

Economic Prosperity

WHITE PAPER

THE SAN DIEGO ASSOCIATION OF GOVERNMENTS

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Introduction

As the San Diego Association of Governments (SANDAG) develops regional policies and programs to guide transportation infrastructure investments over the next three decades, the vision for San Diego Forward: The 2019-2050 Regional Plan (2019 Regional Plan) is “to facilitate the efficient movement of people and goods to support a sustainable and healthy region, a vibrant economy, and an outstanding quality of life for all.” To help achieve that vision, the objective of this white paper is to help readers understand the complex interrelationship between the transportation system and the dynamic San Diego economy, and the role that SANDAG plays in both. In sum, it helps illuminate how transportation investments will help improve economic prosperity for the region. This white paper will provide some background for examining economic issues in the context of the 2019 Regional Plan, including background information and summary data on the current economy, a brief discussion of forecast trends, a description of interrelationships between economic prosperity and transportation and other Regional Plan topic areas, discussion of key economic considerations and policies to be included in the 2019 Regional Plan, and a description of the economic analysis to be conducted for the 2019 Regional Plan.

Economies are dynamic; they change, and change constantly. But the San Diego economic system always has been linked to our physical environment: the seaport brought the fishermen and the Navy; the Navy and the quality of life brought the high-tech sector; the proximity to the border enhanced international competitiveness; the beaches and weather brought the tourists. In turn, these industries helped shape the built environment of the region: the industrial waterfront, the military bases, the resorts, the convention center, the border crossings, and beach communities and cities. Overlaid on the local economic framework are factors outside local control. Globalization affects the structure of our economy, and national political decisions affect military and research expenditures and our relationship with Mexico.

The residents and policymakers of San Diego influence much of the region’s economy, particularly the decisions that shape the built environment in which the economy functions. As we have come to understand the natural world better, the concept of “habitat” for plants and animals has become familiar. In many ways the infrastructure of our cities and towns—the transportation system, downtowns, industrial areas, public spaces—act as the habitat for our business community. Different businesses, like different species, thrive in various built habitats. These habitats are shaped by cities, planning agencies, counties, states, and the federal government, using tools such as zoning, tax policy, transportation investment, and other means.

The 2019 Regional Plan presents an opportunity to shape our business habitat for the 21st century. Over the next thirty years, billions of dollars will be invested in the San Diego region to create, maintain, and improve transportation and other infrastructure. The 2019 Regional Plan will provide a framework for much of the transportation infrastructure that will help determine how the region will grow and evolve.

This Economic Prosperity White Paper will begin by surveying current economic conditions in San Diego and examining some important concepts in economic development. Next, it will explore the interrelationship between the economy, transportation, and regional planning, with consideration of disadvantaged communities (for the purposes of this paper, low-income populations¹), and the relationship between the economy and the environment. Lastly, this white paper will explore the

ways the 2019 Regional Plan might influence the regional economy, including a brief discussion of funding sources and opportunities.

Current Economic Conditions in San Diego

Existing Setting

The San Diego region is in an enviable economic position. The population of San Diego is younger, better-educated, and earns more than the national average. Average age is about 35.7, versus 37.9 for the U.S. as a whole; a higher percentage of San Diegans have Bachelor's degrees, Master's degrees, professional degrees, and PhDs than the U.S. generally; and median household income is over \$70,000, which is \$12,000 higher than the U.S. median.² San Diego's unemployment rate trends slightly lower than the national average, but our economy is diversified with sizable high-tech, education, health, military, and tourism sectors. The region also boasts a high quality of life, with excellent weather and one of the shortest average commute times of any major metro area in the U.S.³ San Diego also has a diverse and multi-cultural population, and the busiest land border crossing in the world connecting it to an important economic partner – Baja California, Mexico.

Of course, the San Diego region also has its share of challenges, among them the high cost of living—particularly housing—compared to prevailing wages, as well as wait times at the border that are estimated to cost the region billions annually in lost output.⁴ San Diego has an “hourglass economy” with many higher-paying jobs and many lower-paying jobs and relatively few in between; this type of divergence has been found in the national economy as well.

San Diego also is changing demographically. The region is forecast to get older, and more ethnically diverse, with the white population expected to go from roughly half of San Diego today to less than a third by 2050. By 2050, the region is expected to add almost 700,000 residents, almost half a million new jobs, and a nearly third of a million new housing units. Population growth primarily will consist of natural increase (i.e., births outnumbering deaths) and international immigration.⁵

History of the San Diego Economy

Once characterized as a sleepy Navy town, later as a tourist destination, San Diego's economy has diversified and matured over the last 75 years as the population has increased from under 300,000 to over 3.3 million residents. Before World War II, 70 percent of jobs in the local economy were in traditional sectors such as military, manufacturing, construction, finance, and retail and wholesale trade; today this figure is less than 50 percent. In 1940, The military accounted for about 20 percent of the region's employment. This figure ballooned to nearly half during the early 1950s and remained prominent throughout the Cold War.

The 1960s brought the emergence of the tourism and hospitality industry, the opening of the University of California, San Diego (UC San Diego), which became a key economic engine, and the approval of maquiladoras in Mexico, which allowed U.S. firms access to low-cost manufacturing. By the 1980s, tourism was booming, and the nascent life sciences sector was beginning to take root. Base Realignment and Closure shuttered the Naval Training Center in the early 1990s and helped reduce jobs in the military sector to today's 9 percent despite a steady military presence. The 2000s brought the dot-com bust, the September 11 attacks, and the Great Recession.

San Diego Economy Today

Today, San Diego boasts an economy that is not dominated by any one sector; in fact, no sector accounts for more than 15 percent of the regional economy. Several sectors are “economic drivers,” specifically tourism, the military, and the “innovation” sector, which together make up a third of the regional economy. Tourism is an obvious strength, due in part to the weather, the beaches, the San Diego Zoo, and the Convention Center. The military is pivoting toward Asia and has committed to San Diego, as have many military contractors, like General Dynamics (makers of the Predator drone) and ViaSat (satellite communications leaders). Moreover, innovation will continue to drive San Diego’s economy, with forward-looking technologies with massive growth potential from companies like QUALCOMM (pioneers in mobile phone technology), Illumina (revolutionized DNA sequencing with tremendous potential to improve healthcare and quality of life), and ESET (cybersecurity experts).

SAN DIEGO 2018: Diverse Economic Base

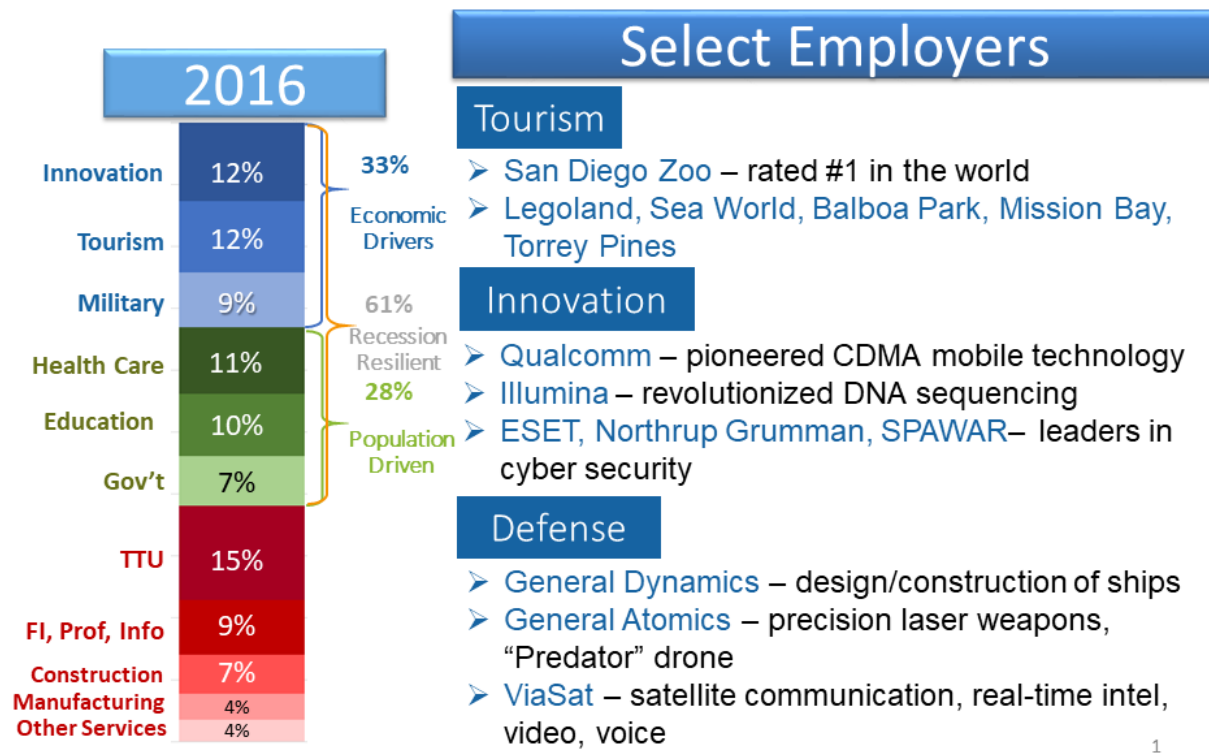


Figure 1

San Diego also fares well in industries like healthcare, education, and a lean government sector. These sectors are generally population-driven—they rise in tandem with population—and, like the economic driver sectors, have proven through the Great Recession to be less affected by economic cycles. In sum, “recession-resilient” sectors account for over 60 percent of the San Diego economy.

As mentioned, the San Diego economy is balanced and not reliant on any one industry, with no single sector accounting for more than 15 percent of regional employment. The diverse distribution of

employment helps buffer San Diego from economic downturns, with 60 percent of regional employment in recession-resilient sectors (i.e., sectors less impacted by national business cycles). The military and tourism provide a stable and diverse employment base, but the economy also is well-positioned for the 21st century, fueled by the next wave of business drivers, our innovation sector, which includes biotech and biomedical, information technology, cleantech, and aerospace jobs.

SAN DIEGO REGIONAL EMPLOYMENT BY SECTOR

2007 Peak, 2010 Trough, 2015 Recovery



Figure 2

Much of San Diego’s forward-looking economy can be traced back to our higher learning institutions and research facilities, like the Salk Institute, Scripps Institute of Oceanography, San Diego State University, the University of San Diego, California State University San Marcos, and UC San Diego. 19 institutions of higher education enroll 270,000 students in the region. UC San Diego specifically is a highly ranked research university that has spawned hundreds of businesses, many of which remain important local employers, and which together employ about 4 percent of San Diego workers. Moreover, UC San Diego’s commitment to generating economic opportunity is evident through their business-friendly approach to licensing technologies to new startup companies that simplifies the transfer of copyrights and licenses for a minimal equity in the company.

Incubated by world-class research institutions, San Diego’s Innovation sector has grown considerably over the last 25 years, posting a growth rate ten times that of the rest of the economy. It now represents nearly 12 percent of San Diego’s local economy and employs almost 170,000 people in high-paying jobs. The innovation sector also is diverse, featuring information and communication technology, biotechnology and biomedical, aerospace and navigation, and “cleantech.” San Diego is the third most patent-intensive region in the U.S., the top destination for National Institutes of Health research funding, first in life-sciences laboratory space, and the number one place in the U.S. to launch a start-up.

As noted, San Diego has a long and successful relationship with the military. San Diego's economy will benefit from the decision, dubbed the "Pacific Pivot," to reallocate 60 percent of military assets to the west coast over the next decade. During the next few years, 50 percent more ships will be berthed in San Diego, and billions of dollars will be invested by the Navy in infrastructure like the Navy Seal training facility. The presence of the military attracts \$8.4 billion in government contracts each year, and 125,000 San Diegans (approximately 1 in 11) are directly employed by the military or the Department of Defense. Many of these jobs are highly skilled, and all generate indirect employment effects in many other sectors throughout the economy. With a large deepwater port, a dozen military installations, and a well-developed support economy, San Diego is an irreproducible ecosystem for the military.

Many people's first association with San Diego is as a tourism destination, and in large part, they are correct. San Diego is routinely listed as the number one domestic travel destination (e.g., in Money Magazine's 2016 assessment). As a result, San Diego's hospitality sector grew four times as fast as its overall economy during the past 27 years. Nearly 35 million visitors come to San Diego annually, bringing almost \$10 billion into the regional economy. While tourism jobs pay slightly less than the average, they provide ample entry-level employment.

San Diego is home to the largest land crossing in the western hemisphere, and the economic impact is significant. Over the past decade (2008 to 2017), the value of trade through the border has risen by nearly a third.⁶ The maquiladoras provide highly skilled workers in technologically advanced factories where costs can be a fraction of what they would be in the United States; many San Diego companies rely on this access to high-quality manufacturing.

The diverse and robust San Diego economy has resulted in strong job growth and low unemployment for San Diegans and a regional economy that is less susceptible to traditional business cycles. San Diego's unemployment rate stands, as of December 2017, at an exceptionally low 3.3 percent, lower than both California (4.3%) and the U.S. as a whole (4.1%).

The San Diego region is in the midst of a reassessment of past housing and development practices. In prior eras, it was assumed that housing would continue to spread east into the back-country; but jurisdictions throughout the county have responded to residents' concerns about sprawl and adjusted their general plans to concentrate growth in existing communities. Beneficially, much of the recent development has been in multi-family housing in downtown areas, which generally are less expensive and are attractive to younger, high-skill workers (and some senior buyers) who prefer active, vibrant communities. As open land acceptable for residential development is in short supply, demand continues to outstrip the pace of building, and while San Diego housing costs are less than those of comparable coastal metropolitan areas, prices and rents are higher than California or the U.S. as whole and represent a challenge to additional economic growth and to the economic well-being of many residents. For example, it is estimated that only about a quarter of the San Diego households can afford a median-priced home, despite historically low mortgage interest rates.

The San Diego economy is healthy, but it is tethered to the global, national, and state economies. Globally, the economies of both advanced and emerging nations have begun to retain momentum. According to the Organisation for Economic Co-operation and Development, global growth looks to be in the 3.7 percent range in 2018, which is improvement over previous years. Nationally, growth continues at a slow and steady pace, with the Federal Open Market Committee revising their growth forecast for 2018 up to 2.5 percent, and with the national economy seemingly shrugging off political

tensions. Wage growth also has begun to move forward after a decade of stasis. In California, the economy continues to overcome challenges, with significant growth in the high-tech, healthcare, and tourism sectors more than offsetting lagging sectors.

As the economy improves, the gains are not shared equally. While 130,000 new jobs were created in San Diego from 2010 to 2015, the average salary of new jobs was well below the average salary for existing jobs, which decreased the average salary in the region. The healthcare sector is a prime example of this phenomenon; while almost 25,000 new jobs were created from 2010 to 2015, they were not primarily highly paid doctors and registered nurses, but home health aides and aides in residential facilities. The average salary in that sector fell from \$56,000 to \$42,000. Real hourly wages (hourly wages that have been adjusted for inflation) have been flat in San Diego for a decade, while costs, primarily housing costs, have risen precipitously. This stagnation produces circumstances where despite an economy with low unemployment and generally excellent health, many San Diego residents are not able to participate in the prosperity. In the long run, this divide can threaten the city's well-being if San Diego ceases to be an attractive place to live compared with cheaper areas and those with lower incomes see their opportunities dwindle and their economic potential go unfulfilled.

While analysis of the San Diego regional economy is revealing, it is important to note that the San Diego region is diverse and physically large, with 3.3 million residents, 18 municipalities and the County of San Diego, 17 Native American Tribes, a metropolitan area that shares an international boundary with Mexico, with military bases spanning north, central, and southern San Diego, and an area with an abundance of endangered species and sensitive habitat lands. The policies and economic issues that guide Downtown San Diego, for example, differ from those most relevant to the rural east or the beach communities. North County has different challenges than South County and the border area, and the Tribes have unique economic and cultural concerns.

Economic Development Partners

While SANDAG has many responsibilities as the Metropolitan Planning Organization, its primary responsibilities are in regional transportation planning. SANDAG influences local land use and economic policies through regional transportation investments in transit, highways, bike infrastructure, freight corridors, transportation demand management, transportation system management, and supporting programs, and through financial incentives such as grants from the *TransNet* Smart Growth Incentive Program, Active Transportation Grant Program, and Environmental Mitigation Program. SANDAG also influences land use and economic policies through technical assistance via the Smart Growth Toolbox and through localized and customized modeling and forecasting work. As a regional agency, SANDAG is uniquely positioned to bring together decision makers from all areas of the region to discuss issues of mutual concern and coordination.

In both economic research and policy, SANDAG collaborates with a variety of partners, including regional economic development corporations, chambers of commerce, municipal economic development departments, partners in Baja California, Tribal nations, and neighboring counties to strengthen the economy of the region. In addition, many of these groups, as well as local universities, work to understand the structure of the San Diego regional economy and explore ways to improve. The strategy is not about creating a specific economic plan, but about collaboration between stakeholders. These organizations research the region's economic strengths and shortcomings and identify the tools needed to reshape the economy; they also conduct economic studies such as

industry cluster and sector analyses, cross-border and export trade reports, infrastructure plans, and workforce and job training programs.

The San Diego Regional Economic Development Corporation (EDC) enhances regional economic competitiveness and supports the San Diego region's key industries, with policy priorities to improve the region's emerging industries, workforce, infrastructure, transportation, housing, and access to capital. Recent initiatives include a regional strategy to protect and grow San Diego's defense assets; a plan to boost San Diego's international profile; and a program focused on attracting and retaining top talent. The San Diego Regional EDC also works with other regional and local organizations to support research initiatives, including studies on the region's key industries, such as genomics.⁷

The San Diego Workforce Partnership (SDWP) funds job training programs to meet the region's demand for qualified workers, and researches the local labor market to identify goals and strategies designed to meet the needs of both employers and workers in San Diego County. The SDWP recently focused on "priority sectors" where employers need workers and on the roughly 43,000 "opportunity youth" in San Diego—young people between the ages of 16 and 24 who are neither working or in school.

The San Diego Regional Chamber of Commerce coordinates with other regional and local agencies on economic development and business policies, and produces and is a hub for business collaboration. The sub-regional EDCs initiate economic development plans, programs, and policies that build on regional initiatives. The South County Economic Development Council promotes economic development and investment in the southern part of the county, and encourages cooperation with businesses in Baja California. The East County EDC works to strengthen the economic base in the eastern part of the county. Likewise, the San Diego North Economic Development Council works in the northern part of the county to support the business community there. All sub-regional EDCs support localized cluster and sector studies as well as targeted business outreach to those clusters and sectors that support regional and sub-regional growth.

Although most municipal economic development organizations focus on local and site-specific strategies, many of their plans and policies align with regional plans and initiatives. For example, the City of San Diego recently administered the Business Improvement District program to promote local business. The City also operates Civic San Diego, a non-profit that focuses on economic development in underserved neighborhoods.

Emerging Concepts

For much of the last two decades, research in regional planning economics has focused on the effects of "smart growth" (sustainable development), specifically focusing on trends that have reinvigorated the centers of many American cities and metropolitan areas and creating new development in communities and neighborhoods of all sizes. Smart growth is of particular relevance to the urbanized areas of the San Diego region, which grew outward during the era in which automobile transportation was the most accessible option; local jurisdictions are seeking to redevelop many neighborhoods to accommodate population growth.

New research focuses on inequality and housing. By and large, the trends creating compact communities of mixed-use development served by public transit and allowing for active transportation such as walking and cycling are positive for the economy, potentially reducing environmental, transportation, and health costs while creating economic choice and a quality of life

that is attractive, especially to younger, high-skill workers.⁸ While this type of growth can occur without significant additional traffic congestion, there are important limits to this type of development in many places, including in San Diego. First, as the dense centers of cities become more attractive, they become more expensive; this has led to skyrocketing housing costs even in the wake of a significant residential construction boom in denser areas of San Diego. The increase in housing costs can push poorer residents away from areas serviced by transit options that lower-income residents often rely on. There is evidence that lower-income residents are switching to private vehicles as they move further from city centers.⁹ Second, the San Diego region has a highly dispersed development pattern, with a general lack of density. While the redevelopment of urban centers is positive, the region does not have either the strong central business district or the profusion of compact neighborhoods that make transit and other alternative modes a viable option for the majority of residents.¹⁰

SANDAG conducted an analysis of the region’s commuting patterns,¹¹ and the results clearly show the dispersed nature of residents’ travel patterns. 71 percent of residents commute to work outside of the jurisdiction in which they live. Similar results are true for businesses: the vast majority of their employees tend to come from outside the jurisdiction. As an example, the maps below show the place of work for employed Carlsbad residents (Figure 3), and where employees of Carlsbad businesses live (Figure 4). People live and work in highly diffused patterns—the pattern is clear and holds true for all jurisdictions in San Diego, which makes transit and active transportation challenging.

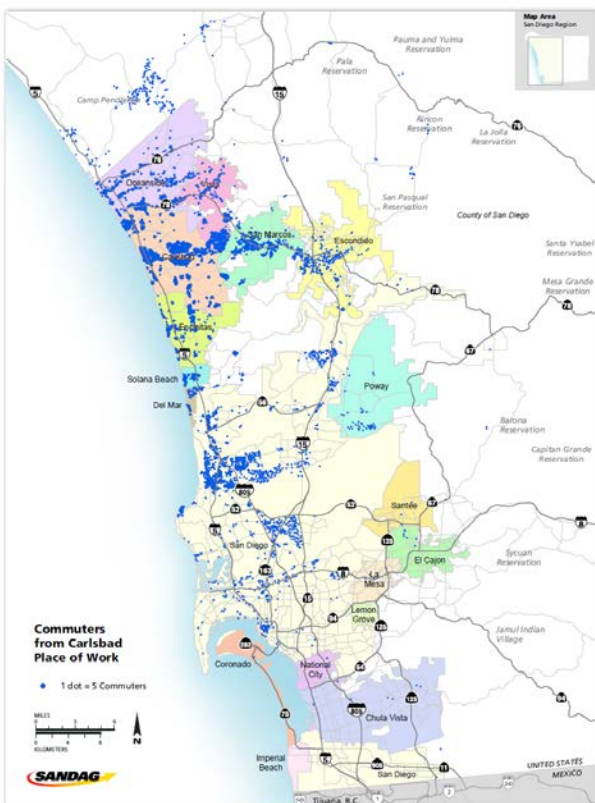


Figure 3

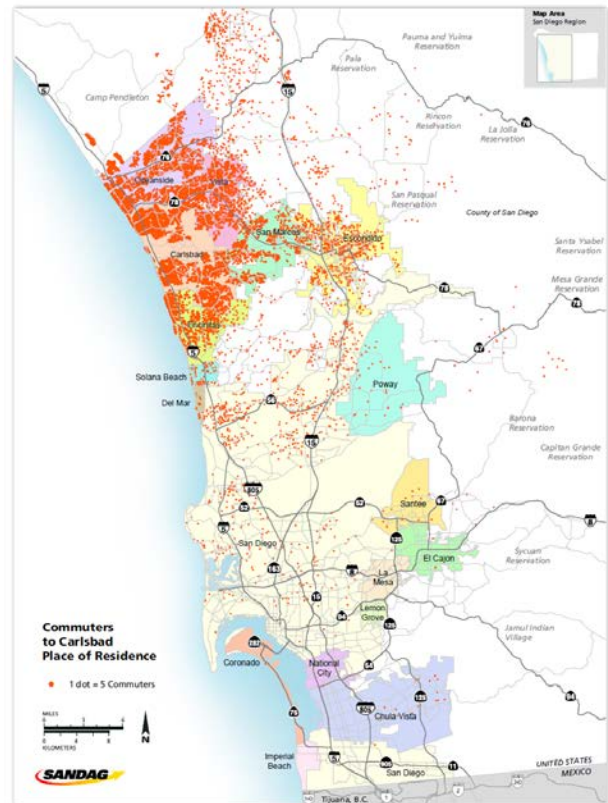


Figure 4

While the development trends of the last 70 years, suburbanization followed by re-emergence of city cores and denser development, offer some insights into how San Diego will continue to change,

emerging transportation technologies will play an increasing role in the transportation system, and will both respond to and help shape San Diego's development pattern, as well as the structure of the economy. Considerable uncertainty surrounds these technologies. Ridesharing services like Uber and Lyft could benefit transit by providing "last mile" solutions, or they could poach riders. Autonomous and connected vehicles could reduce traffic congestion by increasing efficiency, or could exacerbate it by encouraging people to live even further from work and amenities. Technologies to improve telecommuting could finally allow working from home to become common, as has been predicted for decades. Online shopping could reduce the need for personal trips, or could clog the roads with delivery vehicles. Intelligent transportation policy and infrastructure responses to the opportunities and challenges of these emerging technologies will be critical to ensure that the advantages outweigh the disadvantages.

The key point is that development patterns have economic consequences on housing prices, municipal revenues, business location decisions, and residential and employment opportunities. Development patterns also influence transportation options, which have economic consequences, such as the relative costs and benefits of highways and transit, accessibility of jobs and residential areas, traffic congestion and time consumed in commuting, health effects of transportation modes, and business development. Spatial patterns and associated transportation systems also have environmental impacts that have economic ramifications, such as the costs of pollution generated by differing transportation modes, and open-space and habitat-conservation needs. The effects of these patterns should be analyzed so that municipalities and economic development professionals can have the best information available to make complex decisions that affect land use and transportation investments.

By 2050, SANDAG forecasts that there will be roughly 700,000 more residents of San Diego County, nearly half a million new jobs, and almost a third of a million new housing units.¹² These growth numbers are substantially lower than previous estimates, and depend less on an influx of new residents, and more on natural increase (i.e., births outnumbering deaths of current residents). How these additional people, jobs, and houses fit into San Diego will determine the physical shape of the region, the transportation system, and the economy.

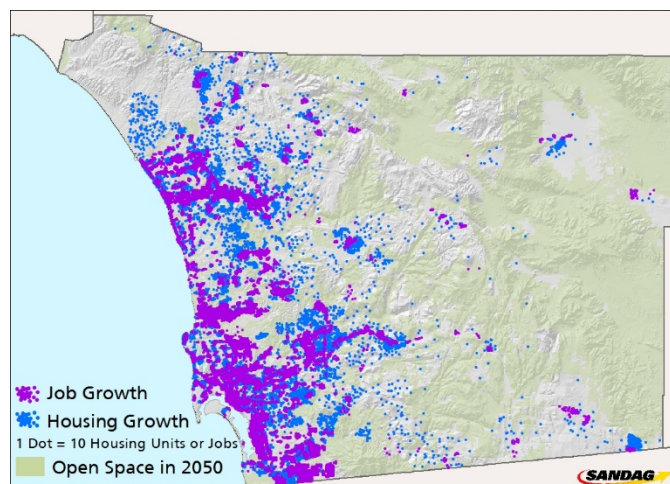


Figure 5

Local general plans have been modified significantly over the last decade to accommodate growth within the most urbanized areas of the region where there is existing and planned public transit. These changes in local plans support and reinforce investments in transportation and housing options

for the region's residents. Figure 5 shows expected job and housing growth to 2050 with job growth in purple and housing growth in blue, showing that the vast majority of development will occur within the already developed footprint.

A key question of the San Diego regional economy in the coming years is: will we successfully invest in transportation to connect the population in San Diego with an adequate supply of well-paying jobs for which they are prepared, and to an adequate supply of housing they can afford?

Interrelationships

How Transportation and Regional Planning Can Influence the San Diego Economy

As noted, the infrastructure of a region, including the transportation infrastructure, forms part of the economic "habitat" in which businesses engage in their fight for survival. As different animal and plant species thrive in different conditions, so do different businesses require a variety of conditions. As thriving ecosystems that support many types of adaptable species are more resilient and rich in a biological sense, diversified economies like San Diego's also are likely to be resilient and prosperous.

In economic terms, public infrastructure is a "public good" in that it loosely meets the definition of being both non-excludable (i.e., difficult to prevent people from using) and non-rivalrous (i.e., one person's use of the good does not inhibit another's). In economic theory, the private market does not provide optimal levels of public goods, and the common solution for this market failure is government provision of the good. As governments seek to make sound investments in provision of public goods, they must weigh competing projects and the expected rates of return (which are difficult to measure in this context) and gauge the optimal level of the resource overall, as businesses do.

The transportation system acts as the economic circulatory system, allowing businesses to access raw materials, ship finished goods, and reach customers and providing a way for employees to get from home to work. A healthy economy requires a healthy circulatory system, and the San Diego region is fortunate to have a system that includes robust freeways and arterials, multiple airports, a seaport, expanding bikeways and active transportation options, a growing transit system, and shared-use mobility services. This transportation system includes connection to Mexico, a critical trading partner, as well as to the surrounding counties and 17 Native American Tribes.

The transportation system does not simply support the economic activity in a region: transportation (and related land-use decisions) influence the economy. To explore these interrelationships, it is instructive to explore patterns of employment and housing in the San Diego region, the economic activity that transportation and land use decisions generate, and the challenges and opportunities facing them.

Many of San Diego's economic sectors are physically clustered in "employment centers," which allow opportunities to develop a more-compact development pattern. Using analysis of travel patterns, regional agencies can plan for improved transportation options, such as the in-progress Mid-Coast Trolley line.

Suburban job centers like Sorrento Valley-Torrey Mesa and Kearny Mesa are major residential and commercial/light industrial areas for which significant jobs and housing growth is likely. Oftentimes, however, areas such as these already see significant traffic delays as they have been designed in largely car-oriented ways. The challenge is to accommodate economic growth and improve traffic, with additional transit and active transportation options. New transportation options can be enhanced by Transit-Oriented Development, which is specifically designed to take maximum advantage of the transit. However, while these are areas of dense employment, retrofitting these areas for provision of transit and active transportation infrastructure is both expensive and challenging, and will only be accomplished over the long term and with consistent effort.

EMPLOYMENT CENTERS:
25%, 50% AND 75% OF TOTAL EMPLOYMENT

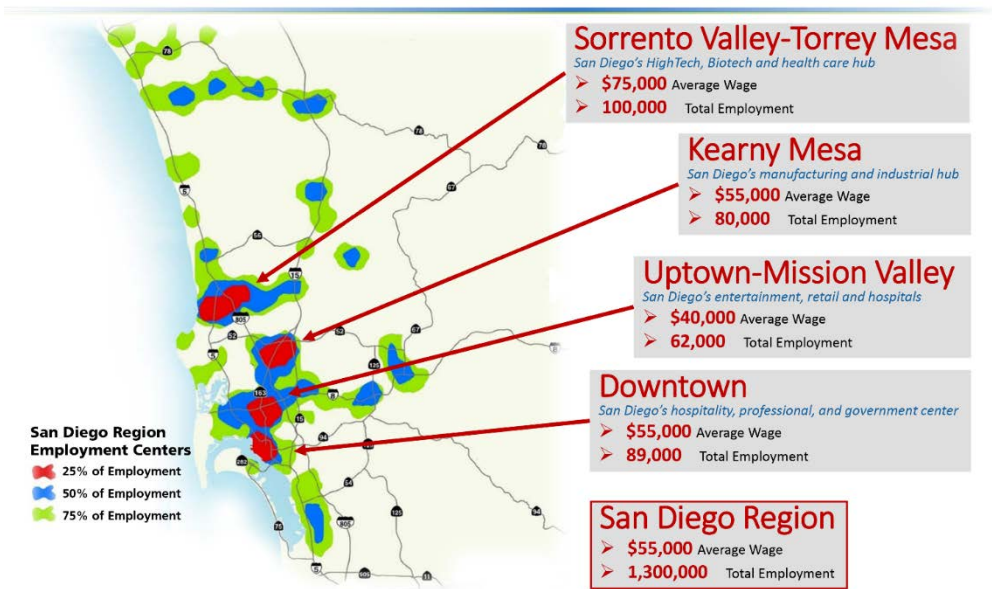


Figure 6

Areas with significant development potential are likely to experience significant increases in intensity of use, whether residential, commercial, or industrial. Areas like these, which often are somewhat distant from the urban core, offer lower land costs and can become employment centers and home to a greater number of residents. The critical issues in areas such as these are creation of transportation infrastructure that fits a variety of needs and balancing plans for industry, new residents, protection of the natural environment, and the needs of current residents. Otay Mesa, for example, is a rapidly developing area in the southern portion of the City of San Diego, for which variety of transit and highway projects, including a new border crossing, are proposed. Eastern Chula Vista is another example of a rapidly growing area of this type.

Redeveloping core neighborhoods, both in large cities and smaller jurisdictions, are primed to absorb a large chunk of the residential and job growth. These areas often are well-served by transit and highways, both existing and planned, and are attractive to residents that desire compact, walkable communities and minimal commuting hassle. Significant economic development, both small (e.g., shops and bistros) and large (e.g., office buildings and regional attractions such as art centers), characterize such areas, and the challenges of development in these areas often are tied to the

difficulty of permitting and financing in often-crowded city areas and in assessing the needs of existing residents and neighboring communities. The East Village section of the City of San Diego, located just east of Downtown San Diego and the Gaslamp Quarter, is an example of this type of area, with many new residential and mixed-use buildings. The Downtown Specific Plan for the City of Escondido, with its vision of “a dynamic, attractive, economically vital city center providing social, cultural, economic, and residential focus” is another example.

Different areas in the San Diego region clearly have different economic needs, goals, and outlooks. The challenge to the region is to plan for a transportation system that facilitates all types of economic development.

Transit allows for density of activity because the large physical space needs of automobiles can be reduced. Transit also allows access to jobs for people who cannot or prefer not to drive: the young, the elderly, and increasingly, professionals attracted to urban-style living. Shared-use mobility services also can supplement transit by improving access to transit. The challenge is to provide transit options in less-dense areas that still are effective and cost-efficient.

The **highways and road network** must be maintained, expanded, and optimized. The road system will continue to be the main mover of people and goods. Given spatial constraints, highway projects will involve more efficient use of limited space, through the construction of “Managed Lanes,” through the implementation of advanced technologies, or both. The local road system will need to be designed to optimize traffic flow while accommodating distinct types of business development.

While highways and regional arterial roads are critical to economic needs like goods movement and general measures of accessibility, local and neighborhood-level economic development may depend less on maximizing traffic flow and more on creating and maintaining attractive public spaces. The development of thriving mixed-use areas will require a careful analysis of how to best spend public funds on physical infrastructure.

Encouraging and building infrastructure for **active transportation**, such as walking and cycling, has several benefits. Active transportation can reduce congestion on roads, have a positive effect on public health and associated costs, and help develop neighborhoods. In addition, active transportation provides options and connections to transit for residents that lack automobiles. In this way, active transportation can complement and improve other transit investments.

The San Diego region is home to 12 **airports** that can serve as regional or local economic development generators, though only two are certified by the Federal Aviation Administration for commercial service, and all have physical limitations. The economics of air travel are not generally under local control, and smaller airports have seen airline traffic cuts, but airports will continue to be essential economic hubs, especially for tourism-heavy San Diego. A cross-border facility that links the Otay Mesa area and Tijuana International Airport opened in 2015.

While 98 percent of freight movement in the San Diego region is by truck, the **Port of San Diego** and the **rail system** plan to improve to meet growing demand for freight in an increasingly international economy. At the same time, both are up against significant physical restraints. The importance of trade in providing high-wage jobs that bring investment and revenue from outside of the region means that it is critical to continue to improve the connections of the region to both the southern California “megaregion” and the global economy.

Transportation and land-use decisions can influence economic growth, and can be considered an economic development tool. There is evidence that the physical “clustering” of types of businesses can have positive effects on growth, innovation, and entrepreneurship.^{13,14} The life sciences and brewing industries in San Diego provide ready evidence of this effect. If, for example, the San Diego region wants to be a high-tech hub, it must encourage the type of atmosphere that tech firms seek. Economic activity such as retail, manufacturing, freight movement, and residential construction require optimal transportation and land-use habitats as well. Businesses depend on roadways, rails, and ports, but they also depend on sidewalks and parks to attract customers and employees and on the educational system to produce viable employees and educated customers. The economic effects of public investment—including environmental effects, public health effects, social effects, and others in our interconnected economic system—must be considered properly in an economic sense for policymakers to make effective decisions.

To help measure the economic effects of the 2019 Regional Plan, SANDAG is preparing an economic analysis with two primary areas of focus. The first is a Benefit-Cost analysis to measure, using the innovative tool developed for the 2015 Regional Plan, the economic effect of the transportation improvements planned. Such benefits will include travel-time savings, safety improvements, emissions reductions, health effects, and auto-ownership costs, and are directly calculated from the output of the SANDAG Activity-Based Travel Model. In 2015, this analysis showed that for every \$1 invested in the Regional Plan, almost \$2 of benefits to society were created. The second facet will be an expanded economic impact measure. Traditional economic impact measures focus on the economic stimulus achieved by the construction and operations expenditures, and the SANDAG analysis will include this focus, but also will explore how the increased efficiency of the transportation system translates into increased economic activity by reducing transportation costs for businesses and individuals. A similar analysis in the 2015 Regional Plan showed that these cost reductions would mean tens of thousands of new jobs in the region by 2050 versus a “no-build” scenario. In addition, the analysis will present a detailed look at the regional economy and how the region can maintain its health and diversity. While there are limitations to any economic analysis, the goal of this economic analysis is to present information that will help inform and influence the choices the region will make over the next 30 years.

Equity Concerns from an Economic Perspective

The critical issue for economic vulnerable populations¹⁵ that the 2019 Regional Plan can address is access. Low-income residents in areas without adequate public transit often must spend disproportionate amounts of time and money to access education, jobs, and recreation. A key strategy to address the plight of low-income residents is to improve transportation options. Access is equally important to employers who want to draw from a wide pool of potential employees of varying skill levels. Failing to encourage the economic integration of low-income populations today can have generational impacts and reduce economic mobility in the long run.¹⁶ The importance of transportation options to the economically disadvantaged is difficult to overstate; without access to transportation, it is extremely difficult for individuals living in poverty to improve their economic prospects, as the cost of owning a private vehicle are often prohibitive. With investment in better transportation options, economic opportunity is increased, and these communities can thrive.

While the mandated social equity analysis of the economic impacts of the 2019 Regional Plan has yet to be conducted, the analysis for the 2015 Regional Plan showed that lower-income residents benefitted slightly more than the population as a whole from transportation investments, and that

their access to jobs, education, and amenities increased substantially.¹⁷ It is evident that lower-income communities in the San Diego region have the need and potential for economic development. Many of these communities are relatively close to the core of San Diego, Escondido, and other communities in San Diego County. Like other metropolitan areas around the country, the San Diego region has seen a resurgence in development in the central cities and surrounding neighborhoods, a trend which is likely to continue. Some are concerned that this type of development can lead to gentrification, and argue that it displaces the economically disadvantaged and weakens community identity, but recent research indicates that residents in neighborhoods that have seen substantial increases in housing prices enjoyed improved economic health.¹⁸ The same study indicates that despite high overall costs of housing, San Diego has not experienced a high degree of neighborhoods changing from low-cost to high-cost, though increases are possible, and rapid development often is seen in neighborhoods with good access to public transit.¹⁹ The intent is not to diminish the impact of high housing costs on low-income residents of San Diego; the focus should be on providing more housing, which can lower housing costs for all, with the most benefit for low-income residents who likely pay a large percentage of their income for housing.

Relationships between the Economy and Environment

In economic theory, the inputs to economic production are usually referred to as “land, labor, capital, and raw materials.” The environment is not usually considered beyond the land and raw materials nature can provide. However, as the science of economics has advanced, concepts such as pollution as an “externality,” or of “ecosystem services,” have become more generally understood, and a healthy natural environment is known to be both a cause and a result of economic health; a cause in that economic damage is a hindrance to economic development, and a result in that wealthier economies demand higher environmental quality.

The San Diego region is fortunate to have a quality environment and a healthy economy that is, in many ways, based on that environment. The tourism economy relies heavily on the environment, and the quality-of-life issues that make San Diego such an attractive place to live also hinge on environmental factors. In an economic sense, protecting the environment sometimes means balancing the needs of industry with environmental considerations. Frequently, though, in San Diego and elsewhere, the technologies and approaches that benefit the environment also are beneficial to the economic bottom line when costs and benefits are properly understood.

Environmental regulations have costs and benefits. While costs can be obvious, the benefits of considering the environment in an economic context are twofold. First, the economy as a whole can become more efficient when costs of environmental degradation are reduced with policies that have proven to be strikingly cost-effective for the economy as a whole,²⁰ and sometimes for the private sector, as in the case of energy efficiency.²¹

Second, a region could become a leader in environmental technologies or strategies that could lead it to develop a comparative advantage over other regions in these products. This is the case in the San Diego region, where over 7,000 jobs with an average wage of over \$87,000, are in the “cleantech” sector, which produces products and services related to renewable energy, alternative energy, and energy efficiency.²² In fact, Cleantech San Diego, an industry group, estimates the numbers to be much higher.²³ The general outlook for these environmental services and technologies is positive, as environmental problems increase globally with population growth.²⁴

Many of the region's environmental challenges, while complex, can be dealt with effectively on a case-by-case basis, though cooperative solutions may be preferable. The issue of global climate change, however, is interwoven with most other environmental issues, but also with the structure of the economy and the physical infrastructure of the region. California has enacted aggressive climate change policies that will affect many aspects of the economy and will likely result in both substantial costs and in many business opportunities.

Climate change has the potential to present substantial costs to the San Diego region, from impacts of sea-level rise and increased storm activity on the region's high-value oceanfront and vulnerable transportation infrastructure to the impact on energy needs, agricultural disruption, and public health. There is considerable uncertainty as to the timing and severity of these impacts and to our ability to avoid, mitigate, and/or adapt to them should they occur to any substantial degree. Technological and engineering solutions of varying cost and effectiveness could mitigate or prevent many of the effects, but it is likely that behavioral changes will be required as well.

The positive aspect of taking steps to avoid or mitigate climate change is that they assist with many of the other objectives in the 2019 Regional Plan and can have substantial economic benefits. For example, a push to improve energy and water efficiency, if well-designed, can benefit the San Diego economy, independent of its effect on climate change, by saving money and encouraging efficiency in markets that have not historically had strong conservation incentives. The same is true for air quality; a reduction in carbon dioxide emissions is likely to have associated reductions in pollutants that result in positive health effects. Land use regulations, zoning, and transportation infrastructure intended to reduce transportation carbon dioxide emissions can create denser, mixed-use communities that can be more desirable to the growing populations of younger professionals, singles, and seniors. These steps also can lead to better health outcomes and improved access to schools, jobs, and recreation for those with limited resources, increasing economic opportunity. Assessing and preparing for vulnerabilities of drought and severe weather can have substantial economic benefits, even if the frequency and intensity of these natural phenomena does not increase.

The cost-effectiveness of any climate-change or environmental mitigation strategy may be difficult to quantify using existing analytical tools, but as with all environmental concerns, it is important to remember that the environment and the economy are not separate, but intertwined. To obtain the most accurate picture of the economic effects of policy decisions concerning transportation and land use, it is critical to analyze their impact on the environment.

SANDAG will analyze the environmental and greenhouse gas effects of the 2019 Regional Plan in detail in the Environmental Impact Report.²⁵

Future Funding, Trends, and Possibilities

As SANDAG plans for the next 30+ years of transportation investment, one noteworthy uncertainty is the availability of funds to complete these investments. Funding sources—local, state, and federal—rely on policies and priorities determined by political processes over which San Diego has little control. It has been demonstrated locally that even a dedicated funding stream from sales taxes can vary from year to year as economic conditions fluctuate and consumer behavior changes. The effects of state and local tax policy, such as gas tax rates or e-commerce taxation, can have outsize impact on local revenues. The financial details of the plan will be presented in the 2019 Regional Plan's financial report,²⁶ but the difficulty of forecasting the future economic and political conditions is severe. The

important facts are that transportation infrastructure is critical to our region's economic health and that funding can often be scarce.

The ability of SANDAG to directly influence the region's economy is limited. While transportation planning is critical to the future economic health of the San Diego region, the economy is an amalgam of federal, state, and local rules that guide the complex interactions among the thousands of businesses that call the region home, and between the businesses in our region and the wider economic world. Decisions, issues, and conditions far from San Diego have large impacts in our region, and few of these factors are within control of the residents of the San Diego region.

Despite this, SANDAG, as a region-wide agency, can help the San Diego region succeed in the coming economy, which will be more global, with global trade increasing and with technology increasing the interconnectedness of the world economy. However, the economy may also be more local as the value of community economic development expands and consumers continue to discover the pleasures of locally-produced goods and services.

In addition to helping provide a varied and efficient transportation infrastructure that provides the access to the local and global economy, SANDAG will continue to bring together the San Diego region's business and academic leadership to study the regional economy, and will be a go-to resource for economic data and analysis for the San Diego region. By bringing the tools of economic analysis to bear on issues once considered outside the realm of economics, better decisions can be made.

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