discussed in the relevant sections below:

- Regionally Designed Industrial Clusters
- Statewide Integration and Connectivity
- Technology-Driven Development
- Responsible and Sustainable Growth
- Comprehensive Placemaking

Regionally Designed Industrial Clusters

The impact of the Great Recession on Nevada's economy alerted state policymakers to the need for economic diversification. Prior to the economic crisis, Nevada's primary urban areas may have been classified as "company towns," where local economies were overdependent upon a few employers in a single industry for economic growth. The policy response following the Great Recession called for a state-led pursuance of key industries on which Nevada could capitalize for new, stable growth. Growth in new and emerging industries has been notable, with advanced manufacturing, transportation and logistics, and healthcare emerging as strong contenders in Nevada's economy.

The economic crisis spurred by the COVID-19 pandemic has once again drawn attention to the need for economic diversification. Developments in the world economy, such as the push for more localized production and value chains, represent opportunities for Nevada. Businesses will push for proximate, smart supplier networks. Given its close location to the West Coast, this new imperative

will drive new investment toward the state. This investment will tend to be technology- and skill-intensive, paying good wages to a properly prepared workforce.

In order to make the most of these opportunities and build on Nevada's unique geographical advantages, the recommendations below include a variety of necessary infrastructure investments. None can be done in a day or in a week, but even ambitious infrastructure programs will help the state quickly recover from the crisis, as well as lay the foundations for a new, resilient, economy in the future. The impact of this crisis will be felt for many months, perhaps several years. Furthermore, there will be no return to the world as it was in February 2020. Business travel and business meetings are now based on a wholly new technological infrastructure. Consumers' attitudes regarding entertainment and recreation have undergone a significant shift. The structure of the workplace has changed forever for millions of white-collar workers.

Design New Approaches to Cluster Identification and Development

Economic diversification has evolved differently in Nevada's various regions. In Northern Nevada, gaming, tourism, and hospitality gave way more completely to new industries following the Great Recession, particularly advanced manufacturing. In Southern Nevada, the dominance of the leisure sector is more pronounced, but the local economy has seen the emergence of data centers and logistics and transportation as promising avenues for future growth, among others. This growth will be accelerated by the present crisis. Southern Nevada is at the same fork in the road faced by Northern Nevada ten years ago. Its future will remain distinctive, and the legacy sectors of hospitality and entertainment will remain strong—Vegas will remain Vegas. But the region needs accelerated growth in other areas—including health services, logistics, and clean tech—alongside this world-class entertainment cluster if the region is to be diverse, prosperous, and resilient in the future.

The capabilities of Nevada's regional development authorities (RDAs) have been made clear in recent years and represent a valuable resource for future diversification efforts. As RDA staff are embedded in their local communities, RDAs are well-positioned to identify and pursue promising industries for their respective regional economies. There remains a role for GOED to ensure the RDAs pursue a unified approach to diversification and that competing priorities are minimized. Likewise, at the state level, attention should be focused on integrating regional cluster strategies with a high-level economic diversification strategic plan that enables Nevada's regions to establish, grow, and mature industries that diversify the state's economy.

Specific areas of interest include:

- **Develop Regionally Specific Industry Plans.** Enable RDAs to use their extensive knowledge of local capabilities to devise locally relevant clusters as part of a Comprehensive Economic Development Strategy (CEDS) that represent unique paths to economic success for each region.

Integrate into Regional and Global Value Chains

The global economic crisis spurred by the COVID-19 pandemic has strained the production and distribution of critical goods. In the first several weeks of the pandemic, supplies of personal protective equipment (PPE) were very low, threatening the ability of front-line workers to address local outbreaks of the disease. While the private sector has mobilized to produce many of these necessities in the short-term, the disruption of supply chains has urged state and national governments to regionalize, rather than globalize, the production of many goods.

The "reshoring" of production to the United States presents Nevada with the opportunity to grow its nascent advanced manufacturing sector while integrating further into the regional economy of the western United States. The low cost of doing business in the state makes it an attractive destination for manufacturers who want to invest and produce in the United States and export globally but do not want to pay the typical cost of doing business on the West Coast. Likewise, Nevada remains an attractive destination for the "next-shoring" of the technology-intensive industries that comprise Industry 4.0. Nevada's proximity to major urban areas with large consumer populations throughout the western United States increases its attractiveness for advanced and technology manufacturing.

Specific areas of interest include:

- **Fortify Nevada's Small Business Community.** Building job-creation capacity through entrepreneurship and SMEs by empowering them with the tools they need to restore trade and promote supply chain resiliency.
- **Modernize Nevada's Economy through Foreign Direct Investment.** Attract foreign direct investment by building on existing international investors recruit foreign companies interested in key Nevada sectors.
- **Globalize Nevadan Businesses.** Reinforcing state international trade programs to help local businesses start or expand their exports in the global marketplace.
- **Export Nevada's Knowledge Capital.** Strengthening relations with foreign partners to develop platforms for sharing challenges and best practices across technology and innovation domains, including water-tech, autonomous systems, advanced manufacturing, and logistics.

Enable Further Diversification of Southern Nevada's Economy

Although the leisure and hospitality industry continue to be prominent throughout Southern Nevada, the region has successfully attracted new medium- and high-tech industries and sectors with potential for further development, notably logistics and advanced manufacturing. Future growth in these industries, however, is contingent upon the communities of Southern Nevada being able to meet the needs of employers in these industries. Considerable work continues to be done at the state and local level on workforce development, but there remains a need for further industry-specific infrastructure development throughout Southern Nevada.

Meeting the needs of new industry clusters requires a suitable workforce and an enabling environment for going to scale.

Industries such as logistics and advanced manufacturing require medium- and large-scale infrastructure assets to establish a presence and grow. Developments like the APEX Industrial Park in northern Clark County have significantly expanded the region's capacity for manufacturing and logistics, and at least one study found the industrial park capable of creating around 20,000 direct jobs and up to 56,000 induced jobs throughout Southern Nevada. However, the same report found that adequate infrastructure remains a challenge for growth at APEX, and the lack of integrated transport options for employees and goods limits the opportunities for additional industrial development at the site. [48]

Aside from the APEX Industrial Park in northern Clark County, there remains opportunity for additional development in other areas of Southern Nevada, where logistics and advanced manufacturing may be developed concurrently and capitalized on for regional growth. Areas of southern Clark County have received increased levels of interest for numerous projects, including the proposed second airport for the Las Vegas metro area, a manufacturing and business park, and other mixed-use developments. The establishment of an advanced manufacturing park and smart

logistics hub in southern Clark County would contribute to the long-term vision for this area of Southern Nevada and position the region as a major producer and distributor of goods in the western United States.

Specific areas of interest include:

- **Establish an Advanced Manufacturing and Logistics Hub.** Promoting the creation of industrial clusters with innovation programs and intermodal logistics capabilities.
- **Expand Air Passenger and Cargo Capabilities.** Creating a major global trade and passenger hub in the inland Southwest.
- **Grow Nevada's Professional Sports Industry.** Strengthening Nevada's sports sector including professional teams' infrastructure, sports medicine, and healthcare; investing in sports tourism to drive employment and increase the "per capita" contribution of the sports sector in the state economy.

Statewide Integration and Connectivity

Nevada's geographic proximity to major western markets makes it a competitive destination for U.S. manufacturers. Likewise, the strong air connectivity between Reno-Sparks and Las Vegas and many domestic and international destinations has enabled the continued development of the state's leisure and hospitality industries. However, intrastate connectivity continues to be a challenge for Nevadan residents and businesses. While Northern and Southern Nevada are well-connected to other urban markets throughout the West, there remains a notable dearth of infrastructure between northern and Southern Nevada.

The benefit of further infrastructure investment is twofold: increased rail and truck connectivity bolsters Nevada's opportunity to serve as a major transit hub for the western United States, and the development of this infrastructure represents opportunities for short-, medium-, and long-term employment in construction and transportation industries. Additionally, increased roadway connections between northern and Southern Nevada provide a more affordable alternative for intrastate transportation to businesses and residents of these respective regions. This means that there exist tremendous opportunities for employment today while making transformational infrastructure investments that will set Nevada on a new path in the future. Further development of Nevada's infrastructure assets will support the emergence and growth of new industries.

Integrate and Expand Capabilities between Northern and Southern Nevada

With the help of GOED and federal policies, Northern and Southern Nevada have successfully capitalized on their respective strengths to develop new industries and sectors, such as Opportunity Zones. However, a continued lack of connectivity between Nevada's principal urban areas remains an obstacle for the state's economic diversification ambitions, particularly the growth of the transportation and logistics industry. Both regions have sought to develop this industry—as well as others that are dependent upon strong regional and national connections, such as advanced manufacturing—independently, rather than through a coordinated approach. Likewise, the missing connections between the northern and southern portions of the state have contributed to the "missing middle" of western Nevada, where economic opportunity has remained a consistent barrier for many of the region's residents.

Connecting northern and Southern Nevada with one another and the communities that lay between them is a necessity for the state's residents and businesses. Much work has been conducted to identify opportunities for roadway expansion between Reno-Sparks and Las Vegas. The

Intermountain West Corridor Study was completed in 2014 to outline the extension of Interstate 11 (I-11) from southern Las Vegas to Phoenix, Arizona, and subsequent proposals have been made to extend the I-11 corridor north to Reno-Sparks, connecting Nevada's two primary urban areas and connecting Las Vegas with I-80.[49] Expansion of I-11 should be seen beyond passenger transportation but also as the major infrastructure investment in the emerging Southwest Triangle Megaregion (see Appendix A regarding Nevada's unique geographic advantages), which is on the trajectory to be one of the most economically strong American regions (but it is the only one without the interstate system between two of three major metropolitan areas: Las Vegas and Phoenix; major freight movement is going through Texas and California omitting Las Vegas).

Aside from highway expansion, opportunity exists for development of rail lines, both freight and passenger, that connect northern and Southern Nevada, as well as the rural and frontier communities of western Nevada. Establishing multi-modal facilities in the Reno-Sparks and Las Vegas metro areas would provide anchors for future freight and passenger roadways and railways and create opportunities for industrial development in underserved western Nevadan communities. In Northern Nevada, the creation of the Innovation Park at Tahoe-Reno Industrial Center, led by Blockchains, LLC, represents an opportunity to centralize medium- and high-tech manufacturing in the Reno-Sparks area while increasing regional and national rail connectivity. This connectivity would allow the communities between Las Vegas and Reno-Sparks to participate in the development of Nevada's western frontier.

Specific areas of interest include:

- **Develop the Fernley Multi-Modal Hub.** Expanding manufacturing and logistics opportunities for Northern Nevada and intra-state connectivity.
- **Establish Logistics and Manufacturing Parks in Northern and Southern Nevada.** Supporting the development of competitive manufacturing and logistics industries throughout the state.

Expand Broadband Accessibility

Access to high-speed, reliable broadband internet service is required for the "digital prosperity"[50] of our economy, educational systems, healthcare services, and state and local governments. Nevada's leaders face an enormous challenge. Too few people and communities have access to quality broadband technology: "If broadband is essential infrastructure, then regulation and public policy should support every American community having equitable access to broadband and the skills necessary to use it."[51]

For rural communities, broadband may be the only viable solution to the delivery of healthcare and educational services. For instance, Pennsylvania launched a broadband initiative with a focus on rural communities, with Governor Wolf noting: "The critical need for high-speed Internet has become clear in light of our efforts to mitigate the spread of COVID-19, as more families work and learn from home, businesses operate online services and patients access medical care through telehealth."[52]

Broadband access often varies by income, race, and remoteness. In the case of Nevada, the "Las Vegas-Henderson-Paradise MSA" has the highest rank of broadband access in the Mountain West. However, 13.7% of the area's population maintain low broadband subscription rates.[53] Access in the state's rural communities remains limited by the physical absence of the networks needed to support broadband.[54]

Access to broadband is essential to remote education and distance learning. School leaders and elected officials are searching for resources to provide broadband access to those who need it. Even

in the state's most urbanized county, the Clark County School District (CCSD) estimates that as many as 40% of students require assistance to gain adequate internet services.[55]

To help address these challenges, Attorney General Aaron Ford recently announced the launch of T-Mobile's "Project 10 Million" to offer broadband access for educational needs. The program provides "qualifying student households with access to broadband products and internet services before the start of the 2020-2021 school year."[56]

Technology-Driven Development

Nevada has long been a place where industry-shaping technologies are unveiled to a global audience. In recent years, the state has pushed further, facilitating the deployment and scaling of new and emerging technologies, such as unmanned aerial systems (UAS) and autonomous vehicles, and demonstrating their applicability in real-world scenarios. Since the Great Recession, Northern Nevada has managed to attract a number of high-profile technology companies, including Panasonic and Tesla, that have enabled economic diversification and provided new employment opportunities for regional residents. Southern Nevada has also attracted technology firms, such as Switch and Hyperloop One, that have worked to diversify the local economy. Other developments, such as the formulation of the water innovations research and commercialization organization WaterStart, have established Nevada as a thought leader in certain growing technology fields.

Work remains to be done, however, to place technology at the center of Nevada's economy. While new technologies are used throughout Nevada's industries, Nevada has struggled to become a producer and developer of technologies. Recent progress has been made in Southern Nevada to enable the development of new and innovative technologies in the region's dominant industries—gaming, hospitality, and entertainment—through the creation of industry-specific accelerators, like Black Fire Innovation. Expanding the opportunities for technology development and deployment in globally-critical sectors—such as manufacturing, energy, and logistics—will fortify Nevada's economy and place it among key producers of technology.

Investor and mentorship networks for technology-focused startups are relatively underdeveloped in Las Vegas compared to the other metro areas in the country. The COVID-19 impact on co-working and other startup support organizations is high compared to other sectors of the economy, creating an even greater need to strengthen Nevada's startup ecosystem, in partnership with Nevadan organizations like StartUpNV as well as external ones. A good example is the Innovation District designation by the City of Las Vegas and the launch of the International Innovation Center (IIC). The International Innovation Center will be a hub for the development of new and emerging technologies (IoT, artificial intelligence, virtual and augmented reality, cybersecurity, water science and advance mobile data) and house local and international startups and established companies.

Establish Southern Nevada as a World Data Hub

Since the Great Recession, Southern Nevada has successfully attracted several firms to establish data centers in the region, most notably Switch and Google. Due to its climate conditions and the low risk for natural disasters, Southern Nevada remains one of the most competitive locations in the United States for data centers. Factors such as available land parcels, energy stability and availability, and the availability of a skilled workforce, are particularly important for the data sector. According to research by the industrial real estate firm CBRE, Southern Nevada ranks competitively among other metropolitan areas for construction and land costs and is middle-of-the-road for labor costs.[57]

Data centers are a catalyst for a wide range of qualitative economic benefits and are attractive assets to Foreign Direct Investment (FDI) in related industries. Data centers and the wider digital ecosystem stimulate growth through knowledge spillovers. Tech-focused FDIs are also considered a major driver of knowledge spillover through labor mobility, market competition, and market transactions with local companies.

Power costs in Las Vegas, however, remain above average for comparative metropolitan areas.[58] One way to address the comparatively higher power costs in Southern Nevada is to increase the deployment of renewable energy sources; a 2018 study by the Association for Computer Operations Management (AFCOM) found that nearly 42% of companies that use data centers had either already deployed renewable energy sources or were intending to do so in the next year. Of those companies investing in renewables alongside their data centers, 60% indicated that renewables would help the financial bottom line of the data centers.[59]

The increasing attractiveness of Southern Nevada to technology companies, particularly those looking to establish data centers in the region, heightens the need for a qualified workforce that can meet the needs of these employers. A 2018 report by AFCOM identified the top job types that are needed for a strong data center workforce, including cloud, facilities, and center technicians; operations and controls engineers; and program managers.[60] Each of these career pathways requires highly technical training, much of which is done at the post-secondary level. To position itself for exponentially greater growth in the data center industry, Southern Nevada must pursue education and training programs in these fields at the Clark County School District (CCSD), as well as the region's two- and four-year higher education institutes.

Building out 5G networks and closing other digital divides (like broadband access), Nevada can position itself as the "Data Capital of the Mountain West." With the presence of Switch and Google taking a lead, Nevada can claim a leadership position in data storage and become a world-renowned cluster in that business category.[61]

Specific areas of interest include:

- **Facilitate the Deployment of Renewables for Industry.** Accelerating the transition to a low-carbon economy by supporting the private sector's adoption of resource-saving technologies.
- **Support the Development of Data Center Training Programs.** Facilitating the growth of Nevada's skilled technical workforce by expanding training opportunities for middle- and high-skill and -wage occupations at the state's two- and four-year higher education institutions.

Recruit Automation and Digital Technologies Firms

The COVID-19 pandemic has accelerated the transition toward greater automation and digitization of many routine, and some non-routine, tasks. As these technologies mature beyond the laboratory, companies will be looking for opportunities to deploy their innovations in a real-world context. Nevada has demonstrated its openness to being a testbed for autonomous technologies; Reno-Sparks' metro region is home to UNR-led "Living Lab" for autonomous vehicle technologies, while Southern Nevada is host to the Nevada Institute for Autonomous Systems (NIAS) and is an FAA-designated proving ground for unmanned aerial systems, one of a handful in the United States. Such designations will be a valuable feature of the state for companies operating in this space.

The recruitment of automation and digital technologies firms also builds upon the state's push to integrate advanced manufacturing capabilities into the economy. Advanced manufacturing requires

cutting-edge equipment and systems, such as those produced by automation and digital technologies firms. Clustering the producers and users of these technologies together creates critical mass in the local economy and incentivizes other firms to relocate to the area.

Specific areas of interest include:

- **Establish an Advanced Manufacturing Applied Research Center Housed Jointly between the University of Nevada Reno and Truckee Meadows Community College.** This will support the development of human and knowledge capital in the advanced manufacturing arena to accelerate the growth of Nevada's advanced manufacturing industry.

Enable Technology-Based Entrepreneurship

Entrepreneurship has been a key focus of Nevada's recovery from the Great Recession. According to the Kauffman Foundation's Indicators of Entrepreneurship, in 2019 Nevada ranked 15th out of all U.S. states and Washington, D.C. in the percent of population that started a new business, indicating the highly entrepreneurial spirit of Nevadans. However, the data also reveal that the rate at which Nevadans start new businesses has steadily fallen since 2016 and remains well below 2012 levels. Slightly offsetting this decrease in the rate of new entrepreneurs is the increasing number of jobs created by the average Nevadan startup; since 2010, the average number of jobs created by a Nevadan startup has increased from roughly 4.8 to about 6.4, a 31% increase, ranking Nevada sixth in the United States for startup job creation. Likewise, an increasing share of startups in Nevada are formed by choice (82.62%), rather than necessity, though the state remains below the U.S. average and ranks 40th overall.[62]

While the above data indicate that Nevada has proven adept at fostering entrepreneurship throughout the state, much of the state's business creation activity remains concentrated in retail and other service-oriented sectors. There is an important distinction to be made: though "entrepreneurship" may be interpreted as any new business creation, there is a difference between "small business entrepreneurship" and "startup entrepreneurship." Many newly formed retail and service-oriented businesses would likely be classified as small businesses rather than startups due to their primary focus on local markets and limited interest in scaling nationally or globally. Startups, however, intend to create a new industry or disrupt an existing industry, frequently on an international scale. To do this, many startups spend significant capital on research for a new product or service, often not seeing positive revenue for years.[63]

Encouraging growth in technology-driven entrepreneurship calls for a more intentional approach to entrepreneurship-supportive policies. Due to their focus on developing new products or services, startups require access to knowledge capital and competencies within certain technical domains. Outside of the software space, startups looking to develop new products or services can also be capital-intensive (e.g., in energy or transportation), requiring consistent access to funding sources over longer stretches of time. Mentorship from successful startup founders, as well as venture capitalists, are also valuable resources for those looking to establish technology-intensive startups.

Unfortunately, the COVID-19 pandemic has had a negative impact on startups and small businesses. Globally, 41% of startups are threatened because of the COVID-19 pandemic, and Nevada is not exempt from that statistic.[64] The responsibility of preserving startup companies falls on governments and their willingness to mitigate the impacts through grants, loans, deferring costs, payroll support, and other measures to alleviate investment uncertainty. At the state and local level, it is important to understand the pain points faced by local technology entrepreneurs when forming and scaling their firms. State and local leaders have been effective at doing this for larger tech companies—such as

Apple, Tesla, and Google—enabling the firms to establish a presence in northern and Southern Nevada. A different suite of policies and initiatives will be necessary for enabling technology entrepreneurs to sustain their success.

Specific areas of interest include:

- **Establish a Statewide Network of Angel Investors.** Convening Nevada-based investors to support emerging start-ups throughout the state.
- **Support Collaboration with Private and Non-Profit Tech Accelerators.** Expanding the state's collaborations with organizations that provide support to Nevada's entrepreneurs, such as the North Las Vegas Innovation Collective.
- **Conduct a Study of Missing Tech Ecosystem Components.** Identifying the shortcomings of Nevada's current tech ecosystem to enable more effective tech-centric policies and programming.
- **Close Funding Gaps by Creating a Statewide Seed Fund**. Accelerating the growth of Nevadan start-ups by providing direct support to entrepreneurs operating in key sectors of the economy.
- **Design a Cohesive Strategy to Enhance the Existing Nevada Global Business Recruiting Platform.** Positioning Nevada as an ultra-competitive soft-landing region for high-growth technology startups from around the world.
- **Create Mechanisms to Identify, Match, and Support a Wide Pool of Mentors.** Establishing a cohort of mentors that can provide guidance and assistance to Nevada's entrepreneurs.
- **Create a Diverse Innovation Ecosystem.** Enabling the growth of women and minorities in STEM fields.

Responsible and Sustainable Growth

Nevada has consistently demonstrated a dedication for embracing sustainability as it develops and diversifies its economy. Since March 2019, the state has been a signatory of the U.S. Climate Alliance, which commits the state to a reduction in greenhouse gas emissions of over 25% by 2025. Not only has the state looked to reduce its impact on the environment to mitigate its contribution to climate change, but Nevada has also viewed sustainability as an economic opportunity on which it can capitalize. According to the U.S. Climate Alliance, member states created more than 133,000 jobs in clean energy between 2016 and 2019, bringing the total employment in clean energy in these states to more than 2.1 million. Of the 25 member states, Nevada experienced the most significant growth in clean energy jobs, witnessing a 45.5% increase in clean energy employment between 2016 and 2019.[65]

Nevada is well-positioned to maintain growth in the clean and green economy. As electric vehicles become more commonplace throughout the world, and as renewables achieve further integration within national electric grids, the need for energy storage solutions will increase significantly. Nevada has the opportunity to place itself at the center of energy storage supply chains, in large part due to its enormous reserves of lithium. There is also potential for Nevada to export its expertise in water conservation and management, for which the state has become internationally renowned. It will be critical for state and local agencies to facilitate the actions of key players in these areas so that utilities, transportation networks, and consumers can move rapidly toward a sustainable future.

Lead the Global Development of Energy Storage Supply Chains

Mining has long been a significant component of Nevada's economy, and the discovery of large lithium deposits in Northern and Central Nevada positions the state to be a global leader in lithium production. Lithium plays a critical role in many new and emerging technologies, especially those concerned with energy storage for electric vehicles and electric grids. The mining of lithium provides a catalyst for Nevada to develop a new component of its mining industry that is intimately connected to the global value chains in technology development and production. Likewise, the processing of other critical materials and minerals beyond lithium that are key to U.S.-based technology production and development would position Nevada well within the national security apparatus, securing the state as a key component of U.S. technology supremacy.

Nevada is currently well-positioned for this transition. The opening of Tesla's Gigafactory in Northern Nevada served as a critical first step in realizing the state's role in global energy storage supply chains. However, despite Nevada's significant known and probable lithium reserves, Tesla is forced to import lithium from outside of the United States for inclusion in their batteries.[66] Development of Nevada's lithium sector not only closes a critical gap in Nevada's energy storage production, but also enables Nevada to become a net exporter of lithium. In fact, the expected yield of Thacker Pass, the region of Northern Nevada that is proposed for lithium mining, may potentially fulfill 25% of today's global demand for lithium, once the proposed mining development reaches full capacity.[67]

Specific areas of interest include:

- **Accelerate the Convergence of In-State Lithium Mining and Production.** Enabling the centralization of lithium procurement and refinement within the state of Nevada.
- **Solidify Nevada's Role in the Global Energy Storage Supply Chain.** Growing Nevada's lithium operations to position the state as a key player in the global energy storage supply chain.

Transition to a Low-Carbon, Low-Emission Economy

Nevada's Climate Strategy has committed to a reduction in greenhouse gas emissions of over 28% by 2025 and net-zero (near zero) by 2050.[68] The state has made progress on this goal through several recent developments, including widespread solar energy deployment and electric vehicle adoption. The state's energy provider, NV Energy, remains committed to further usage of renewable energy technologies and adopting a greater variety of renewable energy sources. It has partnered with higher education institutions throughout the state, providing million-dollar grants to the University of Nevada, Reno (UNR) and the University of Nevada, Las Vegas (UNLV) to develop a geothermal studies program (UNR) and a renewable energy studies program with an emphasis on solar energy (UNLV).

In recent years, NV Energy has also begun harnessing emerging technologies—including drones—to monitor Nevada's energy transmission network and identify potential fire threats. In deploying renewable energy technologies in the state's energy infrastructure network, however, NV Energy has faced challenges. Before making an investment in renewable energy infrastructure, the proposed project is assessed by the Public Utilities Commission of Nevada (PUCN) using a cost-of-service-based framework, which does not take into consideration many of the current values held by energy infrastructure stakeholders, such as reducing carbon emissions. However, PUCN is obligated to use the cost-of-service framework by historic public statutes, making it difficult for the regulator to assess proposed investments according to newer standards tied to green energy. A scorecard approach—for example, one that examines the number of jobs created by a proposed project and the expected

carbon reduction—would better enable NV Energy to flexibly integrate renewables into the state's energy network.

Specific areas of interest include:

- **Evaluate PUCN's Investment Review Framework.** Re-evaluating PUCN's cost-of-service approach and integrated resource planning process for reviewing energy infrastructure investments to identify areas for modernization, such as moving toward a performance-based approach, that enable the use of new metrics for investment assessments.
- **Expand Nevada's Electric Vehicle Charging Network.** Partnering with Nevada's energy providers to significantly expand the state's electric vehicle charging network to enable greater adoption of electric vehicles.
- **Build research capacity across UNR, UNLV, and the Desert Research Institute in renewable energy.** Reaffirming Nevada's commitment to excellence and leadership in renewable energy by supporting research in key areas of renewable energy technologies.

Transition to Water-Wise Economy

The climatic conditions to which Nevada has long been accustomed have required the state to be innovative in how it exploits its water resources. Local governments, particularly in Southern Nevada, have incentivized residents to forego the typical greenery that is common in many suburban developments in favor of drought-tolerant landscaping that is more typical of the state's mostly desert climate. Initiatives such as these have helped to increase the resiliency of Nevada's communities, while also creating new opportunities in the development of water conservation technologies.

The foundation of WaterStart in 2013 served as a catalyst for the emergence of Nevada's water conservation expertise. Through the commercialization assistance provided by WaterStart, Nevada has attracted companies developing key technologies to conserve water resources. Scaling these technologies—not only throughout the state, but also across the United States and internationally—represents a significant opportunity for Nevada to achieve a water-wise economy and grow an economic sector that is sure to be in demand as the consequences of climate change are felt across the globe.

Specific areas of interest include:

- **Bring smart meter pilot program to scale statewide.** Determine how to scale smart meter pilot program across the state.
- **Study Northern Nevada Development Authority's (NNDA) effluent water proposal.** Lift potential constraints on future industrial and residential development
- **Expand WaterStart's water-tech company recruitment.** Recruit into the existing water-tech cluster through the attraction of WaterStart programs and partnerships.

Comprehensive Placemaking

Nevada has experienced some of the nation's most rapid population growth over the last decade. While much of the growth is concentrated in the state's two major urban areas, Reno-Sparks and Las Vegas, the growing opportunity for remote work due to the COVID-19 pandemic opens much of Nevada's frontier to a new class of digitally- and geographically connected worker. Workers that were once constrained to urban and suburban localities due to their proximity to business now have the opportunity to relocate to areas that are more affordable and offer a better lifestyle. Nevada's

connectivity, particularly via air travel, and low cost of living make it a competitive destination for these workers.

To fully capitalize on the new geographies for living and working brought about by the COVID-19 pandemic, a clear understanding of Nevada's communities is necessary. Mapping the benefits and challenges of living in Nevada's communities will help determine where interventions are necessary to ensure Nevada can meet the needs of a vibrant, diverse population. Some pain points, such as healthcare access, have been identified previously and remain imperative, especially during a pandemic. Other areas of interest, like placemaking, are newer but comprise an integral component of defining what it means to be a community in Nevada.

Remove Barriers to Healthcare Access across Nevada

Timely access to quality healthcare has been a consistent obstacle for many Nevada residents that has worsened due to the COVID-19 pandemic. According to the Association of American Medical Colleges' (AAMC) State Physician Workforce Data Report, Nevada ranks 45th in the nation for the number of active physicians per 100,000 residents. The data are worse for the number of active primary care physicians and active general surgeons in the state, where Nevada ranks 48th and 50th, respectively. Around 27% of Nevada's active physicians are international medical graduates, the eighth highest rate in the United States, indicating an intense need to recruit medical professionals to the state.[69] In Nevada's urban regions, a lower-than-average number of primary care physicians means that many Nevadans face long wait times when seeking medical care. In Nevada's rural communities, long wait times are compounded by a lack of local options, requiring residents to drive to more urbanized areas of the state for medical procedures.

While Nevada has struggled to develop home-grown healthcare talent, much progress has been made on this front in recent years, notably through the establishment of the University of Nevada, Las Vegas (UNLV) School of Medicine, as well as the formation of several nursing programs at the state's two- and four-year colleges. According to AAMC's data, of those physicians who completed their graduate medical education (GME) in Nevada, about 55% chose to practice in the state, ranking Nevada sixth in the United States for graduate medical student retention. However, Nevada again ranks poorly (44th in the nation) for the number of medical residents and fellows enrolled in accredited programs. Additionally, of all the active physicians in Nevada, slightly more (17 percent) received their GME in California, not Nevada (14 percent).[70] As Nevada is clearly successful at retaining physicians who complete their GME in Nevada, further expanding opportunities for medical students to complete their residencies in Nevada may better enable the state to grow its healthcare workforce.

The COVID-19 pandemic has demonstrated the need for an adequate healthcare workforce in the state's localities. It has also illuminated the need for a greater diversity of healthcare access points aside from physical healthcare facilities, encouraging medical professionals to meet patients where they are located. By minimizing the need for individuals to physically go to see a medical professional, Nevada can reduce the strain on the state's healthcare industry and increase the total number of patients a physician can see. Telehealth has become an area for growth within the healthcare industry, enabling individuals to access medical expertise for non-emergency conditions from their homes. Assembly Bill 292 (2015) enabled greater development of telehealth services in Nevada, and the COVID-19 pandemic has necessitated a dramatic increase in the use of telemedicine.[71] Increasing the opportunity for telehealth throughout Nevada, particularly in the state's rural and frontier communities, requires investments in the state's digital infrastructure, especially broadband connectivity.

Specific areas of interest include:

- **Expand Opportunities for Residency Programs at Nevada's Hospitals.** Reduce the shortage of medical professionals by recruiting newly graduated physicians to Nevada's hospitals.
- **Expand Broadband Access in Nevada's Rural and Frontier Communities.** Based on Project ECHO, expand the capacity of health professionals to treat disease via telehealth.
- **Address Low Medicaid Reimbursement Rates.**[72] Encourage the establishment of more hospitals by raising reimbursement rates.
- **Join the Enhanced Licensure Compact.** Eliminate barriers to mobility for medical professionals.

Encourage Purposeful Residential and Commercial Zoning and Development

Nevada's housing market has recovered significantly from the pain inflicted by the Great Recession. As the state has continued to attract new residents at a record pace, new construction of mostly single-family homes has risen to accommodate this growth. Home prices also rose as the state exited the recession. According to the Lied Center for Real Estate at UNLV, whereas the average new single-family home in Southern Nevada sold for around $300,000 in June 2014, the price had risen 35% to $463,000 in June 2020. A similar trend has been observed in the Reno-Sparks area, where the average new single-family home price rose 40% from $325,900 to $546,670 between June 2014 and June 2020.[73] There has clearly been a shift in builder preference for more lucrative, high-end homes in Nevada's two primary urban areas.

The increase in pricing of new single-family homes is further compounded by the increase in pricing of existing single-family homes during the same period—44% to $365,000 in Southern Nevada and 50% to $502,000 in Northern Nevada. Across-the-board increases in the price of home ownership contribute to the polarization of local housing markets, where median earners are faced with fewer affordable options and are forced to compete for a smaller amount of housing stock, which can drive prices further.

It is important that Nevada's urban, suburban, and rural communities meet the needs of a socioeconomically diverse population. This may require a more comprehensive approach to zoning and planning in Nevada's communities, where residential, commercial, and retail spaces are co-located to enable further population growth without inundating existing transportation infrastructure. Likewise, ensuring that affordable housing options are integrated into future residential development plans allows for a greater diversity of individuals to engage in Nevada's communities.

The situation for commercial property is especially challenging because of the shortage of sites of the appropriate size. Indded, a recent study sees land rather than water as the principal constraint on the development of Calrk County in the years ahead. The region is projected to require about 14,100 acres of developable employment land to meet the needs of the expected economic and job growth by 2035. Given that only 9,100 acres are available that are optimal for development, there is the possibility of a 5,000 acre shortfall by 2035.[74]

Specific areas of interest include:

- **Lobby for the Southern Nevada Public Land Management Act (SNPLMA)** Immediately and aggressively pursue changes to federal law to release additional space for development.

Expand the Outdoor Recreation Economy

The COVID-19 pandemic has encouraged individuals to engage with their local and regional outdoor amenities. According to the U.S. Department of Agriculture Forest Service, this renewed attention in the American outdoors as a result of stay-at-home orders and restrictions on indoor entertainment is built upon a trend that has been growing in the United States since the late 1990s. On a national scale, outdoor recreation has grown to a $646 billion industry that directly employs more than six million people.[75]

While the "recreation economy" has long been present in Nevada, COVID-19 has reinvigorated interest in the state's outdoor assets. Prior to the pandemic, the Nevada outdoor recreation economy directly employed 87,000 workers, generating nearly $13 billion in consumer spending, $4 billion in wages and salaries, and over $1 billion in state and local tax revenue.[76] Nevada has taken steps to recognize the potential the outdoor recreation economy represents for the state, notably through the creation of the Nevada Division of Outdoor Recreation (NDOR) in 2019.[77]

Continued development of the state's outdoor recreation portfolio can increase the quality of life for residents of Nevada's urban areas by providing opportunities for outdoor exploration while increasing economic opportunity for residents of Nevada's rural communities. Housed within the Department of Conservation and Natural Resources, NDOR will also ensure that the growth of this industry does not come at the expense of the health of Nevada's public lands.

Specific areas of interest include:

- **Expand the scope of the Statewide Comprehensive Outdoor Recreation Plan.** Coordinate outdoor recreation infrastructure planning and implementation with small business development in rural communities.

Support Entrepreneurship in Digital Arts and Esports

Entertainment has been an integral component of Nevada's economy. As creative content has increasingly become digital and easier to consume without requiring individuals to travel to one particular destination, a shift toward becoming a hub for digital arts creation provides local creatives the opportunity to produce and share their works to a broader audience.

Entrepreneurship in the digital arts goes beyond the creation of digitized art. Indeed, emerging areas like game design are also a significant area of growth in Nevada, especially in Southern Nevada. The emergence of esports as the new frontier in gaming and digital entertainment will allow for a new class of digital artist. Access to resources, such as game design studios and equipment, will enable entrepreneurs in this space to hone their skills and develop industry-leading games in Nevada. The presence of the gaming industry throughout the state provides these entrepreneurs with a built-in test bed for their games and the potential to scale beyond the state.

Specific areas of interest include:

- **Create a Digital Arts Studio in Southern Nevada.** Within the UNLV innovation district provide the infrastructure necessary for digitizing the performing arts

Nevada's Plan for Recovery & Resilience

Capabilities to Realize the Vision

The Future Beyond the Pandemic

Capabilities to Realize the Vision

In order to realize these strategies for the future, Nevada will need to build or rebuild key financial and institutional capabilities and develop realistic statutory actions. The capacity of the state and its associated institutions is stretched to the limits by the current crisis. Nevadans have preferred a low-capacity state government, dispersed over three cities. But Nevadans cannot prosper in the future without accepting the need to invest in real management and financial capabilities. This does not necessarily mean a large government, rather it calls for an effective government. To be effective, systems must be modernized, and institutions reformed. Such initiatives would include those listed below:

- Fully fund the state infrastructure bank.
- Establish a sovereign wealth fund.
- Reinvent the Knowledge Fund and build a network of innovation and evergreen venture funds.
- Establish a single state office in support of Micro-, Small-, and Medium-Enterprises (MSME).
- Grow Nevada's community banking network
- Modernize Nevada's fragmented administrative systems.
- Redesign governance and funding mechanisms for the community college system.

Fund the State Infrastructure Bank

Nevada needs to make significant investments in infrastructure if it is to keep growing its economy. However, the state's ability to raise money is more limited than that of most states; for example, Nevada's state constitution bans toll roads. In response to these challenges Nevada lawmakers passed AB 399. This measure, commonly known as the "infrastructure bank bill," created the framework for the Nevada State Infrastructure Bank in order to fund roads, bridges, and other projects across the state. Such an institution not only allows the state to mobilize its own ability to borrow but provides an institutional environment ready to respond to federal infrastructure initiatives. Such initiatives, although much talked about, have not yet materialized.

However, as the scenarios laid out at the beginning of this report indicate, recovery from this crisis may take a long time. Capital will be cheap, labor will be available, and it will be vital to complete the capital projects discussed in the section above if the state's economy is going to grow in new, more resilient directions.

The first order of business in building Nevada's capabilities for the future is to capitalize the bank, which at present is an empty shell. This could be achieved in a variety of ways, but seed funding from the state employee's retirement plan could be a viable path (although CARES act funding may also be a possibility if constraints on the use of that funding allow). Given the list of projects already identified across the state with a high ROI it would be easy to then obtain other investors in the bank.

Establish a Sovereign Wealth Fund

Sovereign Wealth Funds (SWF) are often used to smooth out public-sector revenues by calling on savings obtained from taxing natural resources (mitigating the necessity of funding substantial rainy-day funds out of general fund revenues). There are many examples of SWFs in the United States and around the world (see the list of U.S. states with sovereign wealth funds in Appendix C). Some states obtain modest revenues, although they can be vital in a crisis. New Mexico was able to shore up many small businesses early in the present crisis by calling on its SWF. Other states can use them in transformational ways: The University of Texas benefits from a Permanent University Fund that now exceeds $20 billion.

Nevada has several possible sources of revenue from which to draw in order to fill the fund. More important at this stage is to set in place an institution that was truly independent and transparent (many models exist). Voters may have reservations about revenue that disappears into the general fund. A sovereign wealth fund tasked by statute with supporting applied research for business and workforce development would increase the confidence of the voters that the revenues were being invested in the state's future (a model could be the Golden Leaf Foundation in North Carolina).

Establish the Nevada Innovation Fund

Nevada's Knowledge Fund has recorded some high-profile successes in innovation and entrepreneurship. However, Knowledge Fund investments to date have mainly established sustainable research infrastructures and conduits of access for private companies to Nevada's three main research institutions. This approach has provided research services and a talent pool to industry and helped to support projects in obtaining federal research grants (DARPA, NIH).

However, a changed mindset is required at the universities. Such a fund is not best thought of as an opportunity to build capacity. It is an opportunity to fuel business-based innovation in partnership with universities. A Nevada Innovation Fund, a new vision in this space, would make investments

targeting tech commercialization, spin-out company formation, and monetization of IP from research institutions; it would also support the growth of entrepreneurial ecosystems (up to and including direct support of tech companies).

Such a fund could work in at least four ways:

- **Innovation Capacity Building**: Grant funding for applied R&D infrastructure and projects at Nevada System of Higher Education (NSHE) (similar to Knowledge Fund projects). Emphasis on university/private industry partnerships.
- **Innovation Transfer**: Grant funding for technology transfer projects at NSHE and private companies through Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) matching program (Focus on Technology Readiness Level [TRL] 3 – 6)
- **Innovation Acceleration**: Grant funding to accelerate innovation for private early-stage Nevada tech companies to help them scale (best practice: USTAR TAP). Creation of acceleration and venture building programs through collaboration with outside organizations (e.g., Rainmaking – UNLV). Support for Entrepreneurial Service Organizations (ESOs) to include mentoring, networking, entrepreneurial training for private entity or university researcher.
- **Innovation Ventures Seed Funding**: Through non-profit Nevada Battle Born Growth Escalator, Inc. (NBBGE). Assistance with creation of Independent Commercialization Entity to offer NSHE path to effective formation of spin-out companies while providing investors with clarity of ownership structure. Equity-based investment to early-stage companies with high potential to scale (through NBBGEI). Focus should be on NIF/KF project linked spin-outs.

Establish an Office for Micro-, Small-, and Medium-Sized Enterprises (MSME) within GOED

Support for MSME is especially important for a state like Nevada. The state is home to an enterprising population known for pursuing gig work alongside regular employment, lifestyle entrepreneurship or businesses (in the arts and outdoor recreation), or opportunities available from family-run businesses (especially valuable to recent immigrants). In short, MSMEs are a source of economic dynamism and often an important step on the economic ladder for immigrants and other disadvantaged populations.

However, responsibility for state policy towards MSMEs is spread across three parts of state government: The Department of Business & Industry (B&I), GOED, and the Nevada System of Higher Education (NSHE) through its Small Business Development Centers (SBDC). As a result, there is limited coordination and conflicting communication, with no single office or leader charged with owning all of the issues of importance to this sector.

Self-Employment Assistance (SEA) is an example of the kind of initiative such an office could coordinate. Five states — Delaware, Mississippi, New Hampshire, New York, and Oregon — have implemented this federal program that facilitates small-business startups. States that opt in can pay dislocated workers a weekly SEA allowance—the same amount that an individual would receive in unemployment benefits—with the individual encouraged to work full-time on his or her new venture instead of seeking a job. SEA also supports a wrap-around infrastructure through which participating individuals receive entrepreneurial training, business counseling, and technical assistance.[78]

In the last legislative session, the Lt. Governor proposed an Ombudsman in her office to trouble-shoot small business issues. This is a move in the right direction but could be amplified by moving

the small business function from B&I to GOED. With the Lt. Governor serving on the board of GOED, this could create a working group and point of contact for small business inside GOED, led by the Lt. Governor, that addressed the present fragmentation of policy.

Grow Nevada's Community Banking Network

Community banks were essential to the success of the Paycheck Protection Program (PPP) in the present crisis. It was designed in a way that made community banks integral to its success. $525 billion was distributed in the four months from April through August and Community banks with $10 billion or less in assets made about 40 percent of the overall number and value of PPP loans. But Nevada is grossly underserved by community banks, and as a result was relatively slow to benefit from the PPP.[79]

Community banks are small, but they play a big role in local economies. A community bank is a bank which has specialized knowledge of their local community and their customers and base credit decisions on local knowledge and information obtained through long-term relationships. They receive deposits from sources within a town or city and lend that money to local businesses to create balance within that economy. Because community banks consider history and reputation of their customers when making decisions, they invest themselves in their customer's success and offer assistance, training, and support beyond that of national institutions.

Such banks can take many forms, both private and not-for-profit. Most are certified by the federal government and are eligible for government support (through the federal CDFI Fund) as well as private funding. Nevada's regional leaders should mobilize partnerships of key regional institutions in support of their formation. This will enrich the ecosystem in which MSMEs operate and help ensure their success.

Modernize Public Policy and Governance

Introduction

As individuals, families, businesses, schools, and communities across Nevada work to recover from the public health and economic devastation brought about by the COVID-19 pandemic, elected officials have an opportunity to enact a series of reforms to modernize state government. These efforts should address structural deficiencies in government operations and policy issues including workforce, economic development, and taxation. For example, the Nevada Governor's Office of Science, Innovation & Technology (OSIT) should be empowered to establish enterprise-wide information technology systems (comparable to initiatives in Utah and Colorado). It is a given that Nevada is behind in adapting technology for the delivery of government. By contrast, Arizona implemented a cloud-based management system that ends the "reliance on paper, outdated procedures and decentralized management [that] can hamstring a state's ability to disperse and track funds."[80]

The COVID-19 pandemic demonstrated that states must operate in a 21st century technological environment. State employees require basic infrastructure to perform their duties. Laptop computers without cameras are not a budget savings measure if state workers cannot participate effectively in virtual meetings. Requiring paper copies of standard forms, accepting fax copies but not pdf documents, and being unable to respond to email inquiries is unacceptable.

Nevada's efforts to manage federal stimulus funds, to administer healthcare and social services (most notably unemployment insurance), and to conduct legislative operations during the summer

2020 legislative special sessions demonstrate that relying on antiquated technology and outdated policies and procedures fail to serve the state.

Federal Funds

The state faces a period of austerity in its finance system, making it critical for state agencies to become more sophisticated in securing federal funds to support important services and ongoing policy priorities. Budget and policy decisions should be strategic and not reactionary to fiscal deficits. Where cuts need to be made, it must be done in a way that ensures the state does not lose matching federal funds. Nevada has recently taken steps to improve its acquisition and management of federal grants. When the state fails to pursue federal resources, the funds are distributed to other regions, placing Nevada further behind its peers.

Local and state leaders across the nation are accessing federal programs and developing public-private partnerships to bring resources to their communities. The Brookings Institution highlighted a sampling of innovative programs that engage idle restaurants, explore online job recruiting tools, including new "apps," apply federal grants and public-private partnerships to help small businesses, and champion racial and social equity measures among others.[81]

Boards and Commissions

Nevada relies on boards and commissions with statewide responsibilities to oversee many government and economic sectors. Despite their importance, these bodies often do not reflect the state's current population distribution and operate with antiquated charges that reflect a smaller, more homogenous, and rural-oriented state.

For example, based upon an executive branch audit, Governor Sisolak's administration found that many of the state's occupational boards were misaligned and underperforming. Utah and Colorado have created a division of occupational licensing within their departments of commerce, a model suitable for B&I to follow. One benefit is easing the transfer of credentials for trailing spouses, often an obstacle to recruiting professionals to Nevada where both partners work. This suggests that these boards and commissions require additional reforms and greater oversight to improve performance and representation.

Two recently created boards and commissions demonstrate state government adapting to changes in economic and social needs. The Cannabis Compliance Board focuses on marijuana policy and regulation in a manner similar to Nevada's Gaming Control Board.[82] The Patient Protection Commission recently voted to focus its work "on healthcare issues facing the state, including workforce development, COVID-19 response, and telehealth."[83] The body is even authorized to bring bill drafts directly to the legislature.

These two new entities can serve as models for a review and modernization of existing Nevada boards and commissions. Such a review may identify and recommend the creation, dissolution, or merging of existing boards or commissions.

Taxation

Nevada's system of tax and finance rests on a narrow base, in particular on a single industry, tourism. This leaves the larger Nevada economy vulnerable to economic disruptions, such as the downturn brought about by the COVID-19 pandemic. During the first three months of the pandemic, Nevada lost 250,000 jobs. In April 2020 alone, visitation dropped 97.3%.[84] To this end, a Legislative Study Commission or similar body could explore alternative revenue sources designed to broaden

the tax base in order to limit volatility in revenues and ensure that the base tracks future change in the economy.

Another element to consider in the state's system of taxation is to draw on regional economic activity to support local services and infrastructure investments. The concept of regional taxes is not new. In Nevada, any consideration of regional taxes must reflect the state's economic geography. Mining, to a large extent, takes place in rural Nevada, while gaming and live entertainment concentrate in Southern Nevada. The introduction of legalized cannabis generated new state and local tax revenue and also raised conversations about its geographic allocation.

Mining is treated as a regional tax, with a portion of revenues reserved for the localities where the resource is located. A similar carve out of the live entertainment tax to support local services and infrastructure, reflecting the concentration of industry and associated costs, would parallel the current tax arrangement for mining in rural Nevada.

Reinvent Nevada's Workforce Institutions

The sections below highlight governance, funding, and workforce development as it relates to the state's community college systems. Options are considered for reforms to integrate innovation and workforce assets to help grow and diversify the state's economy.

Governance and Administration for Workforce Institutions

Nevada's regional institutions need active, locally recruited advisory boards with representation from sector industries that are within the campuses' service areas. These boards will be able to work directly with leadership to develop and assess campus policies, priorities, and performance. Aligning these institutions with regional constituencies will position the campuses to develop partnerships with local industry and governments. Examples from across the country demonstrate the benefits for workforce development and economic diversification that result from locally focused college governance.

Funding

The ideas presented below are designed to more effectively align resources to support the campuses' differing constituencies and missions, particularly as they relate to economic development.

Implemented in 2013, the current formula used to distribute operational funding to the teaching institutions places these colleges at a disadvantage as they compete against the universities for a finite resource. In order to address these shortcomings, the state should develop separate formulas for the universities and colleges that reflect these institutions' differing missions, service areas, and student needs. Resources should be dedicated to students who are Pell-grant eligible and first-generation attendees to support their onboarding, advising, and mentoring. Furthermore, credentials, certificates, and other competency-based curricula should be fully rewarded under the formula for workforce institutions.

The non-alignment between Nevada's colleges and the mix of degrees and certificates awarded also has implications for accessing federal resources. Truckee Meadows Community College (TMCC) most comports with the federal government's definition of a community college, although that was truer several years ago than today as the school expands its four-year programs. As a consequence, TMCC was the primary intake for federal workforce training funds during the Obama administration. Yet, the campus serves a region with just 16% of the state's population. Out of the $2 billion in Trade

Adjustment Assistance Community College and Career Training (TAACCCT) grants awarded nationally between 2011 and 2014 by the U.S. Department of Labor, Nevada received less than $24 million.

Nevada needs genuine community colleges based in their communities. Nevada should redefine College of Southern Nevada (CSN), TMCC, and Western Nevada College (WNC) to align with the federal government's definition of a two-year college. These colleges should focus on articulation, certification, remediation, stackable credentials and work-place learning. They should serve as the principal institutions for public-private workforce development collaborations. In the recovery from the current economic crisis, the federal government may fund workforce development and retraining initiatives as it did during the Great Recession. Nevada would be much better positioned to receive federal resources with three IPEDS-defined two-year colleges.

Conversely, Great Basin College (GBC), which offers bachelor's degrees in both arts and sciences, a degree portfolio consistent with a four-year school, should be reclassified as such. GBC should be elevated to a full four-year institution and place the Elko micropolitan area on a par with its regional peers, such as Durango, Colorado and Clovis, New Mexico—both of which maintain four-year institutions that also offer limited graduate education. Elko lies at the center of an enormous rural space where the most proximate four-year college is the University of Utah, 230 miles away. The lack of human capital in the area creates an over-reliance on mining, leaving the Elko area vulnerable to market swings in gold prices. Just as Las Vegas' economic health is over reliant on a single industry, the same is true for many remote communities.

Reimagining Nevada's Higher Education Institutions

The first step in better connecting higher education and industry requires transitioning from the current "state-controlled" university structure to an "academic enterprise" model as exemplified by Arizona State University (ASU). Academic enterprise institutions, such as ASU, focus on "social transformation." A hallmark of this approach is public-private partnerships that attract external resources for infrastructure investments and research initiatives. ASU vastly expanded its physical plant by offering private firms access to its nonprofit tax status in exchange for developing facilities that are shared with partners. For instance, State Farm's western headquarters was built on land leased to it by ASU and thus qualifies for property tax exemptions. In exchange, ASU receives academic space and funding, including a $30 million donation for its career development program.

Nevada's universities should pursue ASU-style, public-private partnerships with multiple industrial and private collaborations in order to expand their research and teaching capacities in an era of very restricted state resources. UNLV began switching to this approach in 2019 to develop its medical education building via a non-profit development corporation. While this particular project was developed in partnership with local philanthropy, it nonetheless establishes a flexible method for using external resources to build what previously would have been a mostly state-funded and state-controlled building. The answer to the prospect of limited state support in the future is to engage multiple stakeholders, including local governments, with common interest in constructing academic facilities that will sustain applied technology and startup enterprises.

Appendix A: References for Nevada's New Economic Geography

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Appendix B: Timeline of Nevada COVID-19-Related Major Events

- March 11: WHO declares a pandemic.
- March 13: President Trump announces a national state of emergency.
- March 15: Governor Sisolak issues Directive closing schools and non-essential government facilities as well as ordering essential government services to transition to online and phone services to the greatest extent possible.
- March 18: Governor Sisolak issues Directive 002 closing nonessential businesses statewide, including Strip resorts.
- March 22: Governor Sisolak announces new COVID-19 response task force.
- March 24: Governor Sisolak issues Directive 007 limiting indoor and outdoor gatherings to 10 people.
- March 27: President Trump signs the CARES Act.[85]
- March 29: Governor Sisolak issues Directive 008, a statewide moratorium on residential and commercial evictions.
- April 1: Governor Sisolak issues Directive 010, extending previous orders as well as enacting a statewide stay-at-home order.
- April 1: Governor Sisolak issues Directive 012 activating the Nevada National Guard to assist with the state's response to the COVID-19 pandemic.
- April 4: Federal government approves Nevada's request for a major disaster declaration, paving the way for federal financial assistance.
- April 8: Governor Sisolak issues Directive 013, extending the statewide shutdown order to golf courses and religious establishments.
- April 21: Governor Sisolak announces framework for reopening the state, largely following White House guidelines.
- April 29: Governor Sisolak issues Directive 016 to extend the stay-at-home order while some certain restrictions lifted.
- April 30: Governor Sisolak releases "Nevada United Roadmap to Recovery" amid plan to reopen state economy under "Phase 1" restrictions.
- May 7: Governor Sisolak issues Directive 018 enacting Phase 1 of the economy reopening plans.
- May 11: Governor Sisolak declares a fiscal emergency.
- May 18: Interim Finance Committee transfers $401 M balance of rainy-day fund to the state general fund.[86]
- May 28: Governor Sisolak issues Directive 021 enacting Phase 2 of the economy reopening plans.
- June 10: Governor Sisolak issues Directive 023 to ease restrictions on youth sports and to empower local governments to increase restrictions to limit the spread of COVID-19 as they see necessary.
- June 22: State releases "Nevada COVID-19 Outbreak Management Strategy and Concept of Operations" to develop an operations surge strategy to prevent the spread of COVID-19.
- June 24: Governor Sisolak issues Directive 024 mandating the use of masks in public spaces.
- June 25: Governor Sisolak issues Directive 025 easing restrictions on evictions.
- July 8: Governor Sisolak convenes a special session of the Nevada Legislature to address the state budget.[87]

- July 10: Governor Sisolak issues Directive 027, which reverts bars that serve food in counties with elevated levels of disease transmission to Phase 1 and again shutters bars that do not serve food.
- July 21: Clark County School District announces most classes will be held online to start the fall 2020 semester.[88]
- July 28: Governor Sisolak issues Directive 028 to provide guidelines to county school districts on the reopening of schools.
- July 31: Governor Sisolak convenes a second special session of the Nevada Legislature to address several issues.[89]

Appendix C: Supplemental Tables

Table 5: Variables Used for RCG Economics' Analysis

Variable	Geography
Industry-Level GDP	Nevada
Taxable Retail Sales	Nevada, Clark County, Washoe County
Total Nonfarm Employment	Nevada, Las Vegas MSA, Reno-Sparks MSA
Unemployment Rate	Nevada, Las Vegas MSA, Reno-Sparks MSA
Unemployment Insurance Claims	Nevada
Visitor Volume	Nevada, Las Vegas MSA, Reno-Sparks MSA
Property Tax	Nevada, Local Government & School Districts
Room Tax	Nevada, Local Tourism, Clark County School District
Gaming Tax	Nevada, Clark County, Washoe County
Sales & Use Tax	Nevada, Clark County, Washoe County
Consolidated Tax	Nevada, Clark County, Washoe County
Modified Business Tax Collections	Nevada
Marijuana Tax Collections	Nevada

Table 6: Sample of U.S. States with Sovereign Wealth Funds and Their Characteristics.

State	Fund	Funding Source	Funding Purpose	Value
Texas	Permanent School Fund	Sale of public lands	Education	$46.5B (2019)
	Permanent University Fund	Rents on public lands Resource rents	Education	$24.0B (2020)
Alaska	Alaska Permanent Fund	Resource rents	Dividends for residents	$55B (2016)
New Mexico	New Mexico State Investment Council	Resource rents Tax revenue Appropriations	Education Health Infrastructure General fund	$23.6B (2018)
Wyoming	Wyoming Permanent / Endowment Funds	Resource rents Tax revenue Sale of public lands Rents on public lands Appropriations	Education Public institutions Worker compensation General fund	$22.7B (2020)
North Dakota	North Dakota Legacy Fund	Resource rents	General fund	$7.3B (2020)
Alabama	Alabama Trust Fund	Resource rents	Infrastructure Local government Land conservation Senior services General fund	$3.1B (2020)
Utah	State School Fund	Sale of public lands Rents on public lands Resource rents	Education	$2.3B (2020)

Oregon	Oregon Common School Fund	Sale of public lands Rents on public lands Resource rents	Education	$1.5B (2019)
Louisiana	Louisiana Education Quality Trust Fund	Resource rents	Education	$1.5B (2020)
Montana	Coal Severance Tax Trust Fund	Resource rents	Economic development Education General fund Infrastructure Land conservation	$1.1B (2020)
	Public School Trust	Sale of public lands Rents on public lands Resource rents	Education	$0.7B (2019)
West Virginia	West Virginia Future Fund	Resource rents	Education Workforce development Economic development Infrastructure	$0.1B (2019) (projected)
Idaho	Endowment Fund Investment Board	Sale of public lands Rents on public lands Resource rents	Education	$2.2B (2020)

Note:
The New Mexico State Investment Council is comprised of four sovereign wealth funds: Land Grant Permanent Fund (1912), Severance Tax Permanent Fund (1973), Tobacco Settlement Permanent Fund (2000), and Water Trust Fund (2006).

The Wyoming Permanent / Endowment Funds is comprised of eight investible funds: Permanent Wyoming Mineral Trust Fund, Permanent Lands Fund, Hathaway Scholarship Endowment Fund, Excellence in Higher Education Endowment Fund, Workers Compensation Fund, Legislative Stabilization Reserve Account, Pool A, and State Agency Pool.

Appendix D: Forecasted Impact of COVID-19 on Nevada State & Local Taxes

Property Tax

Regarding the tax estimates, because the distributions between the state and sub-state levels are stable, and in some cases (see *Methodology* section) calculated as a fixed share of the state-level revenues, the trends are very similar.

The Property Tax estimates show relatively small hits to total state and local collections, from about 1% to 5% based on the scenario compared to No-Pandemic. This appears reasonable based on the continued strength of the housing market nationally and in the state.

Table 7: Forecasted Change in Property Taxes in Q4 2021 Compared to Expected Property Taxes Under No-Pandemic Scenario (in Millions). Source: RCG Economics.

	Best Case	Most Likely	Worst Case
Nevada	-$40.4	-$76.6	-$140.3
Local Government & School Districts	-$38.2	-$72.4	-$132.8

Gaming Tax

As the Gaming Tax is heavily dependent on visitation, these revenues are highly vulnerable during the pandemic. Relative to the No-Pandemic case the Worst Case would see drops in Gaming Tax collections of up to almost 3.7% in 2021. The Most Likely scenario predicts a 2.0% drop and the Best Case a 1.1% drop.

Table 8: Forecasted Change in Gaming Taxes in Q4 2021 Compared to Expected Gaming Taxes Under No-Pandemic Scenario (in Millions). Source: RCG Economics.

	Best Case	Most Likely	Worst Case
Nevada	-$7.6	-$14.4	-$26.5
Clark County	-$6.5	-$12.4	-$22.7
Washoe County	-$0.6	-$1.1	-$2.0

Room Tax

Estimates on the Room Tax show potential drops of 3.2% to 11.0% relative to the No-Pandemic case in 2021. The Most Likely scenario suggests a 6.0% decline in collections compared to what they would have been had the pandemic not occurred.

Table 9: Forecasted Change in Room Taxes in Q4 2021 Compared to Expected Room Taxes Under No-Pandemic Scenario (in Millions). Source: RCG Economics.

	Best Case	Most Likely	Worst Case
Nevada	-$10.3	-$19.5	-$35.7
Clark County School District	-$3.2	-$6.0	-$11.0
Local Tourism	-$0.3	-$0.7	-$1.2

Sales & Use Tax (SUT)

The SUT revenues are estimated to experience hits of 2.8% (Best Case), 5.0% (Most Likely) and 8.7% (Worst Case) in 2021 relative to the No-Pandemic case. These would be significant impacts to state and local coffers as the SUT is the largest revenue generator. Additionally, it is possible that enhanced Unemployment Insurance (UI) benefits and the direct pandemic payouts are inflating the model outputs because they no longer benefit households. For this reason, these estimates may be overly optimistic in every scenario.

Table 10: Forecasted Change in Sales & Use Taxes in Q4 2021 Compared to Expected Sales & Use Taxes Under No-Pandemic Scenario (in Millions). Source: RCG Economics.

	Best Case	Most Likely	Worst Case
Nevada	-$156.5	-$276.7	-$485.1
Clark County	-$113.2	-$200.1	-$350.8
Washoe County	-$20.7	-$36.7	-$64.3

Consolidated Tax (CTX)

The same limitations that exist regarding the SUT apply to the CTX. Even with this possible overestimation, the CTX is still expected to experience declines in 2021 of 3.2% (Best Case), 16.0% (Most Likely) and 36.4% (Worst Case). It makes sense that these drops are greater in magnitude than for the SUT because CTX revenues are largely dependent on spending that is easier to cut out of a household's budget, like cigarettes and alcoholic beverages.

Table 11: Forecasted Change in Consolidated Taxes in Q4 2021 Compared to Expected Consolidated Taxes Under No-Pandemic Scenario (in Millions). Source: RCG Economics.

	Best Case	Most Likely	Worst Case
Nevada	-$18.8	-$95.4	-$217.0
Clark County	-$5.4	-$27.2	-$62.0
Washoe County	-$0.3	-$0.7	-$1.2

Modified Business Tax (MBT)

The MBT is a state-level payroll tax. With lower levels of employment, it is expected that these revenues would be diminished as well. According to the model results, these declines in 2021 relative to the No-Pandemic case would amount to about 4.8% in the Best Case, 9.0% in the Most Likely scenario and 16.0% in the Worst Case.

Table 12: Forecasted Change in Modified Business Tax in Q4 2021 Compared to Expected Modified Business Tax Under No-Pandemic Scenario (in Millions). Source: RCG Economics.

	Best Case	Most Likely	Worst Case
Modified Business Tax	-$36.1	-$67.7	-$120.1

Marijuana Taxes

The Marijuana Taxes, the last collections estimated under the model discussed below, are expected to take hits similar to those of the MBT (by coincidence). In the Best Case, we expect a drop of about 4.2% compared to the No-Pandemic case. In the Most Likely scenario, that drop would be about 8.0% percent while in the Worst Case we estimate a 14.5% drop.

Table 13: Forecasted Change in Nevada Marijuana Taxes in Q4 2021 Compared to Expected Nevada Marijuana Taxes Under No-Pandemic Scenario (in Millions). Source: RCG Economics.

	Best Case	Most Likely	Worst Case
Marijuana Tax	-$4.7	-$9.0	-$16.5

Appendix E: Economic Model Design

Modeling the economic situation relative to the pandemic is a difficult task. First, basic univariate methods are likely to fail because the pandemic presents an economic shift. Second, there are simply not enough data to forecast economic variables analytically in a multivariate model. There are several variables that are helpful to the model, but not enough post-pandemic observations to estimate the variables' coefficients with any certainty. Another complication is that psychological/behavioral and sociological effects are driving much of the response to the pandemic and associated economic outcomes. That makes it even more difficult to measure and predict. For this reason, RCG chose to take a less rigidly statistical approach to modeling economic outcomes relative to the pandemic. The model is based on applying what we think are reasonable assumptions, backed by data and the economic and medical literature, relative to certain drivers that shift a baseline level of GDP. The purpose of this section is to describe these assumptions based on the sources cited throughout the study.

The model that drives the study's results has been performed in a series of steps. The first step defines the scenarios based on certain driver variables. Those variables are driven by assumptions that underlie three scenarios. Next, these variables are used to drive decreases to a baseline GDP forecast that assumes the pandemic never occurred. Finally, the finalized GDP forecast has been used to forecast various indicators of interest.

Based on the information discussed below, three scenarios were created for the Nevada economic forecasts produced in the study, in addition to a hypothetical fourth "no-pandemic" scenario, the baseline GDP forecast. These scenarios should provide a reasonable range of economic outcomes to make more informed decisions relative to the Nevada economy over the course of the next several quarters. The scenarios are:

- No Pandemic
- Best Case
- Most Likely Case
- Worst Case

As the name suggests, the no-pandemic scenario assumes that the pandemic never occurred. The Worst-Case scenario reflects a pessimistic view of the economic effects stemming from COVID-19. The Most Likely scenario represents a most likely outcome, based on the research discussed, while the Best-Case scenario presents an optimistic view.

Basing this model on a baseline forecast that assumes that the pandemic did not occur carried the implied assumption that the structure of the post-pandemic economy changed only relative to factors directly caused by the pandemic. This means that if the economy returns to normal today (i.e., COVID-19 is cured and everybody returns to work), GDP will return to its pre-pandemic level and trend. This may not have been an ideal assumption but based on the economy's initial bounce back after the lockdown, it appears to be a reasonable assumption over the short term.

The forecast horizon of the study is from approximately Q2 2020 to Q4 2021, depending on when the most recent data have been released for each indicator.

GDP Model

No-Pandemic GDP Forecasts

As discussed above, to project inflation-adjusted ("real") GDP and other indicators into the future, RCG required a baseline real GDP forecast for the regional total. RCG has produced forecasts by sector as well, which is discussed below. These baseline forecasts, in 2012 dollars, estimated Nevada's real GDP assuming the Covid-19 pandemic had not occurred (see Figure III-19). These have been compared to the actual values of GDP that did occur in 2020. This has been done to later apply certain "change" factors to the baselines that arrive at the actual values thus far and then to project those "change" factors to forecast future GDP. The model includes natural economic growth because the baseline forecast is in real terms and captured the growth trend in the series since 2014.

The GDP data have been obtained from the Bureau of Economic Analysis (BEA). To produce the baseline GDP forecast, RCG has employed the Seasonal Autoregressive Integrated Moving Average (SARIMA) method.[90] A version of the Hyndman-Khandakar algorithm[91] is used to produce initial results and then several variations of the models were then run in order to choose a reasonable set of findings. These findings have been double-checked using several visual and analytical tests.[92]

Setting Up Scenarios

After estimating baseline, no-pandemic GDP, RCG continued estimating GDP under the three scenarios (Worst Case, Most Likely and Best Case). These scenarios have been developed based on the baseline GDP forecasts and three variables:

- Phase effects
- Self-isolation effects
- Unemployment insurance

The discussion below describes how the three factors have been used relative to the No-Pandemic GDP case to produce the results discussed in the previous section. It should be noted that there is also uncertainty around public policy options. Each potential new future policy will make it more difficult to model the impacts.

Length of Pandemic

Before discussing the three main effects, it is necessary to discuss the assumptions regarding the duration of the pandemic. We assume that both phasing and self-isolation will end based on the time to widespread vaccination or the time to herd immunity, whichever will occur first. According to Dr. Fauci, the economy will not return to normal—as it was before COVID-19—until there is a vaccine.[93] In terms of time to achieving herd immunity, it is too early to estimate when that might happen. Based on the studies discussed above, there is too much uncertainty in what share of the population has been infected already. Additionally, the concept of herd immunity may not apply to a novel virus. Per Dr. Michael Osterholm, an epidemiologist at the University of Minnesota, it is possible that neither natural disease nor vaccine provide long-term immunity. If this were to be the case, then COVID-19 could be around for decades and simply become something that humans must survive.[94] However, because this possibility lies outside of the time horizon of the study, it is not included in the model.

According to the New York Times, there were over 126 vaccines in development at the end of August.[95] However, even if a vaccine were ready today, it will take time to produce and distribute, although pre-purchased vaccines may help speed distribution.[96] Wealthy countries will likely horde doses to inoculate their populations before exporting vaccines.[97] In the case of the United States,

this will speed vaccination relative to poorer nations. Another possible problem is that the global supply chain may not be up to the task of quickly distributing a vaccine worldwide. This could be an issue if U.S. firms are unsuccessful in their efforts to develop a vaccine.[98] Still, in light of these variables, according to USA Today's pandemic science panel, a vaccine should reach widespread attainability by mid-2021. However, according to Science, only about 50% of Americans plan to get the vaccine when it becomes available, with another 25% still unsure.[99]

Relative to the research discussed, in the Worst-Case scenario, RCG has assumed that no vaccine will be discovered before 2022, resulting in a prolonged economic emergency. In the Most Likely scenario, widespread availability of a vaccine in July 2021 is assumed. In the Best-Case scenario, availability will occur in April 2021.

Phase Effects

Phase effects refer to negative modifiers to GDP that will be caused by government-mandated business lockdowns. These lockdowns shutter businesses and effectively halt economic activity. They appear to help limit the spread of COVID-19.[100] RCG produced a timeline of the phased lockdowns based on Governor Sisolak's state of emergency directives. The governor has since stated that he plans on moving away from a "phased" system of lockdowns.[101] However, because the phases in this model have been used as a vehicle to develop a rate of active jobs in Nevada, rather than directly employ the phases as variables, our methodology in this regard should be appropriate.

There have been five official phases of reopening described by the state government. We refer to these phases as: Phase 0, Phase 1, Phase 2, Phase 3, and Phase 4, ranging from lockdown to back-to-normal. These phases have been intended to be rolled out based on certain milestones relative to COVID-19 caseloads. However, the New York Times reported that few states that had planned to lift their lockdowns or had already done so by early May had met the White House guidelines for reopening.[102] Nevada was in this group, as are most states.[103]

RCG uses definitions herein for the lockdown phases' inactive jobs, by industry, from GOED. This information reflected which sectors' businesses could remain open during each phase. Phase 0 referred to a total lockdown. Only those businesses deemed "essential" could remain open. RCG employed the GOED definitions to estimate weighted averages for the share of active workers in each two-digit NAICS[104] industry. In Phase 0, businesses accounting for slightly more than 70% of workers could remain open.[105] In every successive phase, more businesses will likely be able to open. Phase 4 represented a "normal" economy—no mandated business closures, meaning after the pandemic has ended. Additionally, RCG added a sixth phase to the mix. Through the July 10, 2020 Directive 027, the Governor declared that bars and taverns not licensed to serve food may only offer pick-up and delivery service. RCG assumes that these establishments will not open at all based on this restriction and referred to this altered version of Phase 2 as Phase 1.5.

The following explanation provided a sample of the method employed relative to the phasing. In the case of Phase 0, there will likely be a significant dampening effect on GDP. About 30% of jobs will be potentially inactive during Phase 0 (this is a lower-bound for the share of active jobs because not all locked down businesses will potentially lay-off all their workers). Research has shown that every one percent decline in GDP correlates to about a one percentage-point increase in the unemployment rate.[106] Assuming that a one percentage-point increase in the unemployment rate roughly corresponds to a one percent decline in nonfarm jobs, there should be a 1:1 relationship between percent change in jobs and percent change in GDP.[107] However, because this represents a lower-bound and there is wiggle room in this particular analysis since RCG had to manually estimate

variable effects—an unavoidable drawback to the problem of a lack of data—we applied a 25% modifier to the 30% change in jobs to obtain the change in GDP. This has resulted in an approximately eight percent dampening effect relative to the no-pandemic forecasted GDP on days where Nevada was in Phase 0 lockdown. We have repeated this method for each phase and estimated a weighted average of this effect based on the number of days that each phase will potentially be in effect over the course of a quarter.

Following the steps above, RCG designed three scenarios for future phasing to correspond to the model's three scenarios (see Table III-2). The phase timelines concerning historical data have been produced based on the Governor's directive dates. The three scenario future timelines have been based on research discussed above. Reopening the economy will be an iterative process. In fact, large events, such as concerts, nightclubs, bars, and sporting events, may not reopen to the public until fall 2021.[108]

In the Worst-Case scenario, it is assumed that infections, hospitalizations, and deaths will surge in the fall through early spring, leading to another Phase 0 lockdown, then reopen to Phase 1.5, before reverting back to Phase 0 lockdowns in fall 2021, as the scenario assumes no vaccine prior to 2022. In the Most Likely scenario, it is assumed that there will be a minor surge of cases in the fall and winter of 2020, resulting in the state moving back into Phase 1. The state will likely return to Phase 2 in February. We assume that widespread vaccine availability will occur in July 2021 and, with it, a return to Phase 4. In the Best-Case scenario, it is assumed that the state will move to a Phase 3 reopening in December 2020, with widespread vaccination and Phase 4 following in April 2021.

Self-Isolation Effects

The second effect included in the model is the "self-isolation" effect. People are generally risk averse, which should lead to an increased propensity to shelter at home for many people, which is independent of government-mandated lockdowns. This self-isolation is most likely to lead to a reduction in spending that negatively affects GDP. In short, lockdowns take away the ability for people to participate in the economy, whereas, with self-isolation, people choose to limit their activity in the economy.[109] It is expected that over the course of the pandemic, self-isolation will likely pose the bigger cumulative threat to economic growth.

In calibrating the model, three timelines (one for each scenario) are assumed relative to the effects of self-isolation on the economy (see Table III-3). These dampening effects represent percentages of lost economic activity starting as of certain dates. For example, relative to the Most Likely scenario, RCG assumes a dampening effect of 0.1 starting in mid-March. The 0.1 effect refers to a 10% decline in GDP relative to the No-Pandemic baseline.

RCG has arrived at a dampening effect of 10% by trial and error. Based on the phasing effects discussed above and the effects of unemployment benefits discussed below, a 10% dampening effect due to self-isolation best fit the data, relative to Q1 2020.

There is a complication that could elongate this downward pressure on the economy. There is evidence suggesting that even if an effective vaccine were to be released in the middle of 2021, many people will decline vaccination. This is likely to cause the pandemic to go on longer than anticipated. A pair of recent polls, one by Pew Research[110] and one by the Associated Press,[111] show that approximately 50 percent of Americans definitely plan on getting vaccinated and about 75% say that they will probably get vaccinated. That is close to the currently assumed threshold of 70% that the Mayo Clinic has reported as necessary to stem the spread of the virus.[112] It is very possible that

due to low rates of vaccination, the virus continues to spread and to dampen economic growth due to continued self-isolation among vulnerable populations, particularly the elderly.

Additionally, any vaccine created is likely to produce less than 100% immunity. This could limit the severity of the disease but possibly not the spread. Dr. Drew Weissman of the University of Pennsylvania told Fortune that "if the best COVID-19 vaccine is only 50 percent effective, that's still to me a great vaccine."[113] While a 50%-effective vaccine will do much to stem COVID-19, the continuing transmission will likely lead to a lengthening in people's fear of the virus and, therefore, a longer-lasting propensity to self-isolate.

Based on the above, in the Worst-Case scenario, RCG assumes a 10% hit to GDP through September, then rising to 15% in the fall and lasting throughout the forecast horizon in this scenario. In the Most Likely scenario, we assume that this effect decreased to 7.5% in April but will then increase to 10 percent in October, before returning to 7.5% in the spring. It will then decline to five percent with the introduction of the vaccine in July 2021 through the remainder of the year. In the Best-Case scenario, RCG assumes that the self-isolation effect decreased to five percent in April and will go to one percent in July 2021 through the end of 2021.

In general, in the Worst-Case scenario, RCG assumes that self-isolation will increase due to heightened fears of venturing outside caused by hypothetically increased deaths in the fall. In the Most Likely scenario, RCG assumes a slight increase in self-isolation in the fall and winter due to a modest increase in deaths, but then returning to Summer 2020 levels. We also assume that some propensities to self-isolate will remain after widespread distribution of a vaccine because polls show that many people are not planning vaccinations right away. This will likely lead to lingering infections and, therefore, fear of infection. In the Best-Case scenario, we assume a small amount of lingering fear starting in the summer due to only small levels of continuing transmission of COVID-19 following an April vaccine.[114]

Unemployment Insurance

The third major variable in the model is unemployment insurance. With the large number of unemployed workers in the state, a significant portion of personal income comes from these payments. There are two components: state UI and federal UI. The federal UI is meant to enhance state UI benefits and hold households over during the pandemic.

To estimate these funds, RCG has collected data from the Nevada Department of Employment, Training and Rehabilitation (DETR) on the number of unemployment claims as well as the payment amounts. RCG then made various assumptions about the number of unemployed persons that will be receiving these benefits as well as the amounts they are likely to receive through the end of 2021. We assume there will be no change to the weekly historical claim payment, which was $369 per week in July 2020.[115] Again, there are three scenarios describing these outcomes. All dollar amounts are in 2020 dollars to match our GDP forecast.

First, RCG developed assumptions relative to the number of unemployed persons collecting UI benefits. Generally, we assume that the number of those receiving benefits will remain at the levels of the most current data, about 301,500 claims per month in the state.[116] This will continue until widespread distribution of a vaccine, at which time people should start finding employment again. This assumes that the labor market is in steady state as of July 2020. Then, because all of these levels are relative to a baseline GDP, it is necessary to subtract the standard unemployment benefits that will occur in normal times. We then assume that the number of those accepting UI benefits will decline linearly until reaching the levels estimated for the end of 2021 in the three scenarios (see

Table III-4). This assumes that the number of workers at the end of 2021 controls in part for the speed of the recovery. We also have assumed that people will go back to work when called in or upon finding a new job, which should happen in a timely manner despite receiving UI benefits.[117]

For the Worst-Case scenario, because RCG assumes that there will be no vaccine available before the end of 2021, total persons receiving UI benefits remained at their August level throughout the forecast horizon. In the Most Likely scenario, RCG assumes total UI claims will drop to 100,000 average monthly claimants by the end of 2021. This assumes that the state will regain about two-thirds of its jobs relative to August 2020, equivalent to approximately an eight or nine percent unemployment rate. In the Best Case, we assume that unemployment claims will return to 20,000 monthly claimants, approximately their pre-recession levels.

Relative to the amount of the UI benefits, RCG assumes that the state UI benefits will remain unchanged compared to what they had been in July 2020. For the federal enhanced UI benefits, which may have started for some as early as late March,[118] RCG used a different set of assumptions for each scenario (see Table III-5). In the Worst Case, we assume that gridlock in Washington, D.C. will continue to keep new enhanced benefits from taking effect.[119] Recent reports indicate that lawmakers may strike a deal in September or that they may not do so until the next Congress begins. To account for this uncertainty, RCG assumes a 50-50 split in the chances of each possibility and picked a date in the middle. We have also assumed that these enhanced funds will decrease to $200 per week in January with benefits coming to an end in June 2021. In the Best-Case scenario, we have assumed that enhanced benefits will resume at $600 per week on September 13, declining to $400 per week in January 2021 and continuing through the end of 2021.

Those UI benefits should also continue to benefit the economy through the "multiplier effect," which accounts for future spending of those same monies. To account for this effect, we applied a multiplier of 1.29, based on household-spending-induced effects in the most recent IMPLAN input-output[120] model for Clark County.

Model Limitations

The purpose of the model is to capture the major outcomes of various behaviors and policies to produce reasonable estimates of GDP through 2021. RCG believes that the model is successful in this respect. However, there are factors at play that are only implicitly included or, in some cases, left out altogether.

One major limitation of this model is discussed above. Because there are not enough data available, RCG estimates the outcomes of the model manually. At the time of writing, there is only one state-level data point collected relative to the pandemic. Therefore, there is more than one solution to the hypothetical econometric formula estimated.

In the case of federal stimulus stemming from the CARES Act, some policies are included implicitly, while others have explicitly not been included. For example, RCG did not include the $1,200 direct individual stimulus. Data on the personal saving rate show that saving in April spiked to an unprecedented 33.5%.[121] This suggests that households are aware of the possibility of dire financial outcomes over the course of the pandemic and are putting aside funds to hold them over if necessary. In fact, a recent Forbes analysis has found that as much as 40% of households are saving all the funds they received from the one-time payment.[122] Money saved today is money spent tomorrow, so to speak. Therefore, because RCG assumes that all UI benefits will be spent immediately, we chose to be conservative with respect to the stimulus checks and assume that none of it will be immediately spent. We think this is a reasonable assumption because in our Most Likely

and Best-Case scenarios, UI funds amount to far more than the stimulus checks and, there is still so little information available about how all of these funds have been used. This assumption linking UI to the stimulus should offset changes in the saving rate.

In the case of the Paycheck Protection Program ("PPP")—a program that dispenses loans meant to incentivize small businesses to keep their workers[123]—those funds have not been included in the model explicitly. However, because RCG used assumptions relative to the number of unemployed workers in the model, we did make implicit assumptions regarding the program.

There are several other provisions in the CARES Act. However, we assume that they will have relatively little effect on GDP. Furthermore, by definition, business-to-business transactions do not directly affect GDP.[124] Of course, these transactions do affect GDP indirectly. Still, we assume that there will be no major disruptions to business aside from those related to the pandemic.

Another limitation stemmed from lag effects caused by the economic crisis. For example, as spending declines, future revenues to the state and municipalities should decline as well. The secondary effects of these declines on future GDP is difficult to estimate in terms of both magnitude and timing and have not been included in the model.

The final major limitation is tourism, a major component of the Nevada economy, particularly Southern Nevada. The Great Recession showed that tourism demand in Las Vegas lags economic growth nationwide,[125] especially relative to California. Economic research suggests that is generally true for North America.[126] This lag effect is not included in the model explicitly, though it is considered relative to the model's final UI claim levels in Q4 2021.

GDP Forecast Results

As of this August, there was only one data point for state-level GDP available that included the pandemic with which to calibrate our model. For this reason, we have been able to obtain an estimate within a fraction of a percent of the actual Q1 2020 GDP estimate for Nevada. However, because our methodology is straightforward and contains two scenarios capturing the most extreme outcomes as well as a most likely scenario, we believe that the results provided herein represent a reasonable set of outcomes for Nevada GDP through 2021. Nevertheless, as more data come in, RCG could revisit the underlying assumptions and update the forecast. The Q2 2020 state-level GDP data are scheduled for release in early October 2020.[127]

Indicator Models

In addition to the forecast of real GDP, RCG has also produced projections for a set of economic and fiscal indicators for Nevada, the Las Vegas Metropolitan Statistical Area (MSA) and the Reno-Sparks MSA. In this section, RCG describes the data and methodology used to develop these additional forecasts. A number of metrics were used to develop these forecasts, including tax collection and unemployment statistics, among others. A full list of the used metrics and their corresponding geographic availability (i.e., state, local, or jurisdictional) is available in Appendix A.

RCG has employed a single method to forecast the indicators to maintain conformity and consistency across the measures.[128] RCG used the ARIMA with Exogenous Input ("ARIMAX") model.[129] This model forecasts an indicator based on its relationship with outside variables. In this case, RCG has used real GDP, as forecasted above, as the exogenous input.[130] We expect GDP to be a good explanatory variable because GDP is generally a function of various economic indicators. Therefore, it should move together with or inversely relative to those indicators. The model enables us to measure how

real GDP moves with each of the Indicators in the past, and then uses the real GDP forecast above to predict how the indicators should change over the forecast horizon.

In terms of the dates that have been analyzed and forecasted, a difference between this analysis and the above GDP forecast is that RCG forecasts the series starting with the most recent historical data rather than the last 2019 data point to improve forecasting results (i.e., fewer forecasted data points lead to more precision and accuracy).

A limitation of this model is that in certain cases, because of the extreme circumstances of the pandemic, economic data have been outside of typical ranges. With no historical data on these types of swings, the model may overweight or underweight these swings in some cases. However, this situation is unavoidable regardless of the model type and, furthermore, RCG is comfortable that the results are generally reasonable. A second limitation, that at times can compound with the previous limitation, is that because RCG used a single indicator as the exogenous input, the results of certain forecasts might not necessarily match the original assumptions.

Rather than run the model on each geographic subset, RCG has run the model on total Nevada revenues and uses the average share of the subsets relative to the state data since 2014 to calculate those series' values. This is reasonable to do because the shares do not change significantly over that time frame. For each indicator, we have produced results for the same four scenarios as for GDP. Data for the model have been aggregated annually for all tax indicators and quarterly for all economic indicators. GDP sector results have been reported in 2020 dollars. All other monies are reported on a nominal (non-inflation adjusted) basis.

The data for the indicators come from various sources. RCG has identified and used the sources that show the most complete accounting of each tax, even if those sources provide less detailed information at the sub-state level. We have done this to get the best estimates of total collections. State totals generally reflect total collections in the state rather than the state's share of a tax. All tax results are presented in fiscal years, while economic indicators are presented as quarterly.

Monthly data on employment and unemployment came from the Bureau of Labor Statistics.

Visitor data herein are sourced from the visitor and convention authorities of the Las Vegas and Reno-Sparks areas. We combined these to represent Nevada visitors. These monthly data do not account for total Nevada visitation, but cover about 90 percent. Data for Nevada visitation had not been updated in nearly a year and the Nevada Department of Tourism and Cultural Affairs has suggested basing our estimates on these updated regional aggregates.

RCG has also collected data on the Property Tax (also referred to as the "Ad Valorem Tax") and Room Tax from the Nevada Legislative Counsel Bureau ("NLCB"). The NLCB does not break down collections by geography. Instead, they show allocations to the major revenue recipients aggregated by type, so in the case of the Property Tax: Nevada and Local Government & School Districts. For the Room Tax, the breakdown includes Nevada, Local Tourism and CCSD.

Another tax series that has been collected is the Gaming Tax. Those annual data come from the Nevada Gaming Control Board and cover the state and largest counties. The data include gaming properties with annual revenues of at least $1 million, so it does not capture all of the tax revenues, but it does capture approximately 90 percent.

Taxable sales (monthly) modified business tax revenue (quarterly), marijuana taxes revenues (monthly), SUT (monthly) and CTX (monthly) data come from the Nevada Department of Taxation. Results are presented annually. Due to the way that many of these revenue sources are collected

and distributed, it is not feasible to separate them all by county. However, RCG has separated them locally to the extent practical. For taxable sales, we have produced forecasts for Clark and Washoe counties in addition to the state. The modified business tax ("MBT") is collected by the state and put into the state's general fund. Therefore, while counties and municipalities benefit, they do so based on the many formulas that are used to distribute those funds. Regarding marijuana revenues (derived from a retail excise tax and a wholesale excise tax), we have performed an analysis at the state level only. Sub-state data have only been published for one year at the time of writing and it is not feasible to run an analysis on so few data, particularly when there are not enough data to perform the state-level analysis, as discussed above.

The SUT and CTX data are provided herein for each county as well as the state. RCG has analyzed these for Nevada, Clark County and Washoe County. Both taxes are comprised of several components. The SUT includes the state sales tax, the Local School Support Tax ("LSST"), Supplemental City-County Relief Tax ("SCCRT"), Basic City-County Relief Tax ("BCCRT") and county-level option taxes. The CTX is comprised of the Liquor Tax, Cigarette Tax, Real Property Transfer Tax ("RPTT") and Government Services Tax ("GST"). RCG has summed the various taxes together for each geography to obtain the totals for the two taxes at each level. As a note, RPTT data are not broken down by county, so the county-level results do not include that tax. Certain SUTs are reported with CTX data. Those had to be separated. These data have been obtained from the Nevada Department of Taxation's ("Taxation") "Statistical" and "Consolidated Tax" reports and aggregated by fiscal year and region.

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129. As above, RCG has tested the model inputs and outputs for each indicator to ensure that the data are stationary, and the output residuals are not auto-correlated and are normally distributed.

130. "An exogenous variable is a factor in causal modeling or causal system whose value is independent from the states of other variables in the system." (From "The SAGE Encyclopedia of Social Science Research Methods," by Daniel Little, 2004.) While this assumption is not strictly true as GDP and employment affect each other, RCG believes it is a weak assumption over the forecast horizon.

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