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RESOURCE CONSERVATION AND RESILIENCE

The Resource Conservation and Resilience Element establishes objectives and policies for the conservation of natural resources in Fresno. The Element addresses air resources, including air quality and greenhouse gas emissions; water resources, including groundwater and waterways; energy resources; and land resources, including farmland and mineral resources. The overarching theme is “resiliency,” meaning the ability to withstand temporary and permanent disruptions in resources that will affect everyday ways of life.

7.1 CONTEXT

A conservation element for the conservation, development, and utilization of natural resources including water, forests, soils, rivers, wildlife, minerals, and other natural resources is required to be included in a general plan by State law (California Government Code Section 65302). The conservation element must consider the effect of development within the jurisdiction, as described in the land use element, on natural resources located on public lands.

Assembly Bill (AB) 32—the Global Warming Solutions Act of 2006 requires California to reduce statewide greenhouse gas emissions to 1990 levels by the year 2020 and Executive Order S-03-05 calls for a reduction of 80 percent below 1990 levels by 2050. In support of these State goals the City has committed through the General Plan and Greenhouse Gas (GHG) Reduction Plan to reduce community-related and City operations-related greenhouse gas emissions to a degree that would not hinder or delay implementation of AB 32 and would lay the framework to help meet future goals.

The primary benefit to the City, and to the development community, of having a citywide GHG Reduction Plan is that it will assist development by streamlining the approval process. The CEQA streamlining provisions of the CEQA Guidelines (SB 97 updates) require local governments to define the extent of GHG production and identify ways to substantially reduce GHGs in the future in order to minimize a potentially significant environmental impact. If a GHG Reduction Plan reduces community-wide emissions to a level that is less than significant, then a later project that complies with the requirements in such a GHG Reduction Plan may be found to have a less than significant impact. This will allow the applicant to complete a GHG Reduction Plan consistency analysis for their project instead of a project specific analysis for greenhouse gases.

Potential improvements in air quality and water supply security are additional benefits to pursuing GHG reductions for Fresno. The factors that contribute to GHG increases also impact air quality and water supply in the San Joaquin Valley. As discussed in later sections of this element, the accelerating climate change could have adverse impacts in the Fresno region such as: increased temperature and extreme weather events, increased risk of large wildfires, exacerbation of air quality problems, reduction in the quality and supply of water from the Sierra snowpack, decreased electricity supply, reductions in the quality and quantity of certain agricultural products, decreased health and productivity of California's forests, and increased flood risk.

Resiliency in City Planning

Resiliency, in terms of city planning, refers to creating infrastructure and implementing policies and programs to ensure that the residents, businesses, and government of a city can withstand temporary and permanent disruptions in resources that affect daily activities. A resilient city is not dependent on certain sources of energy, is able to adapt to shifts in weather patterns, has a plan to respond to emergencies such as earthquakes and floods, and has secured a long-term source of food and water. These ideas are presented in this element in relation to resource conservation concepts; details on infrastructure planning are in the Public Utilities and Services Element and the Transportation and Mobility Element, while emergency preparedness is addressed in the Noise and Safety Element. Protection of biological resources such as native plant communities and wildlife habitats is addressed in the Parks, Open Space, and Schools Element.

Relationship to General Plan Goals

This Element provides objectives and policies that support a wide range of General Plan goals, in particular the following:

3. Emphasize conservation, successful adaptation to climate and changing resource conditions, and performance effectiveness in the use of energy, water, land, buildings, natural resources, and fiscal resources required for the long-term sustainability of Fresno.
4. Emphasize achieving healthy air quality and reduced greenhouse gas emissions.
5. Support agriculture and food production as an integral industry.

Emphasize the economic and cultural role of Fresno as a center of agriculture and food production systems by conserving farmland through a focus on developing vacant and underutilized land within the established Sphere of Influence of the City, limiting any further urban boundary expansion, and developing urban agriculture within the city and designated growth areas.

12. Resolve existing public infrastructure and service deficiencies, make full use of existing infrastructure, and invest in improvements to increase competitiveness and promote economic growth.

Emphasize the fair and necessary costs of maintaining sustainable water, sewer, streets, and other public infrastructure and service systems in rates, fees, financing and public investments to implement the General Plan. Adequately address accumulated deferred maintenance, aging infrastructure, risks to service continuity, desired standards of service to meet quality-of-life

goals, and required infrastructure to support growth, economic competitiveness and business development.

13. Emphasize the City as a role model for good growth management planning, efficient processing and permit streamlining, effective urban development policies, environmental quality, and a strong economy. Work collaboratively with other jurisdictions and institutions to further these values throughout the region.

Positively influence the same attributes in other jurisdictions of the San Joaquin Valley –and thus the potential for regional sustainability - and improve the standing and credibility of the City to pursue appropriate State, LAFCo, and other regional policies that would curb sprawl and prevent new unincorporated community development which compete with and threaten the success of sustainable policies and development practices in Fresno.

16. Protect and improve public health and safety.
17. Recognize, respect, and plan for Fresno's cultural, social, and ethnic diversity, and foster an informed and engaged citizenry.

Emphasize shared community values and genuine engagement with and across different neighborhoods, communities, institutions, businesses and sectors to solve difficult problems and achieve shared goals for the success of Fresno and all its residents.

Fresno Green – The City's Strategy for Achieving Sustainability

In 2008, the Fresno Green Strategies were presented to a previous mayor and City Council. They were accepted as the City's first attempt to articulate a direction for achieving a sustainable future through green conservation efforts, including those that could be made by the City. These strategies addressed a wide range of issues organized around five “visions” for Fresno and its future growth areas: New City Beautiful, Sierra View 2025, Solar Valley, Green Enterprise and Economic Development, and City as Good Steward. The City won an award from the U.S. Environmental Protection Agency (EPA) for these strategies.

Most of the objectives and programs that support these strategies and ideas have been or are in the process of being implemented. The majority are incorporated into policies in this General Plan. Those that are not should not be considered objectives or policies of this Plan. Key ideas from the Fresno Green Strategies are described below.

New City Beautiful

The New City Beautiful vision showcases good urban design, with priority given to public health, open spaces, public art, historic preservation, urban forests, and the protection of natural habitats. The main initiatives are:

- Develop and implement compact, transit- and pedestrian-oriented development principles and green building standards.
- Build municipal buildings to a green building rating system and adopt green technology for the retrofit of existing City buildings.
- Plan new residential areas and retrofit established neighborhoods to be within one half mile of public parks, school playgrounds and/or recreational open space.
- Plant and maintain trees in order to achieve shading of at least 50 percent of all hardscaped parking and pedestrian surfaces.
- Protect critical habitat corridors and key habitat characteristics from unsuitable development.
- Reduce the use of disposable toxic or non-renewable products through environmentally preferred purchasing policies.

Sierra View 2025

The Sierra View 2025 initiatives focus on making the Sierra Nevada mountain range clearly visible to all Valley residents by 2025. The aim of the initiatives is to improve public health with cleaner air, enhance public transportation, and increase opportunities for walking and cycling:

- Implement enhanced public transit and traffic light synchronization programs to reduce commute time.
- Reduce City fleets' air pollutant emissions and City greenhouse gas emissions.
- Reduce the number of commute trips by single occupancy vehicles.
- Meet federal clean air standards.

Solar Valley

This initiative envisions Fresno as becoming a leader in renewable energy use by maximizing new renewable sources. With its abundant sunshine, the opportunity exists to improve air quality, reduce dependence on foreign energy, and provide attractive new jobs by harnessing solar power. Three initiatives work toward this vision:

- Increase use of renewable energy to meet 50 percent of annual electrical consumption for City operations.

- Reduce the city's peak electrical load by 10 percent through energy efficiency and conservation measures and shifting the timing of energy demands.
- Reduce citywide greenhouse gas emissions to meet requirements of State AB 32.

Green Enterprises and Economic Development

These initiatives set the stage for Fresno to become the Valley center for innovative business enterprises with a focus on the “triple bottom line” of providing environmental, economic and social benefits:

- Position Fresno as a regional center for green enterprises.
- Create environmentally beneficial jobs in low-income neighborhoods.
- Promote and support locally grown and organic foods.

City as Good Steward

The City as Good Steward vision puts forth Fresno as a city that leads by example in greening up its facilities and practices, embracing a zero waste initiative, providing appropriate staff resources, and collaborating with other municipalities and agencies to develop regionally-based green programs. Seven initiatives comprise the program for this vision:

- Achieve 75 percent diversion of solid waste that otherwise would go to landfills by 2012 and zero waste to landfills by 2025.
- Develop and implement an Integrated Pest Management program.
- Protect integrity of Fresno's primary drinking water sources through an update of the General Plan.
- Develop and implement environmentally responsible policies and practices.
- Market the Fresno Green Strategies (New City Beautiful, Sierra View 2025, Solar Valley, Green Enterprises and Economic Development, and City as a Good Steward) throughout the community.
- Incorporate sustainable policies into the General Plan.
- Measure successes of Fresno Green Strategies and present a periodic report to the Council, which could be integrated into the General Plan annual report.

Relation between Urban Form and Resource Conservation

Making efficient use of public infrastructure and reducing the financial resources devoted to energy use will save money for residents, businesses, and the City government. By strategically regulating urban form elements through this Plan, such as

development types, intensity, building massing and orientation, landscaping size and type, and the mix of land uses, the city can produce significant energy and water savings.

The Plan also seeks to prevent an overextension of its developable area and manage land use impacts on municipal revenues more effectively. Low-density residential developments on the urban fringe in county areas that require annexation are expensive for the City to serve with both physical infrastructure (roads, water, and sewer) and public services (fire and police). In addition, because of tax sharing arrangements with the County of Fresno, these annexed areas contribute significantly less revenue to the City's general fund than land developed within the city limits. Meanwhile, Fresno has vacant and undervalued parcels located in its urban core, particularly along key transit corridors. In established neighborhoods, infrastructure and services are already provided, and tax benefits are much greater for the City than those generated by newly annexed land. Ultimately, the amount of land available to the City for future growth is finite, as further expansion of the City's SOI is blocked in certain directions by the Madera/Fresno county line and the city of Clovis, is contingent on County of Fresno plans, and may consume valuable farmland. Infill development is also important to other aims of the Plan, including ensuring that the cost of doing business goes down, revenues are maximized, and scarce financial resources are used efficiently.

7.2 USE OF INFRASTRUCTURE AND RESOURCES

Continued growth outwards creates transportation and air quality issues, as well. The continued siting of major retail and commercial uses, as well as jobs, at Fresno's urban fringe is lengthening travel times and increasing traffic levels (and air pollution) disproportionately faster than the rate of population growth, due to inefficient location selection. Given the restrictions on and impacts of increasing Fresno's land area, the Plan promotes the highest and best use of land within Fresno's current city limits, phases growth into unincorporated areas of the SOI, and avoids de-investment in Downtown and established neighborhoods. Furthermore, certain patterns of land development can increase costs to the City in excess of related revenues and essentially reduce fiscal resources. The Plan seeks to discourage this type of development and, at the least, ensure that all development covers its fair share of public costs.

Communication and Broadband

Making efficient use of public infrastructure and reducing the financial resources devoted to energy use will save money for residents, businesses, and the City. This section addresses broadband and telecommunications infrastructure opportunities as they relate to the progression, redevelopment of the inner city and development of additional services to constituents. Broadband has become an important part of the lives of every citizen as it is used for social interaction, education, business, and

healthcare, and has been a key factor in economic development for many cities. As technology evolves and content becomes more readily available, the need for higher communication speeds and access to the technology has also increased.

The City of Fresno Information Services Department (ISD) has used excess fiber of the Intelligent Transportation System, as well as its own implemented fiber, for data transport and connectivity. The City's Intelligent Traffic System is designed and implemented by the Public Works Department with ISD as a partner from a technology aspect. Most of the fiber implemented was funded through grants in order to install conduit and fiber to synchronize traffic signals. To date, most of the construction has been in major thoroughfares where there is a need to control traffic for ease of congestion and improve air quality.

Utilizing the excess fiber, the City has been able to realize a cooperative effort between the region's biggest agencies – the City of Fresno, the County of Fresno and the City of Clovis, as they share data services. In 2003, these three agencies entered into the Fresno Regional E-Government System agreement. Since the initiation of this agreement, ISD has been able to connect multiple agencies (including educational institutions) together to provide shared services such as GIS sharing, public safety data sharing, educational services, data services, as well as video broadcast services. Through this process, the City has been a good steward of taxpayer funds in that they have been able to connect other agencies via this same fiber allowing higher connection speeds without monthly communication fees while realizing additional savings in construction costs. The fiber is also used for other regional services such as video policing and radio services for public safety. In essence, the concept of using excess and additional fiber is a cost savings to the City and its constituents because fiber was installed in trenches while streets were open, thereby only digging once.

Construction costs for installing a fiber network to allow high speed broadband for City operations, as well as to reach the City's constituents is costly. While there are costs in purchasing and installing fiber, the most costly portion of installing a fiber optic network is the trenching and installation of conduit. For this reason, many agencies have considered or have adopted a "dig once" policy. While a trench is open for any reason, one or more conduits are placed in the trench either with fiber installed or it is left empty for future fiber installation. The fiber is then used for a multitude of purposes including connecting locations, video surveillance (video policing), wireless services, or it is opened up to the communication carriers who may lease the conduit space for their build outs, thereby offsetting construction costs. Not only will this cut costs of fiber implementation, it will pave the way to ensure that there is a pathway for higher speed broadband as the needs increase.

In areas of development, where there is a need, fiber can be installed to connect facilities and agencies. This can include many City Fire Department and Police Department stations as many of these have been built near neighborhoods or in locations where City fiber does not exist. Additionally, as the Video Policing program evolves and the need arises for high-tech strategies for the City Fire and Police Departments, the foundation will be in place for a cost effective means of providing connections. If the City ever decides to provide Internet or other services to the public or expand services at City parks, the connectivity can either be installed while construction is commencing or the means will be there for a cost effective implementation at a later date.

In the case where the City will allow private communication companies to lease the conduit, the conduit will remain a City asset with the potential to receive lease revenues consistent with the requirements of the California Public Utilities Commission's regulations and State laws. If other agencies or institutions would like to connect, they may do so under the current Fresno Regional E-Government System Agreement, which covers data sharing and not Internet transport where the City provides Internet connectivity in competition with other carriers.

OBJECTIVE

RC-1 Make efficient use of existing and future public infrastructure.

IMPLEMENTING POLICIES

RC-1-a **Setting Service Standards.** Set service delivery standards at existing levels or formulate and commit the City to an investment program that will meet an improved standard of service.

***Commentary:** Implementation of this policy will be coordinated with the policies and strategies for fiscal sustainability presented in the Economic Development and Fiscal Sustainability Element.*

RC-1-b **Capital Improvement Program.** Prepare and adopt a long-term Capital Improvement Program (CIP) that describes City-sponsored capital projects related to General Plan implementation.

***Commentary:** The CIP will define what areas or projects it would enable and include funding sources covering the complete cost of the projects, as well as intended phasing. It will be updated annually and comprehensively reviewed every five years so that it accurately reflects the City's priorities, community needs, fiscal realities, and State mandates. It also will include an analysis of how improvements*

implement the General Plan and how they reflect the City's commitment to environmental justice and fair share issues relative to individual neighborhood needs. Implementation of this policy will be coordinated with the policies and strategies for fiscal sustainability presented in the Economic Development and Fiscal Sustainability Element and with technical work on service standards and infrastructure improvements mandated by policies in the Public Utilities and Services Element.

RC-1-c

Prioritize Revenues. Prioritize revenues by supporting, streamlining, and providing incentives to projects that create the largest positive impacts on property values, the city's retail base, and, to the extent feasible, Downtown and established neighborhoods.

Commentary: These incentives could include giving priority to supporting redevelopment of vacant and underutilized land, particularly in mixed use and higher density corridors and Downtown, over the conversion of active farmland to urban uses.

RC-1-d

Coordinate Public Construction. Coordinate public construction with other public and private agencies, particularly with respect to streets, sewerage, water, gas, electric, irrigation improvements, flood control facilities, and communication to seek the greatest public benefit and efficiencies at the least public cost.

RC-1-e

Dig Once. Whenever a suitable trench is dug, one or more telecommunication conduits shall be placed in the trench, either with fiber installed or with space available for future fiber installation, to expand or upgrade the fiber optic network as appropriate.

Commentary: Implementation of this policy will require identification of funding sources.

RC-1-f

Telecommunications Strategy. Develop a process for communication carriers to use excess fiber optic conduit with the City in a manner that will allow for appropriate cost recovery and that is consistent with State and federal law.

RC-1-g

Grant Funding. Seek grant funds for the construction or implementation of the fiber optic system to provide expanded public services (such as services for educational, economic, public safety, or underserved communities).

- RC-1-h** **Public-Private Partnerships.** Foster opportunities for public-private partnerships that leverage infrastructure, encourage pooling of resources, and promote shared-use activities.

OBJECTIVE

- RC-2** Promote land uses that conserve resources.

IMPLEMENTING POLICIES

- RC-2-a** **Link Land Use to Transportation.** Promote mixed-use, higher density infill development in multi-modal corridors. Support land use patterns that make more efficient use of the transportation system and plan future transportation investments in areas of higher-intensity development. Discourage investment in infrastructure that would not meet these criteria.

- RC-2-b** **Provide Infrastructure for Mixed-Use and Infill.** Promote investment in the public infrastructure needed to allow mixed-use and denser infill development to occur in targeted locations, such as expanded water and wastewater conveyance systems, complete streetscapes, parks and open space amenities, and trails. Discourage investment in infrastructure that would not meet these criteria.

OBJECTIVE

- RC-3** Actively engage, listen to, educate, and enlist the support of the Fresno community on the need and strategies for resource conservation.

IMPLEMENTING POLICIES

- RC-3-a** **Track Trends in Resource Consumption.** Provide and periodically update written materials and information on the City's website that tracks public and private rates of resource consumption in Fresno and related fiscal and environmental costs.

Commentary: The City of Fresno Department of Public Utilities will work with the San Joaquin Valley Air Pollution Control District and other resource agencies to determine and publish such information, with the frequency of updates dependent on budgetary resources.

RC-3-b **Community Outreach and Joint Solution Making.** Host an ongoing education and listening session series with the public to inform them of public and private rates of resource consumption, costs, impacts, and projected future constraints.

RC-3-c **Multi-Jurisdictional Efforts.** Work actively with the public to develop and champion realistic, effective solutions to conserve resources at the local, regional, and state levels.

Commentary: The City will forge partnerships with other resource agencies, time and resources permitting, to provide information, answer questions, and suggest solutions.

7.3 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

Fresno is located in the center of the San Joaquin Valley Air (SJVA) Basin. The air quality in the SJVA Basin is among the worst in the nation, and routinely exceeds federal and State air quality health standards for ozone and particulates. The poor air quality contributes to high levels of asthma, sinus infections, and cardiovascular disease. The SJVA Basin's poor air quality is caused by natural geographic and climatic conditions, as well as local and regional development, transportation, and land use practices.

The federal Clean Air Act required the U.S. EPA to set standards, which state that certain pollutants should not exceed specified levels. California has adopted its own set of stricter standards under the California Clean Air Act. Transportation conformity is required under the federal Clean Air Act to ensure that federally supported highway and transportation project activities are consistent with State implementation programs. Conformity means that transportation activities should not cause new air quality violations, worsen existing violations, or delay timely attainment of federal air quality standards. Conformity requires demonstration that State and regional transportation control measures in ozone nonattainment areas are implemented in a timely fashion. These measures are expected to be given funding priority and to be implemented on schedule.

The California Clean Air Act requires nonattainment areas to achieve and maintain the State ambient air quality standards by the earliest practicable date and local air districts to develop plans for attaining the State ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide standards. In 2003, the Legislature enacted a bill to reduce public exposure to particulates and established a process for achieving near-term reductions in particulates throughout California ahead of federally required deadlines.

Under the California Health and Safety Code, the Air Resources Board is authorized to adopt regulations to protect public health and the environment through the mobile and stationary source airborne toxic control measures. These measures focus on reducing public exposure to diesel particulates and other toxic air contaminants, particularly for children riding in and playing near school buses and other commercial motor vehicles, who are disproportionately exposed to pollutants from these sources.

Emissions from cars and trucks are being reduced by State and federal standards, which are based not only on air quality considerations but also on energy use. In California, the Pavley Clean Car Standard and the Low Carbon Fuel standard will have dramatic impacts on vehicle emissions in coming years, as will implementation of the newest national fuel standards for current and future model years.

Fresno's air quality management programs are administered by the San Joaquin Valley Air Pollution Control District (SJVAPCD), which covers eight counties, from the San Joaquin County in the north to Kern County in the south. Within this region, the SJVAPCD is responsible for ensuring compliance with federal air quality standards, but it cannot regulate all the pollution sources. The SJVAPCD only has authority to regulate stationary sources for air pollution; its incentive programs to help reduce mobile source emissions are purely voluntary. This lack of authority to regulate mobile source emissions has restricted the SJVAPCD's ability to reduce emissions in the Valley and to achieve compliance timelines for federal air quality standards. Its regulations include dust reduction during construction and stationary source requirements. Incentives, which are paid for by collected fees, include programs to replace or retrofit certain vehicle and engine types (trucks, lawn mowers, and school buses) and the Burn Cleaner Program (wood stove change out).

The City's Role in Improving Air Quality

Given the SJVAPCD's limited authority, any local efforts to directly and indirectly reduce mobile source emissions and thereby improve air quality fall to the City and its transportation and land use policies. Over 81 percent of the region's summer ozone pollution comes from mobile vehicle sources. Reducing ozone pollution is therefore highly contingent on reducing the number of vehicles miles traveled in the city. Fresno residents, like the residents of other neighboring cities, are highly dependent on automobiles and trucks for day-to-day operations due to low-density development patterns. The City can reduce the vehicle miles traveled by planning for and providing feasible and convenient alternative travel facilities and modes that emit fewer pollutants per person. The City can also reduce vehicle miles traveled by striving to ensure that trip generators (such as homes) and destinations (shops and businesses) are located near one another to allow for shorter trips. The reduction in vehicle miles traveled can be realized through transit-oriented development (TOD) and higher density, mixed-use development.

The land use objectives and policies of this Plan are designed to decrease the generation of air pollution and greenhouse gases through the reduction of vehicle miles traveled by supporting infill development, encouraging Complete Neighborhoods, requiring more compact development in infill areas and growth areas, and tying mixed-land uses and high-density development to existing and probable high-capacity urban corridor transit routes. This pattern of development will allow for a more resilient and sustainable community, preserving valued agricultural land.

Infill development relies on the pre-existing public road and utility infrastructure, but may require site cleanup and may burden the existing utility infrastructure to the point that it may need to be upgraded. Mixed-use development allows for a diversity of land uses and activities to be located on the same site or in the same building, including residential uses, retail, professional offices, and commercial uses. Ultimately, higher-density infill and mixed-use development encourages people to drive less because destinations are closer together and easier to reach.

Another type of development that can improve the air quality is TOD, which locates residential and commercial districts around a public transit station or transit corridor. It attempts to encourage walking through a compact pattern of development, mixed land uses, and a location near good transit options such as train lines or bus rapid transit (BRT) corridors. TOD is often characterized by frequent and high-quality transit service, good walkability, parking management, and other design features that facilitate transit use and maximize overall accessibility. It can reduce vehicle miles traveled by offering reliable access to other forms of transportation and mobility.

The availability and reliability of transit service to users is another critical method by which local infrastructure can affect regional air quality. Public transit can play an important role in reducing air pollution by offering an alternative mode of transportation around the city beyond the private vehicle. When individuals opt to use public transportation instead of private vehicles, fewer cars are on the road, which decreases congestion, results in less pollution, and improves air quality.

Street networks can also affect air quality based on the length of trips that they require, as more distance travelled and more time on the road is likely to coincide with more air pollution. With shorter trips needed around the city, the vehicle miles traveled are reduced and fewer pollutants are released into the air, thus improving the air quality.

The term Complete Streets means that streets are designed so all users—pedestrians, bicyclists, motorists and transit riders—of all ages and abilities may safely move along and across them. Since 2011, the Complete Streets Act has required California cities to

account for the needs of all roadway users when updating their General Plans. There is no single design for a Complete Street, but components include sidewalks, curb extensions, accessible pedestrian signals, roundabouts, bike lanes, accessible public transportation stops, and pedestrian-scaled lighting. Complete Street policies often have the effect of encouraging walking and use of public transit, thereby reducing automobile traffic congestion and improving air quality. The Mobility and Transportation Element further discusses street patterns and Complete Street systems.

The Plan also supports modes of travel beyond the private automobile through its circulation policies designed to expand and connect the city's existing sidewalk and bike route network, consider multiple modes of transportation to reduce reliance on single-driver automobile transportation and level of service measurement, and consider context in roadway design. Other transportation measures that are part of the City's effort, and that have been determined to reduce air pollution include:

- Investing in BRT, express bus, limited stop bus and high frequency bus routes on principal transit corridors, transit corridors, and transit routes as determined feasible by appropriate transportation infrastructure studies.
- Support and promote employer implementation of staggered work hours and employee incentives to use carpools, public transit, and other measures to reduce vehicular use and traffic congestion.

Lastly, the use of hybrid, electric and alternative fuel vehicles can improve the air quality, as these vehicles emit fewer pollutants into the air. The Plan supports low emission vehicles through policies and infrastructure, such as providing electric and CNG (compressed natural gas) fueling stations, preferential parking spots for these vehicles, and using these vehicles for the City fleet.

Greenhouse Gas Emissions

Gases that trap heat in the earth's atmosphere are called greenhouse gases (GHGs). These gases play a critical role in determining the earth's surface temperature. Part of the solar radiation that enters earth's atmosphere from space is absorbed by the earth's surface. The other part of it is reflected off the earth and radiated back toward space, but GHGs absorb some of this radiation. As a result, radiation that otherwise would have escaped back into space is retained, resulting in a warming of the atmosphere. Without natural GHGs, the earth's surface would be about 61°F cooler. This phenomenon is known as the greenhouse effect. However, many scientists have determined that emissions from human activities—such as electricity generation, vehicle emissions, and even farming and forestry practices—have elevated the concentration of GHGs in the atmosphere beyond naturally-occurring concentrations, contributing to the larger process of global climate change.

Global Climate Change

Global climate change (GCC) refers to a change in the average weather of the earth that may be measured by wind patterns, storms, precipitation, and temperature. Historically, the rate of temperature change has typically been incremental, with warming and cooling occurring over the course of thousands of years. In the past 10,000 years the earth has experienced incremental warming as glaciers retreated across the globe. However, scientists have observed an unprecedented increase in the rate of warming over the past 150 years, roughly coinciding with the global industrial revolution.

Although GCC is now widely accepted as a concept, the extent and speed of change to be expected, and the exact contribution from human sources, remains in debate. In its 2013 report, the Intergovernmental Panel on Climate Change (IPCC) predicted that the increase in global mean temperature in 2100 relative to 1850 to 1900 is likely to exceed 2.7 degrees Fahrenheit. The same report projects a sea level rise of 10.3 to 21.7 inches by 2100, relative to 1986-2005, with greater rise possible depending on the rate of polar ice sheet melting. A 2012 report done by the National Research Council (NRC) assessed historic and projected sea level rise for specific locations along the open Pacific coasts of California, Oregon, and Washington. Along the California coast south of Cape Mendocino, the committee projected that sea level will rise 1.57 to 11.8 inches by 2030, 4.72 to 24 inches by 2050, and 16.5 to 65.7 inches by 2100.

Accelerating GCC has the potential to cause a number of adverse impacts in California, including but not limited to:

- **A reduction in the quality and supply of water from the Sierra snowpack.** If heat-trapping emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. This can lead to challenges in securing adequate water supplies. It can also lead to a potential reduction in hydropower.
- **Increased risk of large wildfires.** If rain increases as temperatures rise, wildfires in the grasslands and chaparral ecosystems of southern California are estimated to increase by approximately 30 percent toward the end of the twenty-first century because more winter rain will stimulate the growth of more plant “fuel” available to burn in the fall. In contrast, a hotter, drier climate could promote up to 90 percent more northern California fires by the end of the century by drying out and increasing the flammability of forest vegetation.
- **Reductions in the quality and quantity of certain agricultural products.** The crops and products likely to be adversely affected include wine grapes, fruit, nuts, and milk.

- **Decreased electricity supply.** Decreased water availability for hydropower generation (due to less Sierra snowpack and consequently lower reservoir levels) and decreased transmission efficiencies will increase the risk of brown-outs and black-outs and will affect agricultural and industrial productivity.
- **Increased flood risk.** Climate change is anticipated to cause a 20 to 30 percent increase in precipitation in the spring and fall in California. More frequent and heavier precipitation events cause flooding and mudslides, which would incur considerable costs in damages to property, agricultural productivity, infrastructure and even human life.
- **Exacerbation of air quality problems.** If temperatures rise to the medium warming range, there could be 75 to 85 percent more days with weather conducive to ozone formation in Los Angeles and the San Joaquin Valley, relative to today's conditions. This is more than twice the increase expected if rising temperatures remain in the lower warming range. This increase in air quality problems could result in an increase in asthma and other health-related problems.
- **An increase in temperature and extreme weather events.** Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in California. More heat waves can exacerbate chronic disease or heat-related illness.
- **A decrease in the health and productivity of California's forests.** Climate change can cause an increase in wildfires, an enhanced insect population, and establishment of non-native species.

By identifying and addressing underlying vulnerabilities due to climate change in this Plan, the City of Fresno will increase the resilience of the community and the resources it depends on.

Responding to Climate Change Legislation

The City will continue to comply with applicable State climate change legislation. It will also take into consideration settlements by the Governor's Office of Planning and Research (OPR) Technical Advisories and Attorney General with other jurisdictions related to the California Environmental Quality Act (CEQA), GHG emissions, and General Plan updates. By proactively addressing climate change issues and requirements through the Plan, the City has the opportunity to create streamlined application processes for conforming local development.

The issue of climate change is closely related to other resource issues and opportunities, particularly air quality and water supply. The State's GHG legislation (AB 32 – California Global Warming Solutions Act of 2006 and SB 375 – Sustainable Communities and Climate Protection Act of 2008) and the amended CEQA and CEQA

Guidelines require local governments to define the extent of GHG production and identify ways to substantially reduce GHGs in the future in order to minimize a potentially significant environmental impact.

Of particular importance to the Plan is SB 375's requirement that all regional transportation planning organizations (locally, the Fresno Council of Governments) develop a Sustainable Community Strategy (SCS) designed to coordinate regional transportation plans with land use intensities and densities in order to reduce future GHG emissions. Local adherence to SB 375 and the regional SCS is not mandatory; however, the aim is to motivate local governments to align their land use planning with the adopted SCS to capitalize on the new CEQA streamlining opportunities discussed below. For instance, the County of Fresno has a State-mandated target of reducing its GHG emissions from automobile and light trucks (primarily NO_x – nitrogen oxides) by 5 percent by 2020 and 10 percent by 2035. SB 375 provides financial and regulatory incentives to achieve the target GHG reductions, including streamlined environmental review for projects that conform to an adopted SCS.

The Plan includes policies to reduce vehicle miles traveled by increasing land development densities so that more trips (such as to jobs, schools, and personal services) can be accommodated by shorter drives, transit, walking, or biking, and it is likely that such policies would be consistent with an adopted SCS. The Fresno Council of Governments adopted its SCS in 2014. This General Plan complies with the adopted SCS.

Senate Bill 97 (Chapter 185, Statutes of 2007) amended the California Environmental Quality Act statute to establish how GHG emissions and the effects of GHG emissions are appropriately analyzed under CEQA. The amendments stipulate that environmental documents for certain residential and mixed-use projects that are consistent with a General Plan designation, density, SCS, or alternative planning strategy need not analyze global warming impacts resulting from cars and light duty trucks. SB 97 also allows streamlined environmental review for projects in transit corridors that are consistent with an SCS and a City or County's General Plan.

CEQA Tiering and Streamlining Analysis of Greenhouse Gas Emissions

A Climate Action Plan (CAP) to reduce GHG emissions is being prepared concurrently with this Plan. The CAP will allow the City to streamline environmental review for later projects. This is because CEQA and CEQA Guidelines will allow the City to determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously adopted CAP or mitigation program under specified circumstances. An environmental document that

relies on a GHG reduction plan for a cumulative impacts analysis must identify those requirements specified in the CAP that apply to the project, and, if those requirements are not otherwise binding and enforceable, incorporate those requirements as mitigation measures applicable to the project. If there is substantial evidence that the effects of a particular project may be cumulatively considerable notwithstanding the project's compliance with the specified requirements in the CAP for the reduction of GHG emissions, an EIR must be prepared for the project.

OBJECTIVE

RC-4 In cooperation with other jurisdictions and agencies in the San Joaquin Valley Air Basin, take necessary actions to achieve and maintain compliance with State and federal air quality standards for criteria pollutants.

Commentary: This includes compliance with California Government Code Section 65302.1 for the San Joaquin Valley.

IMPLEMENTING POLICIES

RC-4-a **Support Regional Efforts.** Support and lead, where appropriate, regional, State and federal programs and actions for the improvement of air quality, especially the SJVAPCD's efforts to monitor and control air pollutants from both stationary and mobile sources and implement Reasonably Available Control Measures in the Ozone Attainment Plan.

Commentary: A list of Reasonably Available Control Measures was submitted by the SJVAPCD to the U.S. Environmental Protection Agency as part of the Ozone Attainment Plan designed to reduce ozone-forming emissions. The City is responsible for implementing measures related to operations and/or services that the City controls.

RC-4-b **Conditions of Approval.** Develop and incorporate air quality maintenance requirements, compatible with Air Quality Attainment and Maintenance Plans, as conditions of approval for General Plan amendments, community plans, Specific Plans, neighborhood plans, Concept Plans, and development proposals.

RC-4-c **Evaluate Impacts with Models.** Continue to require the use of computer models used by SJVAPCD to evaluate the air quality impacts of plans and projects that require such environmental review by the City.

- RC-4-d Forward Information.** Forward information regarding proposed General Plan amendments, community plans, Specific Plans, neighborhood plans, Concept Plans, and development proposals that require air quality evaluation, and amendments to development regulations to the SJVAPCD for their review of potential air quality and health impacts.
- RC-4-e Support Employer-Based Efforts.** Support and promote employer implementation of staggered work hours and employee incentives to use carpools, public transit, and other measures to reduce vehicular use and traffic congestion.
- RC-4-f Municipal Operations and Fleet Actions.** Continue to control and reduce air pollution emissions from vehicles owned by the City and municipal operations and facilities by undertaking the following:
- Expand the use of alternative fuel, electric, and hybrid vehicles in City fleets.
 - Create preventive maintenance schedules that will ensure efficient engine operation.
 - Include air conditioning recycling and charging stations in the City vehicle maintenance facilities, to reduce Freon gases being released into the atmosphere and electrostatic filtering systems in City maintenance shops, when feasible or when required by health regulations.
 - Use satellite corporation yards for decentralized storage and vehicle maintenance.
 - Convert City-owned emergency backup generators to natural gas fuels whenever possible, and create an advanced energy storage system.
- RC-4-g FAX Actions.** Continue to improve Fresno Area Express (FAX) bus transit system technical performance, reduce emission levels, streamline system operations, and implement BRT where supportive land uses are proposed by Figure LU-1: Land Use Diagram.
- RC-4-h Airport Actions.** Support Airport efforts to develop and maintain programs and policies to support City, State and federal efforts to achieve and maintain air quality standards.
- RC-4-i Methane Capture.** Continue to pursue opportunities to reduce air pollution by using methane gas from the old City landfill and the City's wastewater treatment process.

RC-4-j **All Departments.** Continue to develop and implement in all City departments, operational policies to reduce air pollution.

RC-4-k **Electric Vehicle Charging.** Develop standards to facilitate electric vehicle charging infrastructure in both new and existing public and private buildings, in order to accommodate these vehicles as the technology becomes more widespread.

OBJECTIVE

RC-5 In cooperation with other jurisdictions and agencies in the San Joaquin Valley Air Basin, take timely, necessary, and the most cost-effective actions to achieve and maintain reductions in greenhouse gas emissions and all strategies that reduce the causes of climate change in order to limit and prevent the related potential detrimental effects upon public health and welfare of present and future residents of the Fresno community.

IMPLEMENTING POLICIES

RC-5-a **Support State Goal to Reduce Statewide GHG Emissions.** As is consistent with State law, strive to meet AB 32 goal to reduce greenhouse gas emissions to 1990 levels by 2020 and strive to meet a reduction of 80 percent below 1990 levels by 2050 as stated in Executive Order S-03-05. As new statewide GHG reduction targets and dates are set by the State update the City's Greenhouse Gas Reduction Plan to include a comprehensive strategy to achieve consistency with those targets by the dates established.

RC-5-b **Greenhouse Gas Reduction Plan.** As is consistent with State law, prepare and adopt a Greenhouse Gas Reduction Plan as part of the Master Environmental Impact Report to be concurrently approved with the Fresno General Plan in order to achieve compliance with State mandates, assist development by streamlining the approval process, and focus on feasible actions the City can take to minimize the adverse impacts of growth and development on global climate change. The Greenhouse Gas Reduction Plan shall include, but not be limited to:

- A baseline inventory of all known or reasonably discoverable sources of GHGs that currently exist in the city and sources that existed in 1990.
- A projected inventory of the GHGs that can reasonably be expected to be emitted from those sources in the year 2035 with

implementation of this General Plan and foreseeable communitywide and municipal operations.

- A target for the reduction of emissions from those identified sources.
- A list of feasible GHG reduction measures to meet the reduction target, including energy conservation and “green building” requirements in municipal buildings and private development.
- Periodically update municipal and community-wide GHG emissions inventories to determine the efficacy of adopted measures and to guide future policy formulation needed to achieve and maintain GHG emissions reduction targets.

RC-5-c

GHG Reduction through Design and Operations. Increase efforts to incorporate requirements for GHG emission reductions in land use entitlement decisions, facility design, and operational measures subject to City regulation through the following measures and strategies:

- Promote the expansion of incentive-based programs that involve certification of projects for energy and water efficiency and resiliency. These certification programs and scoring systems may include public agency “Green” and conservation criteria, Energy Star™ certification, CALGreen Tier 1 or Tier 2, Leadership in Energy Efficient Design (LEED™) certification, etc.
- Promote appropriate energy and water conservation standards and facilitate mixed-use projects, new incentives for infill development, and the incorporation of mass transit, bicycle and pedestrian amenities into public and private projects.
- Require energy and water audits and upgrades for water conservation, energy efficiency, and mass transit, pedestrian, and bicycle amenities at the time of renovation, change in use, change in occupancy, and change in ownership for major projects meeting review thresholds specified in an implementing ordinance.
- Incorporate the City’s “Guidelines for Ponding Basin/Pond Construction and Management to Control Mosquito Breeding” as conditions of approval for any project using an on-site stormwater basin to prevent possible increases in vector-borne illnesses associated with global climate change.
- Periodically evaluate the City’s facility maintenance practices to determine whether there are additional opportunities to reduce

GHGs through facility cleaning and painting, parks maintenance, road maintenance, and utility system maintenance.

- Periodically evaluate standards and mitigation strategies for highly vehicle-dependent land uses and facilities, such as drive-through facilities and auto-oriented development.

RC-5-d **SCS and CAP Conformity Analysis.** Ensure that the City includes analysis of a project's conformity to an adopted regional Sustainable Community Strategy or Alternative Planning Strategy (APS), an adopted Climate Action Plan (CAP), and any other applicable City and regional greenhouse gas reduction strategies in affect at the time of project review.

RC-5-e **Ensure Compliance.** Ensure ongoing compliance with GHG emissions reduction plans and programs by requiring that air quality measures are incorporated into projects' design, conditions of approval, and mitigation measures.

RC-5-f **Toolkit.** Provide residents and project applicants with a "toolkit" of generally feasible measures that can be used to reduce GHG emissions, including educational materials on energy-efficient and "climate-friendly" products.

RC-5-g **Evaluate Impacts with Models.** Continue to use computer models such as those used by SJVAPCD to evaluate greenhouse gas impacts of plans and projects that require such review.

7.4 WATER RESOURCES

Population and economic growth of Fresno will be determined, in part, by the availability of water. Fresno's water supply faces challenges and requires strategic decisions to secure its long-term availability and affordability, in light of several pressures:

- Fresno's water supply currently depends on hundreds of deep wells, which draw on a declining aquifer (See the Public Utilities and Services Element for more information).
- The City has the opportunity to use substantial surface water resources, but these require funding and construction of costly new treatment and distribution infrastructure.
- Fresno has one of the highest per capita water consumption rates in California, more than twice that of Los Angeles. More than 50 percent of water consumption in Fresno is used for landscaping, rising to 70 percent in summer months.

- The costs of wastewater treatment, both for the City and industrial users, are relatively high.
- Running groundwater pumps and conveyance systems uses a tremendous amount of energy. Both the amount and cost of energy are rising in spite of technological innovation and efforts to reduce energy demands related to the City's water supply.

Water Sources

Fresno relies on two sources for its water: groundwater and surface water. With its dry climate and low annual rainfall (11 inches), Fresno is dependent on the Sierra snowpack, two rivers, and a groundwater basin for its water needs.

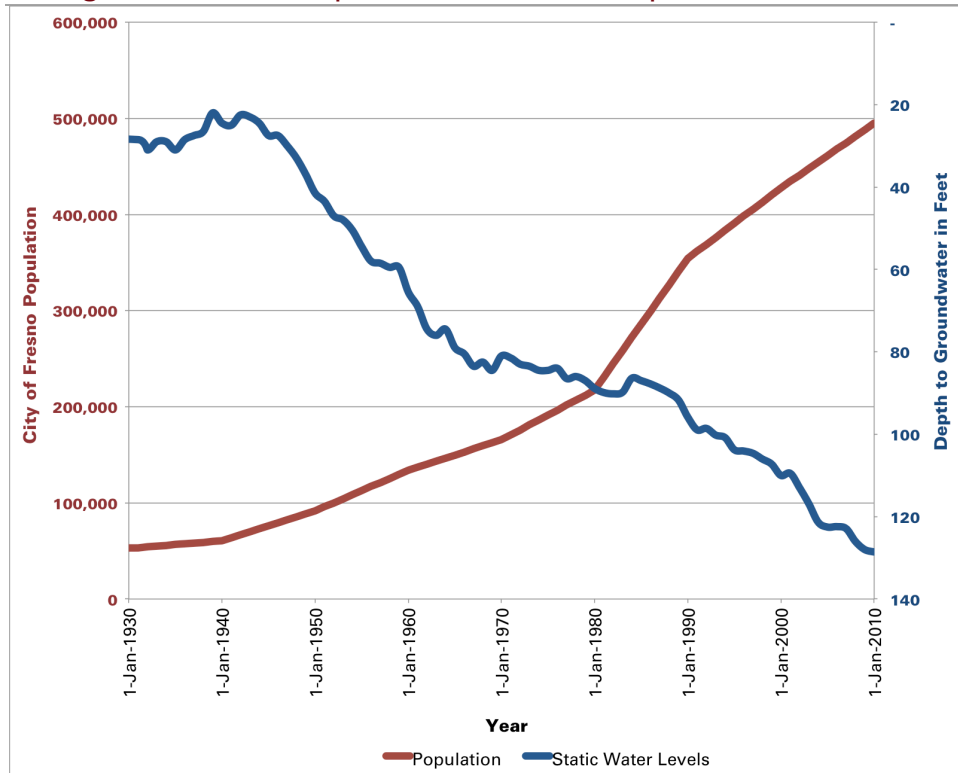
Fresno's primary source of water is groundwater that is located within the existing Kings Sub-basin groundwater aquifer and watershed area, as shown in Figure RC-2. The DPU Water Division currently uses 270 wells to pump about 146 million gallons of water per day (mgd). Since the 1940s, Fresno has taken out more water from the aquifer than has naturally and intentionally seeped back in. This has created an overdraft on the system, resulting in a declining water table (approximately 100 feet in the past 80 years). This increase in the depth to the water table has contributed to water quality problems, deeper well construction, and additional energy costs (due to additional pumping required) and treatment costs. The City currently spends about \$20 million on electricity annually, of which 56 percent, or \$11.2 million, is for water and wastewater services. The vast majority of that expenditure, \$9 million, is for electricity to run groundwater pumps and conveyance.

As the groundwater level decreases, the City will be forced to continue drilling deeper wells, which will result in increased power costs to lift the deeper water from the aquifer. The groundwater level will continue to decline, possibly increasing in its rate of decline as the population drawing water from the basin increases, as shown in Figure RC-1. Other jurisdictions access the Kings Sub-basin groundwater aquifer, and so the rate of drawdown is not solely under the control of the City. Fresno is the biggest user of the aquifer, however, and thus has a large degree of influence on its condition. As it is in a position to lead, the Plan supports efforts to improve regional standards of groundwater usage and recharge.

Fresno does have other sources of water available from the San Joaquin River to the north and the Kings River to the southeast, as shown in Figure RC-2. Snow melt from the Sierras makes its way to Millerton Lake, where it is stored behind Friant Dam and released to the San Joaquin River, and to Pine Flat Reservoir, where it is stored behind Pine Flat Dam and released to the Kings River. Fresno's access to this natural surface water has been established through contracts with the United States Bureau of Reclamation (USBR) for the San Joaquin River and the Fresno Irrigation District (FID)

for the Kings River. The FID contract is renewed annually and the USBR contract is permanent.

Figure RC-1: Population Growth vs Depth to Groundwater



As the City's population has grown, the demand on the City's groundwater supplies has increased. In the 1930s, groundwater was accessible at a depth of 30 feet, while in the 2000s, groundwater was accessible at depths of more than 120 feet in the ground.

Between both sources, 156,100 acre feet¹ (af) of surface water was available to Fresno in 2010. The City diverted 79,000 af for use within the city and allowed the remaining 77,100 af to be used by California State University, Fresno and local farmers for irrigation purposes. This practice is termed in-lieu recharge, whereby groundwater pumping is offset by the use of surplus surface water, thereby leaving groundwater in storage for later use. Another advantage to this practice is that the irrigated surface water seeps through the soil to replenish the aquifer.

¹ An acre-foot is enough water to cover an acre of land with one foot of water. It equates to about 326,000 gallons of water.

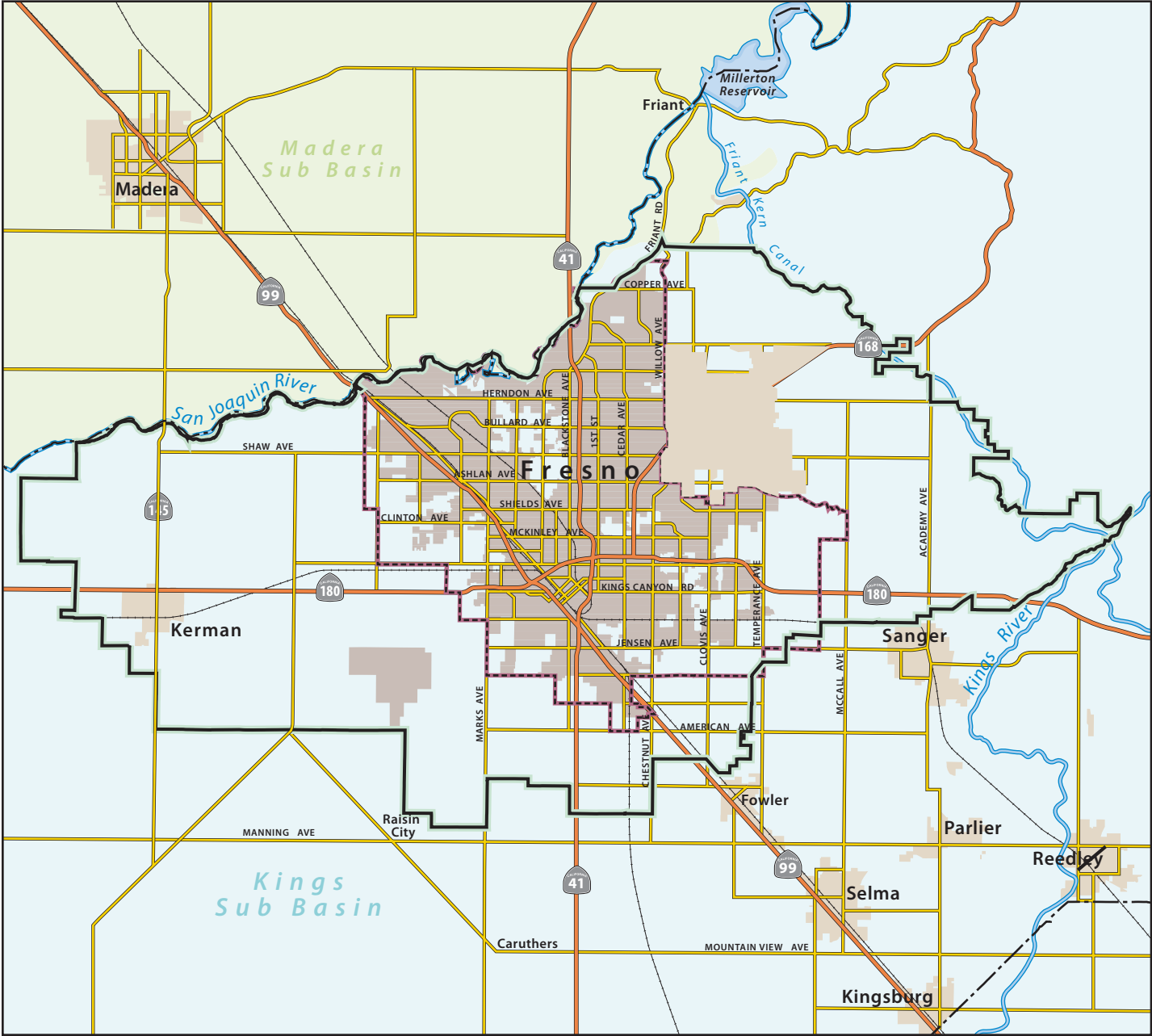
The City's Northeast Surface Water Treatment Facility (NESWTF) opened in 2004. By 2009, it helped to offset demand for groundwater by 12 percent. Because of the depth of the groundwater table in Fresno, it costs less to treat water at a surface water treatment facility than it does to pump water from the aquifer. The City of Fresno Urban Water Management Plan (UWMP) and the City of Fresno Metropolitan Water Resources Management Plan provide recommendations to increase surface water treatment capacity with phased infrastructure improvements that could shift the burden away from groundwater and allow water levels in the aquifer to balance and potentially recover over time. This will also allow the City to make use of available surface water that is not being used within the city.

If the city continues to use primarily groundwater and does not increase surface water treatment and recycled water supply capacity, the groundwater table will decrease at an increasingly higher rate as Fresno grows and the population increases. According to modeling done for Phase 2 of the City of Fresno Metro Plan, continuing to operate "status quo" will cause the groundwater table to decline an additional 85 feet below 2005 conditions by 2025. Under these conditions, 26 percent of the City's wells (69 wells) would have groundwater levels below the current pump bowl intake elevations and would not be operational, and another 13 percent of the wells (36 wells) would have groundwater levels of 15 feet or less above the pump bowl elevations, which may result in inadequate water coverage over the top of the pump bowl.



As part of the Kings Sub-basin groundwater aquifer, the Kings River, pictured here, is an important natural resource for the City of Fresno. Photo: Fresno/Clovis Convention & Visitors Bureau.

Figure RC-2: Kings Subbasin Groundwater Aquifer and Watershed Area



- Fresno Area Regional Groundwater Management Plan Boundary
- Kings Sub Basin
- Madera Sub Basin
- Planning Area Boundary
- Fresno Sphere of Influence
- Fresno City Limits
- Other Cities

Source: City of Fresno, 2014;
Provost & Pritchard Consulting Group;
California Department of Water Resources

Existing Plans and Initiatives

As noted previously, Fresno's future relies on being able to provide a dependable supply of potable water to the community. The City has adopted long-range capital and strategic programs through its City of Fresno Metro Plan, City of Fresno Recycled Water Master Plan, and City of Fresno Wastewater Master Plan. The City has also adopted the State's 2013 CalGreen Building Code, Model Water Efficient Landscape Ordinance, and Graywater Standards, which combine for a 10 to 20 percent reduction in water use in most new construction.

2010 City of Fresno Urban Water Management Plan (UWMP)

The City of Fresno UWMP sets water management goals and strategies to supply water to Fresno's population through 2030. These goals and strategies include reducing the consumption of gallons per capita per day from 300 to 243 by 2020 as mandated by the State and balancing the City's groundwater operations by 2025. To accomplish these targets will require ongoing and new conservation measures; the maximization of available surface water supplies for direct treatment and use, and intentional groundwater recharge; and the incorporation of tertiary-treated recycled water into the future water supply portfolio to meet non-potable demands in new growth areas and existing parts of the city. Implementation of the City's future water supply plan will result in a significant shift and increase in diversity in the City's water supply mix, which will enhance overall water supply reliability.

Water Conservation Efforts

The city depends on reduced consumption due to conservation as a part of its future water supply. Educating the public to reduce usage also directly affects water delivery costs. Power and treatment costs increase as the City pumps more water, so higher water use would mean higher water and sewer rates. Many of the City's water conservation measures respond to requirements in the City's United States Bureau of Reclamation (USBR) contract for 60,000 acre feet of surface water. In fact, one of the contract conditions is that the city follows USBR Best Management Practices, which were used to create the City's Water Conservation Program.

This Program includes watering restrictions in the form of a required winter and summer watering schedule; customer education on the need to conserve water and how to do so; free residential plumbing retrofits such as low flow shower heads and aerators; free system water audits, leak detection and repair; metering for all new connections and retrofits of existing connections; rebate programs for high efficiency clothes washing machines, ultra-low flush or high efficiency toilets, and urinal replacement; public information outreach programs; and water waste prohibition through watering regulations and enforcement. Demonstration gardens and drip

irrigation demonstration plots have been installed as resources to provide examples to customers.

Groundwater Recharge

An important process in a viable groundwater management plan is groundwater recharge. One source is the natural subsurface inflow recharge, which occurs when water flows from areas where the water table is higher to areas where it is lower. The Water Division has estimated that the average rate of subsurface inflow to the aquifer is 22,500 acre feet/year (af/yr). The aquifer is also recharged naturally by rainfall, unlined canals and rivers, as well as irrigation water seeping through the soil at an average estimated rate of 24,400 af/yr. Natural recharge can be impeded somewhat by human activities including pavement and buildings, which can result in enhanced surface runoff and reduction in recharge.



The Kings Sub-basin groundwater aquifer is recharged naturally by rainfall, unlined canals and rivers, and irrigation water, but human activities can impede this natural process with pavement and buildings. Photo credit: Karana Hattersley-Drayton.

To capture surface water runoff, also known as stormwater, the Fresno Metropolitan Flood Control District (FMFCD) has developed an urban drainage design concept that collects, detains and retains surface water runoff for intentional groundwater recharge in ponding basins dispersed throughout the city. FMFCD estimates they collect more than 95 percent of Fresno's urban runoff, though the percentage that actually gets

recharged and the part that is discharged to FID canals and the San Joaquin River is unknown. The FMFCD also partners with the FID and the City in a cooperative groundwater recharge program. This program provides for dry season (generally March through October) delivery of City contract imported surface water from the San Joaquin and Kings Rivers into many of the FMFCD's local ponding basins and the City-owned Leaky Acres recharge basin. Intentional recharge can vary due to a number of factors, which could include pond availability, water delivery season, pond maintenance, or length of wet season.

Intentional recharge in Fresno has averaged 48,900 af/yr from 1990 to 2011. In 2010, intentional recharge was 53,100 af for a total groundwater recharge of 100,000 af. Groundwater pumpage in 2010 was 128,578 af which created a 28,578 af overdraft on the aquifer that year alone. This overdraft is not maintainable.

The City also recharges treated wastewater into the ground at the Fresno-Clovis Regional Water Reclamation Facility (RWRF). Around 55,000 af is percolated for recharge into the aquifer, with 30,000 af subsequently pumped out by the FID in exchange for 13,800 af of fresh surface water from the Kings River.

Stormwater Best Management Practices

The FMFCD captures approximately 100 percent of the stormwater runoff from new development and approximately 95 percent of the stormwater runoff from existing development. Capturing the runoff allows for groundwater recharge and also protects surface water quality by not allowing urban runoff, which often contains contaminants from roadways and lawns, to flow into natural creeks, rivers, and irrigation ditches. The runoff is collected in retention basins (also known as ponding basins), allowing for filtration through the soil. On average, retention basins remove 50 to 80 percent of stormwater pollutants. Additional sediment and ground water studies show that the majority of stormwater pollutant are absorbed to the top 4cm of soil and do not exceed background levels beyond 16cm. The same studies did not detect any stormwater pollutants in ground water tested beneath a retention basin serving an industrial catchment.

The FMFCD's stormwater quality management program includes specific pollution prevention and control practices for urban drainage system planning, design, construction, and maintenance. The program also includes public education to prevent stormwater pollution; commercial, industrial, and new development stormwater quality control practices; monitoring to assess stormwater impacts on receiving water and to evaluate the effectiveness of best management practices; and development and implementation of ordinances to effect and enforce stormwater quality controls.

Water Conservation

Fresno's average total per capita water consumption was 295 gallons per capita per day (gpcd) from 1991 to 2011, making Fresno one of the highest water consuming cities in California. The total per capita water production has varied between 1991 to 2011, from a low of 246 gpcd in 2011 to a high of 329 gpcd in 2001. By comparison, Clovis averages 247 gpcd, Los Angeles is 150, Phoenix is 184, and Tucson is 110.

The California Water Conservation Act of 2009 requires a statewide 20 percent reduction in urban water usage by 2020. The methodology chosen by a jurisdiction must be documented in their Urban Water Management Plan (UWMP). The City's adopted target of 250 gpcd to meet State law is a 20 percent reduction from the 313 gpcd average annual gpcd water use for the 10-year period from 1996 to 2005. The City of Fresno Metro Plan recommends a further reduction to 243 gpcd to help balance the groundwater table by 2020. This General Plan incorporates a comprehensive conservation program that has a reduction target of per capita water usage in the city's water service area of 243 gpcd by 2020 and 190 by 2035.

To meet a consumption reduction target of 243 gpcd by 2020 and 190 by 2035 will require a combination of conservation measures, including among other possible actions: incentives, appliance rebates, outreach programs and education, fixture swap, prioritized leak detection program, retrofit upon resale ordinance, as well as partnering with commercial, industrial, and institutional customers to reduce their water demand through operational improvements. The recent installation of residential water meters is anticipated to reduce water consumption, however additional water conservation measures should be explored. In the future, the City may develop a tiered water rate structure to further encourage water conservation. The biggest opportunities for water conservation are related to the reduction of outdoor water uses, particularly landscape and turf irrigation, by all customers. Measures related to outdoor water use reduction include rebates for xeriscape (drought-tolerant) landscaping for new homes, programmable irrigation, weather-based irrigation control, and turf replacement, and landscape water audit and budget program.

Recycled Water Use

Water recycling is using treated wastewater for beneficial purposes such as agricultural and landscape irrigation, industrial processes, toilet flushing, and replenishing a ground water basin (referred to as ground water recharge). Water recycling offers resource and financial savings, as potable water does not need to be used for non-drinking purposes. Wastewater treatment can be tailored to meet the water quality requirements of a planned reuse. Recycled water for landscape irrigation requires less treatment than recycled water for drinking water.

Wastewater generated from homes, businesses, and industry in the city is conveyed to the Fresno-Clovis Regional Wastewater Reclamation Facility (RWRF). The RWRF is operated by the City of Fresno and has the capacity to treat 80 million gallons a day (mgd) of wastewater. On an average day, the RWRF receives 68 million gallons of wastewater. The RWRF recycles nearly every component of influent wastewater (water, solids, and natural gas). The City releases up to 65,100 af of recycled water per year.

- 10,000 af/yr is sent directly to irrigate non-food agricultural land downstream.
- 55,100 af/yr is directed to 1,660 acres of ponds for percolation into the aquifer.
- 30,000 af/yr is then pumped from the aquifer into FID canals for reuse downstream from Fresno to nearby farmers for unrestricted irrigation use. In exchange for this recycled water, FID provides Fresno with 13,800 af of Kings River surface water.

The City does not presently have the infrastructure to route recycled water from the RWRF to existing or new development. The retrofit of existing residential uses is considered economically infeasible and impractical to implement. The use of recycled water should focus on new and existing large green spaces, industrial uses, and new development. However, the development of a gray water policy for the residential reuse of wastewater for household gardening and landscape irrigation on site may be feasible.

The City also operates a satellite facility in North Fresno called the Wastewater Reclamation Facilities (WRF) Satellite Plant. It was built to serve the Copper River development and golf course. In 2010, the plant was capable of irrigating the golf course at about 750 af/yr and future total capacity will ultimately reach about 1,000 af/yr when the surrounding development builds out.

Key Opportunities

With strategic planning and investments, Fresno will have a dependable water supply system that, in turn, will create a competitive economic advantage. Below are some considerations that are noted with regards to the City's efforts to create a viable water supply system, and many are supported by General Plan policies.

- The geologic structure of the aquifer underneath Fresno is capable of recharging to levels sufficient to support the city during drought periods if the proper infrastructure were in place.
- Conversion to conjunctive use of surface and ground water could reduce energy usage for water delivery purposes by 18 to 20 percent. The reduction in power demand for pumping water would be a reduction in both the total demand and, more significantly, during peak usage periods (a reduction in both production and

grid capacity demand). This reduction could also reduce the city's carbon footprint, potentially eliminating the equivalent of 670,000 gallons of gasoline or one year of electricity for 745 homes.

- Fresno has developed a Property Assessed Clean Energy (PACE) district that can finance water efficiency and energy efficiency upgrades.
- Fresno has the water resources available to balance the groundwater aquifer and create storage for dry years. This can be accomplished by implementing the UWMP and the City of Fresno Metro Plan. These plans call for increased surface water treatment facility capacity, increased intentional recharge, a local groundwater banking program, use of recycle water for non-potable water demands and aggressive water conservation measures.
- Available recycled water and untreated surface water can be used by industrial facilities for cooling systems and other uses without having to meet the drinking water standards for the rest of the city. This water supply could be distributed directly to future industrial facilities or parks to encourage new businesses to relocate to Fresno.
- Changing the practice of lining canals with concrete, or piping them through residential neighborhood developments, will allow for additional natural recharge.
- Outdoor water demand can be significantly reduced through climate-appropriate landscape design and more efficient irrigation technology, while indoor water demand can be reduced by efficient fixtures and appliances.
- Citywide, infrastructure costs and water demand can be minimized through efficient land use. Compact and infill development generally requires significantly less pipe and lower water per capita demand equating to significant per capita cost savings as compared to low density developments.
- Where infill development substantially increases density, or increases the building height, due to both the age and size of the distribution system, the distribution system may require upgrading to avoid negative impacts from suction created by booster pumps, or to provide adequate flows and pressures for increased demands.

In addition to those discussed below, the Public Utilities and Services Element contains additional objectives and policies on water supply, water quality, and reclaimed water.

OBJECTIVE

- RC-6** Ensure that Fresno has a reliable, long-range source of drinkable water.

IMPLEMENTING POLICIES

- RC-6-a** **Regional Efforts.** Support cooperative, multi-agency regional water resource planning efforts and activities on developing and implementing the Upper Kings Basin Integrated Regional Water Management Plan.
- RC-6-b** **Water Plans.** Adopt and implement ordinances, standards, and policies to achieve the intent of the City of Fresno Urban Water Management Plan, Fresno-Area Regional Groundwater Management Plan, and City of Fresno Metropolitan Water Resources Management Plan to ensure a dependable supply of water.
- RC-6-c** **Land Use and Development Compliance.** Ensure that land use and development projects adhere to the objective of the Fresno Metropolitan Water Resources Management Plan to provide sustainable and reliable water supplies to meet the demand of existing and future customers through 2025.
- RC-6-d** **Recycled Water.** Prepare, Adopt, and implement a City of Fresno Recycled Water Master Plan.
- Commentary: This plan will expand the City's wastewater recycling program by developing treatment, delivery, and users.*
- RC-6-e** **Protect Aquifer.** Oppose urban development in unincorporated areas that are not served by a wastewater treatment/management system capable of preventing the buildup of compounds that would degrade the aquifer.
- RC-6-f** **Regulate Sewage Disposal Facilities.** Oppose development of new sewage disposal facilities either within the Planning Area or upgradient (north and east) of the Planning Area, unless the treatment facilities produce effluent that:
- Will not degrade the aquifer in the long term;
 - Will not introduce contaminants into surface water that would negatively affect its potential economic use for drinking water;
 - Will not deleteriously affect downstream agricultural and urban uses; and
 - Will not degrade sensitive riparian habitat.

- RC-6-g** **Protect Recharge Areas.** Continue to protect areas of beneficial natural groundwater recharge by preventing uses that can contaminate soil or groundwater.
- RC-6-h** **Conditions of Approval.** Include in the Development Code standards for imposing conditions of approval for development projects to ensure long-term maintenance of adequate clean water resources. Require findings that adequate water supply must exist prior to any discretionary project approval for residential and commercial development requiring annexation, as required by law.
- RC-6-i** **Natural Recharge.** Support removal of concrete from existing canals and change the practice of lining new and existing canals with concrete to allow for natural recharge.

OBJECTIVE

- RC-7** Promote water conservation through standards, incentives and capital investments.

IMPLEMENTING POLICIES

- RC-7-a** **Water Conservation Program Target.** Maintain a comprehensive conservation program to help reduce per capita water usage in the city's water service area to 243 gallons per capita per day (gpcd) by 2020 and 190 gpcd by 2035, by adopting conservation standards and implementing a program of incentives, design and operation standards, and user fees.
- Support programs that result in decreased water demand, such as landscaping standards that require drought-tolerant plants, rebates for water conserving devices and systems, turf replacement, xeriscape landscape for new homes, irrigation controllers, commercial/industrial/institutional water conserving programs, prioritized leak detection program, complete water system audit, landscape water audit and budget program, and retrofit upon resale ordinance.
 - Implement the U.S. Bureau of Reclamation Best Management Practices for water conservation as necessary to maintain the City's surface water entitlements.
 - Adopt and implement policies in the event that an artificial lake is proposed for development.

- Work cooperatively toward effective uniform water conservation measures that would apply throughout the Planning Area.
- Expand efforts to educate the public about water supply issues and water conservation techniques.

RC-7-b

Water Pricing and Metering. Develop a tiered water cost structure for both residential and commercial users that will properly price water based on its true cost; require all new development to be metered for water use; and charge all customers the true, full cost of their water supply, including costs of acquisition, initial treatment, conveyance, wastewater treatment, operations, maintenance, and remediation.

RC-7-c

Best Practices for Conservation. Require all City facilities and all new private development to follow U.S. Bureau of Reclamation Best Management Practices for water conservation, as warranted and appropriate.

RC-7-d

Update Standards for New Development. Continue to refine water saving and conservation standards for new development.

RC-7-e

Retrofit City Facilities, and Consider Incentives Programs to Encourage Retrofitting of Other Existing Public and Private Residential and Non-Residential Facilities and Sites. Reduce water use in municipal buildings and City operations by developing a schedule and budget for the retrofit of existing municipal buildings with water conservation features, such as auto shut-off faucets and water saving irrigation systems. Prepare a comprehensive incentive program for other existing public and private residential and non-residential buildings and irrigation systems.

RC-7-f

Implementation and Update Conservation Program. Continue to implement the City of Fresno Water Conservation Program, as may be updated, and periodically update restrictions on water uses, such as lawn and landscape watering and the filling of fountains and swimming pools, and penalties for violations. Evaluate the feasibility of a 2035 conservation target of 190 gpcd in the next comprehensive update of the City of Fresno Water Conservation Program.

RC-7-g

Educate on State Requirements. Educate the residents and businesses of Fresno on the requirements of the California Water Conservation Act of 2009.

- RC-7-h Landscape Water Conservation Standards.** Refine landscape water conservation standards that will apply to new development installed landscapes, building on the State Model Water Efficient Landscape Ordinance and other State regulations.
- Evaluate and apply, as appropriate, augmented xeriscape, “water-wise,” and “green gardening” practices to be implemented in public and private landscaping design and maintenance.
 - Facilitate implementation of the State’s Water Efficient Landscape Ordinance by developing alternative compliance measures that are easy to understand and observe.
- RC-7-i PACE Financing.** Develop a residential Property Assessed Clean Energy (PACE) program, if it is determined to be a feasible option, to help finance water efficiency and energy efficiency upgrades for property owners.

Commentary: The program would be administered by private parties.

7.5 ENERGY RESOURCES

Pacific Gas and Electric (PG&E) provides almost all the energy for the city of Fresno. The cost of energy services provided by PG&E is among the highest in the State. Meanwhile, the city has abundant solar resources that could be expanded to reduce dependence on costly purchased electricity, but this will take time and financial resources to implement. Green building practices can be one of the main energy savings strategies encouraged, or required, as Fresno continues to develop. How the City can develop an energy-efficient infrastructure and reduce dependence on the energy grid is a prominent issue for the Plan.

The PG&E electrical grid was established decades ago. It’s been at least 30 years since a large transmission line has been built in the Central Valley. Demand for electricity in Fresno has increased 5.4 percent since 2005, placing an increased load on a finite capacity grid system. In April of 2014, PG&E disclosed plans to build a 70-mile transmission line meant to meet the Valley’s growing demand for electricity. The route for this power line is proposed to the west of Fresno SOI and is expected to go into operation by 2020.

The PG&E natural gas pipeline system was established decades ago and has had limited upgrade. In 1993, a massive expansion of the natural gas pipeline that runs from Idaho’s border with British Columbia to the county of Fresno was completed. Natural gas usage in Fresno has increased 9.2 percent since 2005, adding increased load on the system.

Newer development in Fresno uses energy at higher rates than older land uses, despite having newer, more efficient technology available. Also, the average single-family home consumes 40 percent more electricity than a multi-family home. According to PG&E, the highest amount of residential energy usage in Fresno appears to be in the newer, more affluent areas on the north, west, and southeast edges of Fresno.

Cost data from the recent retrofits done in Fresno shows the average investment necessary to achieve a 28 to 30 percent reduction in energy usage on a typical Fresno home is about \$25,000. Taking the 76,000 homeowners that have a need and multiplying that by the average cost per retrofit, equates to \$1.9 billion in economic activity potential in Fresno, if fully developed. When combined with the estimated \$103 million in annual energy savings through a fully deployed and subscribed existing-home retrofit program, the economic potential of comprehensively reducing energy consumption in Fresno is staggering.

The City has been active since the mid-1990s in taking steps to invest and deploy renewable energy technology and improve the energy efficiency of City-owned facilities and the community at large. Notable actions include:

- Adopting the 2013 California Energy Code;
- Developing a comprehensive free residential energy efficiency survey program (by April 2014, the City has conducted a little over 2,500 residential energy efficiency surveys to Fresno homes);
- Implementing the Fresno Energy Watch Program as part of the Fresno Small Business Energy Makeover;
- Using renewable biogas to produce electric power at the Fresno-Clovis Regional Wastewater Reclamation Facility;
- Installing solar panels at City-owned facilities (As of April 2014, the City had deployed over 4.85 megawatts of solar power on City-owned facilities, including the largest single solar farm at any airport in the nation while a 2 megawatt solar array is planned for the Fresno-Clovis Regional Wastewater Reclamation Facility); and
- Requiring installation of solar energy systems in construction of any new City-owned buildings containing at least 7,500 square feet, and a mandate to use a green building rating system standard for all new municipal buildings over 10,000 square feet.

PG&E also has energy efficiency programs operating in the Fresno area. Many of these programs are geared towards on low-income families, such as the Energy Partners

program and Middle Income Direct Install (MIDI) program. Other programs are focused on local businesses, such as the Direct Install program of the Fresno Energy Watch, the Air-Care Plus program, and numerous others.

The Fresno County Equal Opportunities Commission (FCEOC) administers the federally-funded weatherization programs focused on low-income homeowners in Fresno. These programs are designed to work in collaboration with utility funded programs operated by PG&E. There are several areas of overlap with these programs.

Private organizations, businesses, and individuals are also taking important steps locally. Fresno has the third highest deployment level for solar power among cities in California with 1,056 sites that total 12 MW of power generation capacity. The level of investment in solar power in Fresno has seen a rapid increase since 2006 with over 532 systems installed in 2010 compared with only two systems installed in 2006. In July 2009, Environment California ranked Fresno third in the State for number of kilowatts its solar projects produce and fifth for projects on roofs, with Clovis close behind at seventh.

California State University, Fresno, developed sheltered parking canopies on campus, protecting nearly 700 vehicles from the elements and supporting 3,872 photovoltaic cell panels, which generate 20 percent of the campuses electricity demand. The \$11.9 million project—the largest of its kind on a university campus—was completed in fall 2007.

Key Opportunities

Under this Plan, the City will promote household conservation of electricity, and strive to change current trends of higher energy use in newer development in order to conserve resources for future growth. Fresno also has enormous potential for solar power and will continue investing in solar energy for public facilities. Some of the key opportunities include:

ALTERNATIVE ENERGY

Current viable alternative energy sources for buildings and transportation in Fresno include solar photovoltaic electricity, solar thermal electricity, solar thermal heating, low-speed wind generated electricity, hydroelectricity, natural gas for vehicles, electricity for vehicles, and bio-methane generated electricity.

ENERGY STAR

To earn the ENERGY STAR, a home must meet strict guidelines for energy efficiency set by the U.S. Environmental Protection Agency (EPA), making them 20 to 30 percent

more efficient than standard homes. Homes achieve this level of performance through a combination of energy-efficient improvements including insulation systems, high-performance windows, efficient heating and cooling equipment, and qualified lighting and appliances. In Fresno, 4,441 Energy Star qualified homes have been built, which is equivalent to eliminating 124 vehicles from the roadway, planting 205 acres of trees, or saving the environment from 1.5 million pounds of CO₂.

OBJECTIVE

RC-8 Reduce the consumption of non-renewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources.

IMPLEMENTING POLICIES

RC-8-a **Existing Standards and Programs.** Continue existing beneficial energy conservation programs, including adhering to the California Energy Code in new construction and major renovations.

RC-8-b **Energy Reduction Targets.** Strive to reduce per capita residential electricity use to 1,800 kWh per year and non-residential electricity use to 2,700 kWh per year per capita by developing and implementing incentives, design and operation standards, promoting alternative energy sources, and cost-effective savings.

Commentary: These targets represent 28 and 30 percent reductions respectively, from the 2010 rate of consumption.

RC-8-c **Energy Conservation in New Development.** Consider providing an incentive program for new buildings that exceed California Energy Code requirements by fifteen percent.

RC-8-d **Incentives.** Establish an incentive program for residential developers who commit to building all of their homes to ENERGY STAR performance guidelines.

Commentary: See also Policy RC-7-j on PACE financing for energy efficient retrofits.

RC-8-e **Energy Use Disclosure.** Promote compliance with State law mandating disclosure of a building's energy data and rating of the previous year to prospective buyers and lessees of the entire building or lenders financing the entire building.

- RC-8-f City Heating and Cooling.** Reduce energy use at City facilities by updating heating and cooling equipment and installing “smart lighting” where feasible and economically viable.
- RC-8-g Revolving Energy Fund.** Create a City Energy Fund which uses first year savings and rebates from completed City-owned energy efficiency projects to provide resources for additional energy projects. Dedicate this revolving fund to the sole use of energy efficiency projects that will pay back into the fund.
- RC-8-h Solar Assistance.** Identify and publicize information about financial mechanisms for private solar installations and provide over-the-counter permitting for solar installations meeting specified standards, which may include maximum size (in kW) of units that can be so approved.
- RC-8-i Renewable Target.** Adopt and implement a program to increase the use of renewable energy to meet a given percentage of the city’s peak electrical load within a given time frame.
- RC-8-j Alternative Fuel Network.** Support the development of a network of integrated charging and alternate fuel station for both public and private vehicles, and if feasible, open up municipal stations to the public as part of network development.
- RC-8-k Energy Efficiency Education.** Provide long-term and on-going education of homeowners and businesses as to the value of energy efficiency and the need to upgrade existing structures on the regular basis as technology improves and structures age.

7.6 FARMLAND

Central California is one of the world’s premier growing regions, with Fresno at its heart. The San Joaquin Valley is a mature agricultural area, with a well-defined pattern of farming activities. Much of the arable land is devoted to relatively stable crops, such as orchards, vineyards, and other commercial crops.

The conversion of farmland to urban uses is not the only threat to agriculture. When “leapfrog” development (development that is not contiguous to the existing urbanized area) occurs in the midst of agriculture uses, optimal crop production is precluded due to urban/agriculture conflicts. It is common for farmland to suffer disruptions and economic losses, while urban uses also suffer negative effects, such as farm-generated dust, noise and odors. Another problem exists with premature disinvestment of

farmland where future growth is anticipated but development may not occur for several years. Farmland may be purchased or held for its possible urban development value, rather than continue in agriculture production.

Policies in the Plan will help preserve farmland by incentivizing new development within and adjacent to already-urbanized land, only extending public utilities to new development that adheres to the Plan, and not expanding the City's SOI. Additional objectives and policies in this element address the broader planning issues of farmland preservation. The Healthy Communities Element also has more information on urban agriculture and expanding access to fresh, healthy foods.



Fresno is at the heart of one the premier agricultural areas in the world, and the General Plan policies will help preserve farmland.

OBJECTIVE

RC-9

Preserve agricultural land outside of the area planned for urbanization under this General Plan.

IMPLEMENTING POLICIES

- RC-9-a** **Regional Cooperation.** Work to establish a cooperative research and planning program with the Counties of Fresno and Madera, City of Clovis, and other public agencies to conserve agricultural land resources.
- RC-9-b** **Unincorporated Land in the Planning Area.** Express opposition to residential and commercial development proposals in unincorporated areas within or adjacent to the Planning Area when these proposals would do any of the following:
- Make it difficult or infeasible to implement the General Plan;
 - Contribute to the premature conversion of agricultural, open space, or grazing lands; or
 - Constitute a detriment to the management of resources and/or facilities important to the region (such as air quality, water quantity and quality, traffic circulation, and riparian habitat).
- RC-9-c** **Farmland Preservation Program.** In coordination with regional partners or independently, establish a Farmland Preservation Program. When Prime Farmland, Unique Farmland, or Farmland of Statewide Importance is converted to urban uses outside City limits, this program would require that the developer of such a project mitigate the loss of such farmland consistent with the requirements of CEQA. The Farmland Preservation Program shall provide several mitigation options that may include, but are not limited to the following: Restrictive Covenants or Deeds, In Lieu Fees, Mitigation Banks, Fee Title Acquisition, Conservation Easements, Land Use Regulations, or any other mitigation method that is in compliance with the requirements of CEQA. The Farmland Preservation Program may be modeled after some of all of the programs described by the California Council of Land Trusts.

7.7 MINERAL RESOURCES

This section of the Resource Conservation and Resilience Element is intended to assure that cost-effective locally available mineral resources (such as rock, gravel, and sand for concrete aggregate) are protected for future use by the construction industry, and that extraction of these resources is done in a responsible manner that provides for beneficial end uses of surface mining sites, as required by the California's Surface Mining and Reclamation Act.

Aggregate mineral resources are critical to supporting urban development, as all public and private projects utilize this material for roadway paving, structural elements (foundations), and hardscape (sidewalks, curbing, gutters). Because of the demands that will be made on these mineral resources due to Fresno's projected growth, and because the City has land use authority over designated mineral resource areas, the Plan contains policies relating to mineral resource land and direction for managing mining and post-mining rehabilitation of the land.

Naturally occurring deposits of aggregate minerals must be of sufficient quality to meet engineering material specifications and must be sufficiently concentrated to justify the investment in an extraction and processing site. High-quality aggregate minerals are required for proper formulation of concrete to attain sufficient strength through the curing process. Existing and ancient riverbeds and streambeds are prime areas to look for such high-quality concrete aggregate materials, which consist of sand, gravel, and certain types of rock.

Lower-quality aggregate materials, used for base rock and asphaltic mixtures, also can be recovered from riparian corridors, but may be available in other areas as well. For instance, surface mining for base rock is common on the alluvial fans of the Coast Range along the western edge of the San Joaquin Valley.

Recycling (re-crushing) of concrete extends the available supply of mineral resources but cannot replace mining as a source of these materials. The primary reason for this is that virgin minerals are needed for formulation of concrete. Once minerals undergo the curing reaction once, they are only suited for lower-quality uses such as base rock or asphalt mixtures. Another reason that recycling cannot replace mining is that in a growing area such as Fresno, more new durable structures are created each year than are demolished.

Surface mining operations need to locate in areas where these minerals are sufficiently concentrated—where most of the material excavated consists of the desired materials, and where the mineral deposits can be easily accessed (i.e., there is relatively little “overburden” covering the deposits).

The California Surface Mining and Reclamation Act of 1975 mandates that a “classification/designation” analysis be done to provide information on the availability of mineral resource for construction and growth. The objective is to ensure that raw material will be available when needed—that this raw material will not become inaccessible for mining as the result of inappropriate land use decisions involving mineral resource areas.

The California Department of Conservation Division of Mines and Geology periodically maps high-quality concrete aggregate deposits and compiles statistics on the amount of aggregate minerals available, and consumed, within designated Production-Consumption (P-C) Regions of the State. The Department uses an “MRZ-2” designation for regionally significant deposits of high-grade sand and gravel aggregate (i.e., material suitable for making Portland Cement Concrete). Potential, but presently unproven, mineral resource areas are mapped as MRZ-3. Most of the area outside of the San Joaquin and Kings River Resource Areas has an MRZ-3 designation, and may contain economically recoverable mineral resources. However, those resources may not be of the high quality needed to formulate concrete. The City keeps these maps on file for use in development review and decision-making.

OBJECTIVE

- RC-10** Conserve aggregate mineral resources within the Planning Area, as identified by the Division of Mines and Geology, and allow for responsible extraction to meet Fresno’s needs.

IMPLEMENTING POLICIES

- RC-10-a** **Meet Future Needs.** Adopt land use and resource protection regulations that support mining of the high-quality, close-to-market aggregate resources to meet the needs of the Fresno Production-Consumption Region.
- RC-10-b** **Zoning in San Joaquin Riverbottom.** Maintain zoning consistent with on-going mineral extraction in the San Joaquin Riverbottom that also allows multiple open space uses in conformance with State law and the City’s Surface Mining Ordinance.
- RC-10-c** **Processing-Mining Link.** Accommodate only those mineral processing activities in the San Joaquin Riverbottom that are associated and co-located with mining operations when such industrial activities will sunset with the mining operation and do not stimulate unplanned growth or conversion of multi-use open space to urban uses.
- RC-10-d** **Manage MRZ-2 Areas.** Prohibit land uses and development projects that preclude mineral extraction in potential high-quality mineral resource areas designated MRZ-2 by the California Department of Conservation Division of Mines and Geology.

- RC-10-e** **Existing Permits.** Honor surface mining permits approved by the County of Fresno upon annexation, provided that the mining operation is in compliance with the terms of its current permit(s) and State law. Require new permit applications in the event of noncompliance, permit expiration, or permit revocation, and ensure compliance with law or regulations.
- RC-10-f** **Cooperate on Uniform Criteria.** Work with the County of Fresno, the County of Madera, and the City of Clovis to develop uniform criteria applicable to existing, new, and altered mineral extraction sites in the San Joaquin Riverbottom.

7.8 WASTE REDUCTION

The Public Utilities and Services Element has background information on solid waste collection and disposal and policies related to these systems. This section of the Resource Conservation and Resilience Element contains policies addressing waste reduction.

OBJECTIVE

- RC-II** Strive to reduce the solid waste going to landfills to zero by 2035.

IMPLEMENTING POLICIES

- RC-II-a** **Waste Reduction Strategies.** Maintain current targets for recycling and re-use of all types of waste material in the city and enhance waste and wastewater management practices to reduce natural resource consumption, including the following measures:
- Continue to require recyclable material collection and storage areas in all residential development.
 - Establish recycling collection and storage area standards for commercial and industrial facilities to size the recycling areas according to the anticipated types and amounts of recyclable material generated.
 - Provide educational materials to residents on how and what to recycle and how to dispose of hazardous waste.
 - Provide recycling canisters and collection in public areas where trash cans are also provided.
 - Institute a program to evaluate major waste generators and identify recycling opportunities for their facilities and operations.

- Continue to partner with the California Integrated Waste Management Board on waste diversion and recycling programs and the CalMax (California Materials Exchange) program.
- Evaluate the feasibility of a residential, restaurant, and institutional food waste segregation and recycling program, to reduce the amount of organic material sent to landfill and minimize the emissions generated by decomposing organic material.
- Evaluate the feasibility of “carbon footprinting” for the City’s wastewater treatment facilities, biomass and composting operations, solid waste collection and recycling programs.
- Expand yard waste collection to divert compostable waste from landfills.
- Study the feasibility and cost-benefit analysis of a municipal composting program to collect and compost food and yard waste, including institutional food and yard waste, using the resulting compost matter for City park and median maintenance.

RC-II-b

Zero Waste Strategy. Create a strategic and operations plan for fulfilling the City Council resolution committing the City to a Zero Waste goal.

RC-II-c

Industry Efforts. Support industry efforts to collect and recycle electronics, mattresses, carpets and any other recyclable products to help the region meet goals consistent with the statewide goal of at least 75 percent of all solid waste recycled by January 2020.

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