

Northern Nevada SDAT

Sustainability in the Reno/Tahoe/Carson Region

A Sustainable Design Assessment Team Report

Northern Nevada Region September 25–28, 2006



AIA Center for Communities by Design



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EXECUTIVE SUMMARY

In January 2006 a steering committee based in northern Nevada submitted a proposal to the American Institute of Architects (AIA) for a Sustainable Design Assessment Team (SDAT) to assist the region and its citizens in addressing key issues facing the community. The fundamental issue for the people of this region is societal inertia. Historical, economic, environmental, and political activities have created a current state of affairs that fuels perceptions and expectations among the people of the region. The inertia born of the complexity of these ongoing viewpoints frames and drives the decision-making processes at all levels: at the broad societal level, in smaller communities, and for the individual. The fundamental sustainability question is:

If the current patterns, activities, and viewpoints in the region continue, how long can the current quality of life be sustained?

The answer is, of course, complex and somewhat speculative. Nevertheless the people of this region can choose to act now to maximize and even improve their long-term, sustainable, quality of life. Alternatively, current forces can simply be allowed to go unchecked, leading to an uncertain future.

This SDAT report documents the discussions, analysis, and findings of the charrette process for specific sustainability issues, including water, energy, land use, transportation, and economic development. The SDAT's most acute observation and assessment is that different parts of the region are clearly interdependent. No one community within the larger region can stand alone and sustain itself. Reno, Sparks, and neighboring communities receive 100 percent of their drinking water from Lake Tahoe and the Truckee River that flows out of it. Lake Tahoe and Truckee River communities need the economic base and transportation support from the Reno, Sparks, and Carson City areas. Without these resources, the more suburban parts of the region would not exist. Despite these examples of interdependency, the SDAT noted that residents are proud of being "independent" at both the individual and community levels and that they can at times be a bit territorial.

The overarching issue for the people and leaders of this region is the need to determine how to balance individual independence and recognize that the path to sustaining and improving their long-term quality of life lies in coming together as a unified, cooperative region. Their first step will be to acknowledge the interconnected, interdependent actions, policies, and institutions that already exist; these components are addressed in this report. The next important step in the process will require that people, organizations, and governments come together to work cooperatively.

Overall Analysis

The bistate northern Nevada/California area is experiencing unprecedented growth. A large number of people are choosing to build homes and live in the area to enjoy the many benefits provided by forests, lakes, rivers, mountains, and public land here. In short, quality of life is high in this region and attracting more people who wish to enjoy it. However, there is a point at which additional growth detracts from, rather than adds to, the quality of life. As more people move to this scenic region, the open space and amenities that attract new residents is increasingly at risk of being negatively affected.

Key Recommendations

The region needs to find a *balance* among its elements of sustainability—among the impact of building construction, the protection of natural resources, and housing opportunities for all income ranges; among diversified economic growth, protection of open space, and jobs that pay living wages or better; and between cultural aspects of community and cooperative efforts to work together as a region.

To accomplish these goals, this bistate region must develop a strategy to achieve a sustainable balance that will require cooperatively working across existing political boundaries to protect and manage growth and preserve open spaces.

Achieving these goals will require the formal creation of a regionwide entity or group of entities to address regional planning and sustainability in all of the forms presented in this report.

INTRODUCTION

In January 2006 a steering committee based in northern Nevada submitted a proposal to the American Institute of Architects (AIA) for a Sustainable Design Assessment Team (SDAT) to help the region and its citizens address key issues facing the community. In its application, the steering committee focused on sustainable water resources, regional transportation, and sustainable energy opportunities. The committee focused in particular on their need for a larger, regional approach to achieving overall sustainability.

The AIA accepted the proposal and, after a preliminary visit by a small group July 10–11, 2006, the SDAT members visited the Reno/Tahoe/Carson region over a fourday period (September 24–28, 2006). The team members, working closely with local officials, community leaders, technical experts, and citizens, studied the community and its concerns. The team came to understand the issues and used its professional expertise to frame a wide range of recommendations, which were presented to the community in a public meeting on September 28, 2006.

This report is a more detailed version of the findings and recommendations that were presented to the community on September 28. After a brief overview of the SDAT program and process, and a short discussion of the Reno/Tahoe/Carson region and its issues, the report covers

- Water resources and quantity in the region
- Water quality within the regional watershed
- Sustainable transportation
- Sustainable land use and a regional plan
- A sustainable, diversified regional economy
- Sustainable energy throughout the region

A closing section offers some thoughts on how the community can best move forward to address the range of issues and recommendations covered in the report.

What is the SDAT Program?

The SDAT program is an interdisciplinary community assistance program that focuses on principles of sustainability. Launched in 2005, the program represents an exciting new chapter in the AIA's history of supporting communities with volunteer design expertise.

The SDAT program is modeled on the AIA's R/UDAT (Regional and Urban Design Assistance Team) program. While the R/UDAT program provides communities with specific design solutions, the SDAT program provides broad assessments to help frame future policies or design solutions in the context of sustainability and helps communities plan the first steps of implementation. The SDAT program is based on an understanding of design as a process that

- Is integrative, holistic, and visual
- Is central to achieving a sustainable relationship among humans, the natural environment, and the place
- · Gives three-dimensional form to a culture and a place
- · Achieves balance among culture, environment, and economic systems

The SDAT program is grounded in the AIA design assistance team values, which call for a multidisciplinary approach, objectivity of the participating team members, and broad public participation.

Why is the SDAT Program Valuable?

Many communities are immobilized by conflicting agendas, politics, personalities, or even the overabundance of opportunity. Many communities have not yet taken stock of their current practices and policies within a sustainability framework, while others have identified issues of concern but desire assistance in developing a plan of action to increase sustainability. The SDAT process ensures that alternative solutions are given a fair hearing and that options are weighed impartially. The SDAT process

- Informs the community of opportunities and encourages them to take action to protect local and regional resources
- Helps the community understand the structure of the place at various scales and contexts—from regional resources to the neighborhood scale
- Explores and articulates the larger contexts and interactions of ecological, sociological, economic, and physical systems
- Visualizes potential futures
- Recognizes and describes the qualities of a place by preserving the best elements of the past, addressing the needs of the present, and planning for the needs of future generations

- · Identifies and describes choices and consequences
- · Connects plans and actions
- Advances the principles of quality sustainable communities
- · Helps the community define the roles of various stakeholders
- Develops a roadmap for the implementation of more sustainable policies and practices

The key to SDAT success is diversity and participation; the process involves multiple disciplines and multiple stakeholders. The SDAT process includes not only the expert team but also government agencies and officials, private businesses, schools and students, community members, and other parties as appropriate.

Who are the Key Participants in the SDAT Process?

SDATs bring a team of respected professionals, selected on the basis of their experience with the specific issues facing the community, to work with community decisionmakers to help them develop a vision and framework for a sustainable future. Team members volunteer their time to be a member of the SDAT. To ensure their objectivity, they agree to refrain from taking paid work for three years from the date of completion of the SDAT project. A distinct team is assembled for each project based on the project's unique features. The team consists of a leader, five to seven members, and a staff person from the AIA Center for Communities by Design.

The professional stature of the SDAT members, their independence, and the pro bono nature of their work generate community respect and enthusiasm for the SDAT process which, in turn, encourage the participation of community stakeholders. The passion and creativity that are unleashed by a top-notch multidisciplinary team of professionals working collaboratively can produce extraordinary results.

Local Steering Committee

The steering committee is the key organizing group for an SDAT project. It is responsible for assembling local and regional information, organizing the preliminary meeting and SDAT visit, and generating local media coverage during the entire project. After the SDAT visits, the steering committee typically evolves into a group that is dedicated to implementing the SDAT recommendations.

Local Technical Committee

The local technical committee is the technical support group for the SDAT project, including local design professionals, environmental professionals, economists, and others whose skills and experience parallel those of the SDAT members and who bring with them detailed knowledge of local conditions, issues, and information resources. Their presence magnifies the effectiveness of the team.



Citizens

In the end, the citizens of the community are the critical players, both for their insights and observations during the team visit and for their support for the new directions that emerge from the SDAT process.

NORTHERN NEVADA TODAY

As stated in the Northern Nevada SDAT application:

The northern Nevada region has a great opportunity to take advantage of current architectural, building, energy, and water conservation measures now gaining immense currency in the worlds of sustainable development, smart growth, and green building in creating a higher quality of life for all of its citizens. This opportunity comes about as the result of a "perfect storm" convergence of local, state, and societal issues a rampant developmental growth rate, the emergence of a phenomenally growing green building movement, and some fortuitous recent state legislation encouraging the management of these directions into a cohesive and functioning "live and learn" laboratory (specifically, Nevada State Assembly Bill 3). Use of the term "rampant growth rate" makes note that just one county (Lyon) of our chosen project area is now #7 on a list

of 3,100 counties in the United States for its growth rate, thereby affecting everything around it.

The convergence of these issues, all at the beginning of a new century, is an amazingly opportune time to transform a particularly vital region into a bellwether for many other places in the country to consider their own future directions in sustainable terms. In so doing, our region can create a model for other communities and regions in their quest for a more equitable and balanced management of all of their given resources.

It is ...an "overabundance of opportunity," that forms one side of the coin of premise for this application—the other side of that coin is "luxuriating in growth" (for its own sake) which of course plays into a



more traditional and prevalent development model. We cannot afford to be intimidated by either overabundance of opportunity or luxuriating in growth in trying to overturn the downsides of earlier and still-prevailing ways of thinking. The traditional way of opportunity in the development sense is simply to find some expanses

of underused land and build on it (which is what has made northern Nevada a prime target)—this outdated model of capital placement has of course left so much to be desired for those communities who are now living with the consequences of that earlier mentality. Some of those places are now paying the price of yesterday: with some luck and the help of SDAT, northern Nevada needn't be unduly burdened tomorrow.

At the moment, there is a disconnect that favors traditional development modes, and not as up to date as now-signed-into-law legislation suggest they need to be for effective future implementation of sustainable contexts that result in healthy cities and countrysides.

Overall, the health and well-being of this large, vibrant, and diverse region affects the residents of seven counties, numerous cities, and two states. Undeveloped forests and grasslands—including working farms, ranches, and timberlands—provide clean drinking water, wood and agricultural products, wildlife habitat, recreational opportunities, and jobs.

Finding a sustainable balance among the region's built areas, its resources, and its open space can produce the following outcomes:

- Protecting water quality
- Conserving native wildlife
- · Buffering homes from wildfire
- · Ensuring a future for working farms, ranches, and timberlands
- Supplying access to outdoor recreation
- Elevating home values
- Reducing the cost of community services
- Enhancing the quality of life in the region

Looking forward, this bistate region must develop a strategy to achieve a sustainable balance that will require cooperatively working across existing political boundaries to protect and manage growth and preserve open spaces.

The six sections that follow represent the essence of the SDAT's analysis and recommendations to the citizens of this region.

WATER RESOURCES AND QUANTITY IN THE REGION

Access to reliable, high-quality water resources is essential to the economy, environment, and the identity of the Reno/Tahoe/Carson region. The neighboring Sierra Nevada range provides 65 percent of California's water, but it provides 100 percent

of the region's water. The region's water is a critical, if not its most important, natural resource. Because water in particular ties the region together metaphorically and practically, it is the focus of much dialogue and debate and could increasingly become an icon for cooperation.

The use of water in the region and in the United States in general is managed based on the legal concept of "water rights." The historic water rights allocations, subsequent agreements, results of legal proceedings, legislation, and shifting demands over time have resulted in a legal framework for decision making that constrains what might otherwise be considered common sense or sustainable water management decisions.

Within the Truckee River and Carson River watersheds several entities manage and use the water resources to serve their customers and other users. The nearly complete Truckee River Operating Agreement (TROA) will soon provide a coordinated basis for how water is managed in the Truckee River watershed.





SWOT (Strengths, Weaknesses, Opportunities, or Threats) Analysis

Strengths

The water of the Reno/Tahoe/Carson region is world class in terms of its quantity and pristine quality. The pending TROA was identified in both stakeholder sessions as an important strength of the water resources in the region. The Truckee River appears to have an adequate supply to meet current demand and the Carson River, although it does run dry every year, supports the agricultural industry and community in the watershed. The community in the Tahoe region expressed pride in the community's recognition of the value of the "services" that the ecosystem provides and its willingness to implement such sustainable programs as the Truckee Green Building program and the Tahoe area's Best Management Practices (BMPs) for development to reduce erosion and improve water quality in the Truckee River.

The region also has very advanced wastewater treatment facilities which produce high-quality effluent for discharge and reuse for irrigation. The option of recharging the groundwater with highly treated effluent is one that has not been fully exercised



but this groundwater storage option was identified as an asset. Further, the various entities have developed water conservation tools and programs that feature such approaches as education on landscape practices, water conserving fixture rebates, irrigation with reclaimed water, and others.

Weaknesses or Challenges

As mentioned above, the complex legal framework of the historic allocation of water rights, legislation, and other agreements that control the management of water in the region constrains the implementation of many common sense and sustainable water management practices. As a result, the efficient use of water is not realized as often as it could be to address water supply issues. This framework also has led to water management decisions that are not "science based," including the permitting of new wells within water system boundaries and in areas of declining groundwater levels.

To further complicate water management decision making, perceptions vary throughout the community as to how much water is available. Last, when water rights were allocated over the last 100 years or so, no rights were allocated for in-stream flows for environmental needs, such as the needs of the fish. Owing to the presence of threatened and endangered species in the Truckee River system, water has recently been allocated for in-stream flows and as a result has further taxed the water supply.

The water resources are for the most part fully legally allocated in the region. In addition, these legal allocations often exceed the actual supply in many locations. Because of the demand and allocations, the physical water supply is reaching its limit and cannot always meet the demand. Specifically, the groundwater in the region is dropping 1 to 2 feet per year, the flows into Lake Tahoe are declining, South Lake Tahoe is in permanent water rationing, and the Carson River goes dry every year. Agriculture and the ecosystem suffer as a result.

In addition to these stressors and deficiencies, rising uncertainty further constrains planning and design efforts. On the supply side, the precipitation patterns appear to be resulting in higher high-flow and lower low-flow times; on the demand side the rate of population growth has been so high that the water systems are unsure of when supply will not meet demand. For example, the Truckee Meadows Water Authority has reduced its prediction of an adequate water supply for the Reno area from a projected 25-year supply down to as low as a 10-year supply.

Threats

A worsening of the climactic dynamic described above (higher high-flows and lower low-flows) is just one of many possible negative results of global warming. In particular, a trend toward longer droughts is considered likely. Another immediate threat is contamination near the water source from a catastrophic event such as a bad wildfire, a hazardous materials incident near the river on the highway or railroad, or erosion due to poor site design and landscaping practices. Any of these conditions could further constrain the supply on a temporary basis or longer (see water quality section for additional information).

The growth pattern in the region is perhaps the greatest threat to its water supply. This growth is not being planned for or designed with water conservation in mind. Landscaping irrigation water consumption accounts for nearly 50 percent of the summertime flows

in the Truckee Meadows Water Authority system, yet the use of nonnative irrigated landscaping is not prohibited by code or discouraged by fees. Moreover there is no connection between the development areas allowed by zoning and critical groundwater recharge areas, which not only decrease recharge but also greatly increase the peak runoff rate. Specifically, the public street landscaping requirements appear to encourage the installation of the narrow irrigated landscape strips of turf that strike the casual observer as being so out of place in a desert environment. Last, land-use planning efforts also do not appear to consider the overall water supply issues as primary considerations, but only as an "after the fact" consideration late in the process.

Recommendations

The following recommendations were developed based on the "opportunities" that were identified during the stakeholder events. These key findings, if implemented, will contribute to the overall sustainability of the Reno/Tahoe/Carson region:

- Landscaping with drought-tolerant native and adapted nonnative plants should be required by code for some mandatory minimum portion of new sites. This requirement should be based on the existing efforts in promoting the use of native land-scaping already developed by Truckee Meadows Water Authority (TMWA) and others currently in use locally.
- A water system impact fee should be implemented for the installation of a permanent irrigation system to further discourage permanent irrigation systems. The impact fee should be lower for the use of intelligent and efficient systems.
- A centralized intelligent irrigation control system should be investigated that will allow water districts to control private irrigation systems based on time of day, system demand, and/or weather considerations.
- All water users in the region should be metered for water consumption and a rate structure should be in place that discourages high water use, particularly high summertime water use.
- The existing water conservation education efforts of the water purveyors and others should be expanded to assist in the further reduction in water demand. This could be through providing landscape and low-flow fixture design assistance as well as efforts to increase the sophistication and consistency of the community's understanding of the regional water situation.
- The landscaping requirements for the streetscape/right-of-way areas should be amended to prohibit the narrow irrigated turf areas along public streets.

- The existing programs for rebates and retrofits of inefficient water fixtures in existing developments should be expanded.
- Plumbing codes should be investigated for any limitations on the use of reclaimed water on-site or in the buildings for toilet flushing. The use of household graywater for subsurface drip irrigation should also be investigated, such as through a geoflow type system.
- New developments should be required to install distribution mains in the street for distributing reclaimed water for irrigation to new developments. Service taps should be provided to all new lots to connect irrigation systems to reclaimed water.
- The zoning code should be revised to identify groundwater recharge areas per the report, *Southern Washoe County Groundwater Recharge Analysis* (January 2001), which was prepared for the Washoe County Regional Water Planning Commission by Kennedy Jenks Consultants, Broadbent and Associates Inc. and ADGIS, or similar studies and either set aside those areas as open space or enforce a set of development requirements that result in no net loss in recharge through the use of low-impact development (LID).
- The use of LID should be expanded throughout the region and should be built based on the *Truckee Meadows Low Impact Development Handbook*.
- Zoning codes should be revised to have a direct link to the actual, scientifically documented availability and consumption patterns of water for and in new developments.
- The practices used to create a more sustainable water system in the region should be freely shared among the regional entities, and the synergies should be exploited to the betterment of all the communities in the region.

Connections to Other Issue Areas

Implementing the recommendations above will have natural synergies with the other topic areas covered in the report. For example, pumping water will require energy (or avoiding it will save energy), the recommendations for changes to the zoning code will have implications for land use, LID will affect transportation standards, and the creation of open space for recharge areas will contribute to the economics of the region by weaving more natural areas through the city as a natural amenity that is in sync with tourism efforts marketing Reno as an outdoor adventure city.

WATER QUALITY WITHIN THE REGIONAL WATERSHED

Clean, fresh water is vital to human life and, for human survival, is second in importance only to the availability of air for breathing. Beyond its function as an integral part of the ecosystem, water is also a social and economic good. Demand for water resources of sufficient quality for human consumption, sanitation, agricultural irrigation, and industry will continue to intensify as populations increase and as global urbanization, industrialization, and commercial development accelerate. Therefore, water resources management presents one of the most important challenges for the United States and the world.

There is mounting evidence that our land development patterns can exacerbate problems related to maintaining good water quality. The demand for good quality water resources is continuing to increase, with shortfalls potentially leading to social injustices, civil unrest, and human conflict. Sustainable development is the centerpiece and key to water resource quality, as well as economic health and societal well-being. Carrying out sustainable development activities related to maintaining good water quality requires simultaneous, multidimensional thinking about the consequences of present actions on future public and environmental health by examining the connections among environmental, economic, and social concerns when we make choices for action.

As development continues in the Reno/Tahoe/Carson region, many known impacts can potentially result in decreased water quality available for human consumption as well as ecosystem health.

These effects can come from

- New suburban development (sprawl)
- · Diverse land uses
- Agricultural runoff
- · Forest removal and related erosion
- · Sewage outflow
- Stormwater runoff
- Automobile emissions
- Groundwater recharge of lower quality water (degrade the aquifer quality)

Degraded water quality from these different activities, as well as others, can affect not only human health but also the natural environment as it can interfere with ecosystem services that we rely on for our quality of life and maintenance of healthy places to live.

SWOT Analysis

Conducting a SWOT analysis with the stakeholders in the Reno/Tahoe/Carson region was useful for identifying the major issues the communities believed were important to their present and future. It also provided the data for conducting a sustainability assessment of where this region can go in the future. The analysis was also valuable in elucidating the differences among communities within the region that need attention and that need to be integrated from a regional perspective to encourage more effective future actions in the region.

Strengths

- Reno/Sparks has a pristine water supply
- Sierra Nevada is a good source of high-quality water
- State-of-the-art water/sewage treatment facilities are in use
- · Regional water commission and plans exist
- Strong local and regional regulations are in effect
- · A new environmental center has opened
- · A long-term water-quality database is in use
- Significant resources are allocated to water-quality protection
- An adaptive management system with indicators (thresholds) is in use





Weaknesses or Challenges

- Agriculture practices impact negatively on natural aquatic ecosystems
- No growth-based recognition exists for protecting water resource quality
- No major incentives exist for water-quality protection strategies
- Truckee River upstream has questionable water quality regulations (riparian protection)
- The region's water is fully allocated—there is no room for decreases in water quality or quantity
- The region does not think within the framework of watersheds
- Many jurisdictions are not in regular communication with one another
- Funding for maintaining water-quality infrastructure after initial construction is lacking
- Political commitment to implement water-quality protection at the local level is lacking
- The indicator/threshold program lacks focus on socioeconomic measures

Opportunities

- Landscape ordinances
- Plumbing ordinances
- Integration of water and land-use planning activities
- Education
- Low-impact development (LID) practice implementation
- New technology (e.g., water recycling) to decrease water-quality effects on ecosystem
- New legislative actions
- Alternative boat fuels
- Advance awareness/education for clean water requirements in a larger watershed
- Implementation of LID strategies
- Public education and awareness programs on water-quality needs
- Advancement of green building technologies appropriate for subalpine environments
- Buffer areas along waterways
- Roads as filtration plants
- Zero emission motors on the lake (boats)

Threats

- The Truckee Meadows septic system impacts groundwater
- · Upstream Truckee River decision making should be strengthened
- Information on deep aquifer groundwater quality is lacking
- Transportation corridors along the Truckee River present problems (e.g., spills)
- Planning efforts are disconnected
- Water is an afterthought in growth planning
- · Groundwater and surface water contamination is present
- Too many people are moving into the basin
- Uninformed legislation is in development
- The use of science (or misuse) to support decisions is a problem
- Fire field management is causing erosion and ash problems
- There is a need for "green" lawns (no pesticides/fertilizers)
- Stormwater management is needed
- Groundwater recharge is challenged
- Nonpoint source pollution (air quality, storm water runoff) is a problem
- There are more piers and more boats in the region

Recommendations

When it comes to water quality in the Reno/Tahoe/Carson region, two issues seem to be consistent no matter the audience: concern for water quality in planning is considered an afterthought, especially in the Reno/Sparks area, and the entire region does not view itself from a watershed perspective. If the region adapted a region-wide watershed approach to discussing issues and acting on them, the issue of water quality would move from an afterthought to an integral part of the planning process. This transition is an absolute necessity to establish a future sustainable vision for the region.

The afterthought approach to water quality and the lack of watershed perspective are obstacles the region could easily overcome. To envision this process, it may be helpful to consider the fate of a drop of water as it moves throughout the regional watershed.

After spending up to 700 years in Lake Tahoe, where it is exposed to basin activities such as logging and related erosion, new home building and associated water runoff, and new road building, this drop of water begins its journey down the Truckee River. Exposed to development that will result from Truckee's population growth—expected to nearly double over the next 20 years—the drop of water must meander along the river banks for miles, where the potential for land-use activities may degrade water quality. In reaching the northern Nevada valleys, this drop of water might be affected by stormwater runoff and dangerous chemicals as it continues its trek to Pyramid Lake. It also might be taken out of the Truckee River and used for commercial or residential purposes that will certainly change its quality via human waste products, toxic chemicals, hormones, and other potentially dangerous materials. Ultimately this drop of water might encounter the sewage treatment plant or enter the ground in a septic system/leach field complex. The treatment facility will put the drop of water back into the Truckee River to continue its travels to Pyramid Lake. The septic system will force it into the ground, ultimately to become part of the groundwater.

The residents of the Lake Tahoe basin understand the fate of this drop of water in their part of the watershed. Residents of the northern Nevada valley areas, however, do not show as much of an appreciation for its fate and potential changes in its quality, perhaps because they use so little of the available water supply now (less than 12 percent) and they do not see the potential for degrading its quality. But as growth in the valleys continues, the water-quality situation will change. The time to enact protection for future water quality in the region is now—before regulatory agencies are forced to play catch-up with a runaway train.

A Future Vision for Water Quality in the Region

- The Tahoe and northern Nevada areas of the watershed need to work more closely together to benefit from what each component has learned and implemented independently concerning water-quality protection.
- Lake Tahoe has excellent long-term databases on water-quality variables and has designed and implemented an adaptive watershed management strategy that includes indicators (thresholds) for showing when problems occur or when things are heading in a wrong direction. This same management strategy should be embraced throughout the watershed and coupled very closely to the planning processes for further land-use development.

- The region should seek a better understanding for the quality of groundwater resources available to northern Nevada valleys and guarantee sufficient monitoring activities on the various groundwater aquifers.
- A design and implementation process should be established to eliminate the use of septic/leach field systems in all existing subdivisions and develop associated centralized collection infrastructure for domestic and commercial sewage.
- Policies should be developed to protect all remaining identified aquifer recharge areas from further industrial or residential development to take full advantage of natural, cost-effective processes for filtration and cleaning of used water in the northern Nevada valleys.
- The concepts of LID should be embraced in existing and new residential and commercial development and appropriate strategies should be implemented to minimize negative impacts on water quality while taking advantage of natural ecosystem processes for "cleaning" the water that is affected by human settlement processes.
- The region should implement an intensive effort at education and public awareness for the importance of water quality, not only locally and regionally but also globally.

The quick-impact areas for projects, or the "low-hanging fruit," include the development of intensive education/awareness programs and the development of legislation that will support and provide incentives for the implementation of LID strategies in the region. For example, the National Pollutant Discharge Elimination System (NPDES) stormwater permits issued to the cities of Reno and Sparks and Washoe County in 2000 and 2005 by the Nevada Division of Environmental Protection (NDEP) require the implementation of a Regional Storm Water Quality Management Program (RSWQMP). The RSWQMP provides a framework for reducing pollutants in municipal stormwater discharges to the Truckee River and its tributaries and the various lakes of the northern valleys. The land-use planning element of the RSWQMP calls for the development of planning policies and procedures that will effectively require the implementation and long-term maintenance of structural controls and LID practices for stormwater quality improvement and other point/ nonpoint sources of water pollution in new development and redevelopment projects.

Connections to Other Issue Areas

Water quality directly impacts the amount of water available (water quantity). If the sources of water for human use are degraded by pollution, erosion, or other factors, the total amount of water available for later use by society is affected, as well as the water available for maintaining healthy ecosystems.

Water quality is affected by land use, transportation, and the economy. Land use affects water directly by the flow of polluted waters into the overall system, by erosion from building sites, and by water runoff from impervious surfaces that may contain pollutants. Inappropriate land use may also hinder the natural filtering (cleaning) processes of sediments in the recharge of water into underground aquifers. Transportation affects water quality primarily by the presence of extensive impervious surfaces along the roadway. There is also the potential for spills of hazardous materials on roadways that will find their way into the water system of a region. A healthy economy is based on the presence of a healthy environment. Economic development in an area like the Reno/Tahoe/Carson region needs good quality water to support the kind of clean technologies envisioned for the region and to provide the type of quality of life its natural resources offer the potential employees of those businesses.

SUSTAINABLE TRANSPORTATION: CONNECTING PEOPLE WITHIN THE REGION

Adequate, efficient, and sustainable transportation in the bistate Reno/Tahoe/Carson region of northern Nevada and eastern California is essential if this region is to continue to be the kind of place in which its residents and visitors want to live, work, and play. The Reno-Tahoe International Airport is a vital link between this region and the world. However, once here, people and goods must be able to flow seamlessly throughout the region. This need can only be addressed through a bistate regional approach in which all governments and agencies cooperate to achieve a sustainable, effective, and efficient transportation system that meets the needs of the residents, visitors, and businesses.

Currently, the region includes the states of Nevada and California; the seven counties of Washoe, Douglas, Nevada, Lyon, Storey, Placer, and Eldorado; in addition to the major cities of Truckee, Reno, Sparks, and Carson City. Several regional agencies are involved in planning and implementing transportation and land development. Each has begun the planning for a multimodal system, focused on current jurisdictional boundaries. However, these current plans and processes form the basis for a regional dialogue to develop a procedure to plan and ultimately implement vital regional improvements.



SWOT Analysis

What did we hear from the public and stakeholders in this three-day input process?

Strengths

- This bistate region is a fantastic place in which to live, work, and play
- Residents recognize the need to think and act regionally
- The Reno-Tahoe International Airport is a vital link between the world and this region
- The existing rail system could provide the basis for an expanded regional and interstate system to move people and goods
- The region has a diverse, strong economy
- Existing local and subregional plans call for sustainable, multimodal transportation options and alternatives

Weaknesses or Challenges

- Efforts are fragmented, with no authentic regional approach to transportation issues, although there is some movement in the 2045 Transportation plan to consider regionalism
- True multimodal alternatives do not exist
- The region is auto-dependent
- Land use approvals are not in keeping with the local plan to provide for transit corridors and centers
- Growth is excessive
- The region continues to do things the same way—it is not willing to change

Opportunities

- The region can create a true regional approach to transportation solutions
- The region can provide other modal choices in the region to the auto, particularly rapid transit
- The region can create local multimodal systems to serve individual cities and nodal development centers and to include transit as well as bicycle and pedestrian systems
- The region can link land use and transportation decisions
- The region can ensure the systems serve visitors as well as its residents and businesses

Recommendations

In formulating its ideas and recommendations, the SDAT evaluated public and stakeholder input and reviewed many of the region's existing plans and processes. The good news is that since not everything is "broken," there is no need to start from scratch; the region can build on what has already been achieved by the cities, counties, and existing regional agencies. The core of the regional rapid transit system can be built around the current corridors and centers plan in Reno and Washoe County. This transit system should be extended to link with other parts of the bistate region. The regional rapid transit extensions

- Extend and link the West Fourth Street corridor to Truckee
- Provide shuttle connections from Truckee to the Tahoe rim and the mountain resorts
- Extend the South Virginia Street corridor to Carson City and provide a local internal transit system in Carson City that effectively ties to the regional corridor
- Ensure the new industrial developments and communities within the Sparks area along I-80 East are linked and served by transit
- Provide a new northeast transit corridor along Route 445 from the "center" in Sparks to near the Reno/Sparks Indian colony

The more local systems should always include the provision for transit, as well as bicycle and pedestrian modes. These systems could focus on the city centers and centers identified in the centers and corridors plan conducted by the Truckee Meadows Regional Planning Agency (TMRPA).



Connections to Other Issue Areas

Opportunities exist to expand on the electric corridor along I-80 in California into Reno to encourage the use of energy-efficient electric vehicles and to develop energyefficient rapid transit vehicles.

One overriding recommendation is to link all transportation and land-use decisions into a seamless, integrated decision-making process. Only by considering both issues in a unified process can the region develop and implement a regional, multimodal transportation system that efficiently serves and promotes sustainable development.

SUSTAINABLE LAND USE AND A REGIONAL PLAN

Lake Tahoe, the mountains and forests, the Truckee River basin, Pyramid Lake, and the natural environment of the high desert provide the context and conditions for a place both unique and cherished. This setting and the quality of life it supports are directly dependent on the quality of the natural environment and the impact of the built environment on it. Land use and development, to be sustainable, must first "do no harm" and, as heirs to the stewardship of this land, we must endeavor to leave this ancient place more sustainable than we found it.

The region's governmental jurisdictions have developed numerous planning studies and reports. A review of these plans provided the initial framework and background



Indigenous plants



Non-indigenous plants

for our work. Without exception, the protection of the natural environment was a primary consideration in all of them. In addition, each was developed within a population-growth framework. In fact it became clear that much of the region's economy was directly dependent on growth.

How can this region preserve, protect, and sustain its natural environment and its quality of life and at the same time continue its current rate of growth?

SWOT Analysis

Two stakeholders' sessions and two public input sessions, one of each in Lake Tahoe and Reno, provided valuable citizen and public official input to the SDAT process. The SWOT (strengths, weaknesses, opportunities, or threats) analysis allowed people a framework to voice their views on the issues and to place them on the record.

Strengths

- The natural environment and its beauty
- Lake Tahoe
- Quality of life
- Reno central business district
- Higher education
- Cultural institutions
- Tourism
- Native peoples
- Low taxes
- Lake Tahoe cottage industry
- The will to say "no"

Weaknesses

- Inertia
- Lack of community awareness
- Lack of affordable housing
- Lack of wildlife protection
- No multijurisdictional agency
- Lack of a mass transit system

Opportunities

- Public access to Truckee River in the city and in high country
- Development of solar, geothermal, wind, and biomass industries
- Regional transportation planning
- Pathways 2007 plans
- Regional land use plan
- Urban infill development in Reno and Sparks
- Low-impact development

Threats

- Housing costs
- Nonindigenous landscape
- Property taxes
- Quality of life
- Growth
- Where we are headed

Recommendations

- Establish a bistate, multicounty regional land-use and transportation planning agency
- Develop a regional land-use and transportation plan based on 10-, 25-, and 50-year population-growth projections that establishes at least four density zones: natural preserve and recreational areas; agricultural and low-density residential; medium-density residential, retail, and commercial; and high-density residential, retail, and commercial
- Adopt and apply smart growth principles now
- Provide incentives for high-density development at transit-oriented developmentdesignated sites and for urban infill in Reno and Sparks
- Adopt an indigenous landscape standard for new development and create incentives for the reclamation of nonindigenous landscapes
- Have Reno reevaluate its current property tax law and its unintended consequences
- Consider incentives for developments that are planned to maximize solar gain or incorporate other alternative energy sources
- Develop the Truckee River as the region's central park

Connections to Other Issue Areas

Land-use and transportation planning are like the chicken and egg—with one comes the other. But the transportation plan, which is also the infrastructure plan, should be developed first to help minimize negative impacts on the natural environment and promote smart growth. The current property tax law in Reno creates an economic imperative for ever-increasing growth. An indigenous landscape standard would reduce the consumption of the region's most valuable natural resource—water. Subdivision regulations and incentives can promote alternative energy usage.

Ten Principles for Livable Communities

1. Design on a Human Scale

Compact, pedestrian-friendly communities allow residents to walk to shops, services, cultural resources, and jobs and can reduce traffic congestion and benefit people's health.

2. Provide Choices

People want variety in housing, shopping, recreation, transportation, and employment. Variety creates lively neighborhoods and accommodates residents in different stages of their lives.

3. Encourage Mixed-Use Development

Integrating different land uses and varied building types creates vibrant, pedestrian-friendly, and diverse communities.

4. Preserve Urban Centers

Restoring, revitalizing, and infilling urban centers takes advantage of existing streets, services, and buildings and avoids the need for new infrastructure. This helps to curb sprawl and promote stability for city neighborhoods.

5. Vary Transportation Options

Giving people the option of walking, biking, and using public transit, in addition to driving, reduces traffic congestion, protects the environment, and encourages physical activity.

6. Build Vibrant Public Spaces

Citizens need welcoming, well-defined public places to stimulate face-to-face interaction, collectively celebrate and mourn, encourage civic participation, admire public art, and gather for public events.

7. Create a Neighborhood Identity

A "sense of place" gives neighborhoods a unique character, enhances the walking environment, and creates pride in the community.

8. Protect Environmental Resources

A well-designed balance of nature and development preserves natural systems, protects waterways from pollution, reduces air pollution, and protects property values.

9. Conserve Landscapes

Open space, farms, and wildlife habitat are essential for environmental, recreational, and cultural reasons.

10. Recognize that Design Matters

Design excellence is the foundation of successful and healthy communities.

A SUSTAINABLE, DIVERSIFIED REGIONAL ECONOMY

Brief History of Economic Development in the Region

The region was settled in the late 1850s, with the discovery of gold in what is now Virginia City. To deliver the gold from the mines to the San Francisco Bay area, a railroad was built, which led to the region's development as a transfer point and shipping center. The railroad served Truckee and Reno, with a spur to Carson City and Virginia City. This rail access continues to serve the region today and makes Reno in particular an important break-in-bulk and distribution point for goods from the West Coast and beyond.

During the 1920s a national road system was developed, with the transcontinental Victory Highway coming through Reno on the way to San Francisco. These improvements made the city and the region accessible to tourism. Nevada, already known for easy divorces, became a more popular destination with the advent of legalized gaming in the 1930s. The casino industry grew to dominate the regional economy, particularly after World War II, with postwar prosperity and the development of the interstate highway system. By the late 1980s, however, Reno began to lose its market share to Las Vegas and the growth in gaming began to taper off, a trend that was accelerated by the development of casinos in other states and on Indian reservations throughout the country.

Development in the Tahoe Basin paralleled that of the Reno/Carson/Virginia City area. During the last half of the 19th century, the forests around Lake Tahoe were an important source of wood for the mines and the buildings of the lower cities. By the end of the 19th century, Lake Tahoe had been discovered by the wealthy residents of San Francisco as a vacation destination. The development of roads and the automobile made the area accessible to the middle class, and many lodges and hotels were built. During the 1950s, more permanent residences were established. The 1960 Winter Olympics established the area's ski industry. To manage development, the Tahoe Regional Planning Agency was founded in 1968.

Current Situation

Although gaming remains a major industry, contributing about one-third of the state's total revenue, northern Nevada has seen steady declines in gaming revenues since 2000. Faced with this loss of revenue and visitation, the region has taken several steps to diversify its appeal, its message, and its industry mix. This effort has been very successful. Although some of the older casinos have closed, newer properties

are doing well, as new events and attractions in the region bring in additional visitors. Other sectors of the economy have grown as well, as companies from California and other states locate in western Nevada to take advantage of the business-friendly tax laws. Warehousing and distribution, construction, and financial and business services in particular have grown in recent years. Table 1 shows employment, by sector, in the Reno area for the year 2004.

Table 1

Reno Area Employment		
2004 annual average, by sector		
Sector	Number of employees	
Natural resources and mining	400	
Construction	19,800	
Manufacturing	14,000	
Trade, transportation, and utilities	43,600	
Information	3,100	
Financial activities	10,700	
Professional and business services	23,600	
Education and health services	19,300	
Leisure and hospitality	39,000	
Other services	7,500	
Government	27,200	
Total	208,200	

Source: Economic Development Authority of Western Nevada

Another important element in the region's development has been the growth in the second-home and retiree markets. Tahoe in particular has seen an explosion in the number of second homes, providing a boost to the construction industry but driving the price of housing well above the capacity of the average worker. Approximately 20 percent of the Reno metropolitan area's population is 55 or older, well above the national average. Although the housing market in Reno has softened recently, prices remain higher than most workers can afford.

Finally, anecdotal evidence suggests that approximately 20 percent of the Tahoe Basin population, and a relatively high percentage of the Reno/Sparks area population, may be operating home businesses, either as day traders or as Internet service providers.

Although the region has taken steps to diversify its economy, it is still heavily dependent on the gaming industry, and gaming revenues continue to fall. Home prices have been distorted by the second-home and retiree markets, making home ownership very difficult for employees in the region's industries where wages are relatively low. Although population growth rates are among the nation's highest because of immigration, to operate profitably area businesses require a seasonal labor force, often recruited from outside the country; local residents who graduate from the region's colleges frequently leave to seek employment elsewhere. With these and other factors in mind, the Economic Development Authority of Western Nevada (EDAWN) commissioned the Target2010 study in December 2005 to assess business climate, workforce, infrastructure, quality of life, and marketing.

SWOT Analysis

Strengths

Through its review of the EDAWN Target2010 report, as well as comments from residents and business and government officials, the SDAT identified many strengths that make the regional economy appealing: location, climate, and natural environment; a business-friendly tax structure; the presence of higher education facilities, including a medical school; a diverse economic base; and a strong visitor market.

Proximity to northern California and the San Francisco Bay area population center provides a built-in market for the natural amenities of the region, as well as an audience for events, customers for retail outlets, and users of the casinos. The climate, with more than 300 days of sun per year and the natural attractions, chiefly the pristine Lake Tahoe and the ski areas of the Sierra Nevadas, make the region very attractive to businesses and residents.

Nevada markets itself as business-friendly, and the state has no personal or corporate income tax. There is a low (1 to 2 percent) tax on gross wages, less health care costs, as well as business license fees. There are also sales and property taxes.

The University of Nevada-Reno is a full four-year institution of higher learning, part of the state university system. Truckee Meadows Community College offers many two-year programs geared toward workforce training as well as preparation for a four-year degree. Finally, the University of Nevada Medical School at Reno provides the base of a medical services industry and close linkages with area hospitals. In the Tahoe/Truckee area, there is a branch of Sierra College.

As noted above, the regional economy has diversified in recent years, with more general visitation supplanting the casinos as a driver of tourism, and with warehousing and distribution, construction, and financial services showing gains in employment and activity. The visitor market remains strong, with attractions including the lake and ski areas as well as events, golf courses, and other activities to supplement the casinos.

Weaknesses and Threats

Some weaknesses and threats were also identified: problems with water and air quality; affordability of housing; workforce skills and wages; public revenue streams; lack of access to business capital; the region's mindset; and the brain-drain of college graduates.

The issues concerning water have been discussed elsewhere in this report. The Reno/Sparks area is classified as nonattainment for particulates, caused chiefly by mobile sources and wood stoves. Nonattainment status puts regulatory requirements on businesses and residents that can be perceived as burdensome.

The cost of housing, driven in part by outside development pressures, has risen dramatically over the past decade, to the point that the average worker can

no longer afford to purchase a home without traveling outside the core areas of Reno/ Sparks and Tahoe. This puts added pressure on the regional transportation system and contributes to poor air quality. Coupled with this are the relatively low wages paid in the major industries, chiefly hospitality, and the lack of preparation of the workforce for the available jobs.

Public revenues are heavily dependent on the





gaming industry, with nearly one-half of total state revenues coming from the casinos. Because gaming revenues have been falling so have state tax revenues, although this decline has been partly offset by increases in sales and property taxes. Access to business capital is becoming more of a problem in the region. There is no venture capital, making new business start-up very difficult. This, coupled with low wages and lack of opportunity, leads to the brain-drain, or the fact that many of the graduates of the University of Nevada-Reno and Truckee Meadows Community College choose to leave the region after completing their studies.

Finally, many have referred to the region's mindset, a feeling that things were better when the region wasn't as busy, as populated, or as big. Without making a value judgment on growth, it is obvious that resistance to change makes change more difficult.

Opportunities

Based on our review of background materials and the comments of citizens, business, and government officials, the SDAT identified several opportunities for sustainable economic development and diversification:

- Alternative energy—Currently, the region imports almost all of its energy needs, representing a huge transfer of wealth out of the area. At the same time, studies have shown the region has the potential to generate enough energy to supply not only itself but much of northern California through geothermal, wind, and solar power. In addition, the use of biomass to generate electricity has great potential, chiefly in the Tahoe/Truckee area, through the use of wood waste and forest products. This potential has been recognized by the Nevada state legislature, which passed Assembly Bill 3, a renewable portfolio standard, as well as incentives for the installation and use of alternative energy. California also has a renewable portfolio standard. The region's utilities have been planning and pursuing alternative energy generating facilities. We see three opportunities with respect to alternative energy: generation and distribution, production of components, and installation of systems.
- Green building—The use of green building or LEED standards in construction and renovation is environmentally responsible and cost effective. Green buildings require less energy to heat and cool, have a lower impact on the landscape, and use recycled materials when appropriate. Both Nevada and California have incentives for green buildings. The major impediment to green building in the region, however, is the mindset that business as usual is sufficient. We see three opportunities for economic development here: training and certifying the workforce in green building practices and principles, constructing green buildings (both residential and commercial), and retrofitting and renovating existing facilities.

- Improved and expanded medical services—Advances in medicine and medical treatments occur at a very fast rate and make possible treatments for all sorts of conditions that were once nontreatable. Generally, the ability to provide these new treatments draws people who need them from all over the country and the world. At the same time, the region is becoming a haven for retirees and preretirees, a population segment with a higher-than-average need for medical services. The presence of the medical school, coupled with the recent investment in new medical facilities, presents improved and expanded medical services as an opportunity for the region to treat those residents who now travel out of the area for medical care.
- Increased and diversified visitation—The convention and visitor market remains one of the fundamental elements of the regional economy. While efforts have been made to increase the number and type of attractions (beyond the natural aspects and the casinos), visitation remains heavily seasonal, putting pressure on the workforce and facility owners who suffer if the ski season is bad. An expansion of the retail sector has proven to be an added visitor attraction in the Reno/Sparks area, as have events such as the air races. The period from October through January is relatively slow, however, and offers an opportunity for increasing visitation through promotion of off-season conventions, vacations, and shopping opportunities.
- Additional manufacturing activities—Adding clean manufacturing jobs to the local economy will increase the average wage, provide a reason for graduates to remain in the area, and support other jobs in the retail and service sectors. The region has the potential to attract manufacturing and service jobs in several sectors: ware-housing and distribution, advanced manufacturing (such as nanotechnology), and financial services. The tax structure, location, climate, and natural amenities make the area very attractive to industry.

Recommendations

Alternative Energy

- Continue to work with local utilities to encourage development of alternative energy generating facilities
- Identify opportunities (such as solar/photovoltaic materials) where a demand for manufacturing exists
- Work with local and state officials to expand incentives for the installation of alternative energy systems in homes and commercial facilities

Green Building

- Work with Truckee Meadows Community College and the construction trades unions to train workers in green building techniques
- Work with area architects and contractors to encourage LEED certification
- · Work with local and state officials to expand incentives for green building

Increased Visitation

- · Coordinate marketing among regional convention, visitor, and tourist agencies
- Work with regional attractions to develop and promote events during shoulder seasons
- Work with regional attractions to develop cross-promotions, joint ticketing, and discount opportunities to encourage longer stays and additional activities

Diversified Manufacturing and Services

- Work with existing firms in the distribution and financial services sectors to encourage expansion and to attract additional firms
- Work with local and state officials to provide incentives for clean industry
- Work with local institutions and Desert Research Institute (DRI) to identify opportunities for high-technology ventures
- Work with local financial institutions to make access to start-up capital easier

Support Functions

- Public/private partnerships—Public/private initiatives can often achieve more than what can be done by either sector acting alone. This is particularly true in development where government may be legally constrained and the private sector financially limited. We recommend that the region consider this model in economic development initiatives.
- Higher education/business linkages—A disconnect exists between the needs of the business community for skilled labor and the output of local colleges. By more closely coordinating curriculum with potential employment, the students and the business community will win.
- Alternative transportation—To improve air quality, reduce congestion and stress on the region's roads, and assist employees who cannot afford to live where they work,

some form of alternative transportation is necessary. This transportation should be geared to needs and may be as simple as incentives for carpools, provision of vans for groups of employees, or the rental of buses.

- Improved infrastructure—Business expects certain capabilities, such as high-speed Internet, cell phone access, and other advanced technology. Such amenities are particularly lacking in the Tahoe/Truckee area although the entire region would be well-served by an upgrading of service.
- Affordable housing—A major impediment to economic development in the region is the lack of affordable housing. Some efforts have been made to encourage the provision of some low-cost housing as a condition of commercial development. We recommend that this effort be aggressively pursued, and that efforts with local and state officials be made to address this problem.

Connections to Other Issue Areas

A clear linkage exists between economic development and energy. All facilities require energy to function; additional development will require additional capacity and may strain the distribution system. The recommendations in the Sustainable Energy Throughout the Region section of this report should be considered as part of the economic development program.

There is also a linkage between economic development and transportation. The vast majority of visitors to the region arrive by car. Employees need to get to work. Goods need to flow into, out of, and around the region. A well-functioning transportation system is therefore critical to economic development.



SUSTAINABLE ENERGY THROUGHOUT THE REGION

Several key organizations are involved in energy in this region: Nevada State Office of Energy (NSOE), California Energy Commission (CEC), Energy Nevada Team, other consultant groups, California and Nevada Public Utilities Commissions, private (Sierra Pacific Power Company and Nevada Power Company) and public utilities, other state and local government offices and the U.S. Department of Energy, and various energy stakeholder groups. All these organizations play different roles, and the coordination of activities among them appears to be hit-or-miss.

Several studies and energy plans have been developed by these groups:

- The Nevada Renewable Energy and Energy Conservation Task Force's 2003 Report
- Nevada Governor's Energy Protection Plan
- Nevada State Office of Energy's Comprehensive State Energy Plan
- Potential Economic Impact of Nevada's Renewable Energy Resources
- California Climate Change Center Biennial Report
- California Bioenergy Action Plan
- California Integrated Energy Policy Report

Implementing elements of the various plans and actions on the recommendations in the various reports appear to be on a hit-or-miss basis also. The identification and acquisition of adequate financial and technical resources to carry out the various actions in the plans and the recommendations in the reports seems to be lacking.

In addition to all of the energy-related organizations, the other major players regarding energy are the various state, regional, and local planning bodies. With regard to the bistate region being examined in this exercise, the Tahoe Regional Planning Agency (TRPA) is the critical body that addresses the Tahoe Basin, which is where California and Nevada have joint authority to oversee development at Lake Tahoe. The TRPA is currently updating the land management plans for the next 20 years through the Pathway 2007 process. It is focused on nine thresholds:

- · Air quality and transportation
- Water quality
- Soil conservation
- Vegetation
- Wildlife

- Fisheries
- Scenic resources
- Noise
- Recreation

It is also including economics in the plan.

Unfortunately, this regional planning body as well as all of the other state and local planning bodies has not included any key energy principles in their plans, for example:

- Renewable energy and energy-efficient development where the technology is viable and economic, environmental, and social impacts can be addressed satisfactorily
- Renewable energy and energy-efficiency criteria assessing the housing, commercial, development and transportation sectors
- Use of resource mapping regarding the technical and commercial feasibility of renewable energy projects
- Policies in the various topic area development documents that require a certain percentage of the energy to be used, for example, in new residential and commercial development to come from energy-efficiency measures and on-site renewable energy development

Again there appears to be a lack of communication and coordination in both the development and implementation of these plans.

Issues

The initial broad issues identified related to energy production, distribution, and usage in the region were air quality-mobile pollutant sources; economic development, i.e., more local clean businesses and jobs; and affordability. During the assessment process, other energy-related issues identified included social equity (energy costs and quality of living in housing), reduction of environmental and other sustainable quality-of-life impacts related to housing and commercial development activities, the need to address the effects resulting from climate change, lack of coordinated outreach and public education programs, and the impact on water use.

The five major energy issues identified were

• Promotion and use of energy-efficient technologies and conservation techniques—green buildings

- Promotion and use of distributed renewable energy sources—biomass, geothermal, solar, and wind
- Increased incentives for using energy-efficient measures and renewable energy technologies
- Increased effort on outreach and public or targeted-group (e.g., developers) education programs
- Creation of additional opportunities for training of energy professionals

In summary, as stated by one of the participants who has been actively involved in the land use planning of this region for more than 35 years: "Tahoe is a region where great efforts have been made but more needs to be done . . . Reno/Sparks/Washoe County region is 'a region that is going in the wrong direction in almost all policies' . . . Sprawling growth will weaken the region's economy by increasing service costs."

Following the needs assessment, the Tahoe/Truckee and Reno/Sparks/Washoe County energy working groups discussed regional energy production, distribution/transmission, green building, and transportation sectors.

Energy Production

At present, one-third of the electricity used is imported to the region and about 99 percent of the energy resource (primarily coal) to produce the electricity in the region is imported. The U.S. Department of Energy's National Renewable Energy Laboratory (NREL) has provided assistance in preliminary mapping of the potential resource base of renewable energy sources.

Strengths

It appears for this region, in prioritized order, that geothermal, biomass, solar, and wind offer the greatest potential to start offsetting the use of imported resources. For example, data show that 1,500 megawatts of electricity could be produced by tapping the geothermal resource and 2,000–4,000 megawatts of electricity could be produced from biomass. Second, there are some initiatives under way to start using these renewable energy resources for the production of electricity and for heating/cooling. Third, there is potential for bulk purchasing of this fuel by the existing utilities for economies of scale. Fourth, some incentives are in place to encourage the buying of renewable energy fuel such as renewable energy (and in Nevada, energy conservation), portfolio standards, and green power purchasing programs.

Weaknesses or Challenges

There are apparent roadblocks that are inhibiting the utilities' ability to start meeting their Renewable Portfolio Standards (RPS) requirements, and there is a lack of awareness of the Green Power Purchasing program. In addition, government appears to lack the will to find solutions to these problems. In addition, the independent power producers (IPPs), Nevada Power and Sierra Pacific Electric companies, seem focused on revenue requirements and appear to view the purchase of renewable energy as a negative investment.

Opportunities

This region has a vast renewable energy resource base that it can tap, as well as some scattered educational and outreach programs it can coordinate and build on. By viewing the renewable energy resource as a distributed energy and cogeneration of energy, the region may be able to create new community and municipal utilities that will not have the same mindset and constraints of the IPPs. In addition to federal incentives, several special state programs and incentives, including grants, rebates, and loans, are operated by the California Energy Commission (CEC) and the Nevada State Office of Energy (NSOE) to provide seed monies for development and use of renewable energy. The CEC and the NSOE can be encouraged and supported in their efforts to take the lead in implementing their state comprehensive energy plans and the recommendations in various studies, among other actions.

Threats

The region needs to reexamine plans to continue to build coal plants that cause environmental, water, and transportation problems and compare these plans with the benefits of building renewable energy plants. The utilities' focus on revenue requirements and lack of vision concerning innovations need to be addressed.

Distribution/Transmission

The region has made some progress in mapping its renewable energy sources and examining the potential tie-in to the existing electric power grid. The transmission system needs to be upgraded and expanded.

Strengths

The region has a transmission system in place that appears reliable for its existing customers, except where it has expanded to isolated areas.

Weaknesses or Challenges

The region needs to do more to assess the condition and aging infrastructure of the current system. The localities in which distributed generation is being talked about suffer from the NIMBY (Not In My Back Yard) mentality. The current system is susceptible to disruptions. Because of their upfront costs, renewable energy projects require longterm power purchase agreements.

Opportunities

The region can do more to develop infill using the existing distribution system. New distributed energy plants can be developed independent of the existing grid; distributed energy contributes to the region's energy security. More incentives can be established to support development of a new grid.

Threats

The utility commissions need to play a strong role to address the identified weaknesses.

Green Building

Primarily in the part of the region that is in California, the development of green building guidelines and LEED-related construction of green building are under way.

Strengths

Several state laws, such as Assembly Bill 3, and programs now provide incentives. The CEC and the NSOE are in place to support green building programs. The region's climate allows for the use of natural ventilation. The area has several sustainable construction building professionals.

Weaknesses or Challenges

This region is plagued with sprawling construction by outside builders. Building codes and regulations are set at the minimum energy requirements and are not uniform across the region. The perception, and often the reality, of green building construction is that it requires additional upfront costs. Maintenance costs for retaining a building's green building status is an often-overlooked factor.

Opportunities

The region can build on existing education and training programs by

- Increasing the amount of and types of existing financial incentives (e.g., energyefficient mortgages) and making them more accessible
- Developing bulk purchasing programs for efficiency technologies
- Offering more training programs for building code officials
- Using Institute green building and smart growth guidelines in land-use plans
- Developing cross-cut communication between organizations and others involved in green buildings
- Developing more public awareness and education programs
- Becoming an economic tool for job creation in the region
- Creating an infrastructure to handle demolition and construction waste via reuse and recycling

Threats

Outside builders are encouraged to build in the sprawl development plan. Material and appliance costs are often slightly higher for green building. If a major green-building effort gets under way, one challenge may be dealing with a shortage of trained professionals in green-building practices.

Transportation

The early beginnings of an alternative fuel program with biodiesel and E-85 ethanol is in place. However, the Nevada state energy development plan and various regional plans make no or little reference to energy as it relates to transportation with the exception of the TRPA plan. The TRPA plan includes transportation as it relates to air quality and recognizes motor vehicles as the primary source of air pollution in the Tahoe Basin. But solutions are focused not on alternative fuels but on limited alternative transportation modes such as bicycles and walk paths and some talk about mass transit.

Strengths

The starting elements of an alternative fuel program are in place, with a couple of biodiesel stations and some use of E-85 in Nevada's state government fleet. Some charging stations are available to encourage electric vehicles.



Weaknesses

There is no regional perspective on transportation. The region has a spread-out population with a lot of small groupings.

Opportunities or Challenges

The region needs to connect existing mass transportation nodes and develop a regional transportation plan. The resources are available to develop an alternative fuel supply, particularly biodiesel and electricity.

Threats

The region's challenge is in getting people out of gasoline- and diesel-fueled vehicles and dealing with continuous sprawl and development.

Vision and Recommendations

- Increase use of renewable energy sources
- Develop and expand a green building program
- Develop and expand the use of alternative fuels
- Designate smart growth principles to limit sprawl in the existing land-use plans
- Develop and implement a regional land-use plan incorporating smart growth principles and energy principles
- Develop and implement a coordinated energy education and public outreach program as well as a training program for energy professionals
- Foster community and citizen involvement in the development and carrying out of a regional plan

- Establish energy-efficiency and renewable-energy criteria in the building and transportation sectors
- Make use of resource mapping
- Set out energy-efficiency and renewable-energy criteria when assessing the housing, commercial, and transportation sectors
- Examine the relationship of energy and water
- Continue developing financial, regulatory, policy, and market incentives for development of energy-efficiency and renewable-energy projects and programs

MOVING FORWARD

To create a more sustainable future, the Reno/Tahoe/Carson region needs to protect and improve the availability of clean water to its ecosystems and residents, make the transition away from the use of imported fossil fuels, diversify its economy using the region's strengths, and coordinate long-term land-use and transportation plans across municipal and county boundaries. Although all of these issues are important, the most significant action the people of the Reno/Tahoe/Carson region can take is to formalize a way to plan and act regionally. This plan would include several components:

- Agree on the defined extent and boundary of the region, i.e., the counties of Washoe, Douglas, Nevada, Lyon, Storey, Placer, and Eldorado; the cities of Reno, Tahoe, Carson City, Truckee, and Virginia City; all the surrounding and outlying areas associated with them; the two watersheds of Lake Tahoe; Truckee Meadows; and the area around Pyramid Lake—Once the boundary is formally agreed on, then it should be easy to also agree on a formal name for the region. We have referred to it as the Reno/Tahoe/Carson region for this report but there may be a more fitting name the local community may wish to adopt.
- Establish a means for local organizations and governments to convene and plan on a regional basis—Precedent has been set in the area for cooperative planning such as the Tahoe Regional Planning Agency. However, many more government and citizen entities could and should be brought to the table. The task will be determining how to bring them together, in what format, and with what frequency. This does not necessarily mean creating a new entity, rather it could operate as a "council" or collaboration of the many existing government and citizen organizations. Once convened, the focus should be to take up planning, in all aspects of the word, on a cooperative, regional basis. This planning would include all of the topics presented in this report and ideally maintain the focus on the long-term interconnectedness and sustainability of the components of the region and the region as a whole.
- Use available models and information of other regions to move forward with this region—For example, there is a planning concept known as the Urban Constellation Concept described as follows:
 - "In developing sustainable land-use design processes for large regions that include rural areas and urban metroplexes, because of present American lifestyles and the cheapness of travel compared to other countries, it is now imperative that planning include consideration of a relatively new concept known as the "Urban Constellation" model and what effects this dynamic has on conscious development to achieve sustainability. Proposed by Phillip Lewis (University of Wisconsin), the Urban

Constellation model depicts the relationship of metropolitan areas to their surrounding rural regions for goods and services, food, recreation, housing, waste disposal, and other material flows normal between an urban area and surrounding rural landscapes.

In essence cities in an urban constellation configuration are related to one another by common marketing, transportation infrastructure, economic similarities, and codevelopment patterns. Each of 26 major urban constellations defined around the United States possesses what is called a "hole in the donut," the geographic area in which the urban complex exists, surrounded by the donut itself, where the municipalities in any urban constellation share a common backyard, playground, or rural region. For example, the connection of Norfolk, Va., Richmond, Va., Washington, D.C., Baltimore, and Philadelphia comprises one of the major 26 urban constellations ("the hole in the donut") around the United States. Part of the "donut" or backyard for this constellation is the Delmarva Peninsula. In this regard the Delmarva provides the rural landscape, "bedroom community" setting, and all associated services for this eastern urban constellation. This kind of relationship exerts a significant pressure on a rural region and therefore, must demand serious consideration in any regional planning effort for a jurisdiction. At a minimum it requires planners to seriously consider the "footprint" (demand for regional goods and services, including ecosystem services) that is exerted by demand on food, lumber, recreational land, water, etc. within the entire urban constellation area by the metropolitan settings and their populations."

The region should consider tapping into and connecting with local Nevada and California academic, research, and planning institutions as a resource for such regional planning models.

Overall, the people and leaders of this region need to keep talking, meeting, and working collaboratively on the issues that will make this area a thriving, desirable, and healthy place in which to live, work, and recreate for many generations to come. The SDAT process has begun the dialogue; the next step is for the people and the leaders of the region to continue the dialogue and focus on the region's multivariate issues. Although the outcomes are not yet clear, this SDAT report provides the basic vision of a healthy, livable, sustainable region that balances economic, environmental, and socialequity concerns. This report lays out the process for getting there as a full regionwide collaboration. The ultimate success in achieving this vision and the details in carrying it out are up to the people of the region.

On behalf of the Northern Nevada SDAT and the American Institute of Architects, we hope this report will be a useful guide to the northern Nevada region as it charts its future for the coming years and generations.

