6.4 ENERGY

6.4.1 Introduction

Since the end of World War II, the United States has relied on large amounts of energy to fuel its transportation systems, factories, industries, offices, stores, homes, agricultural and recreational activities.[1] Nearly every aspect of life is directly or indirectly influenced by the availability of relatively low cost energy resources. The influence of energy supply and costs is evident in the way communities are designed as well as how consumer choices are decided. The manner in which energy is used has definite consequences for air quality planning, transportation networks, and residential densities. The energy crisis of 2000-2001 was the largest electricity and natural gas crisis in the state's history and amplified the need for stable energy markets, reliable electricity and natural gas supplies, and adequate transmission systems.

Wasteful energy use and excessive reliance on conventional energy sources, particularly oil imports, may cost substantially more money, unnecessarily degrade the environment, heighten health and safety risks, and imperil the security of the country in those instances of severe shortages and/or high costs.

Energy conservation through efficiency and design is the most effective way to reduce long-term economic and environmental costs associated with conventional dependence on petroleum. Typically, energy conservation efforts will require an early investment which leads to greater cost recovery and economic vitality during the lifetime of the alternative product or program, especially during and following periods when conventional energy costs rise.

The optional Energy Element is included in the Shasta County General Plan in recognition of these facts and to draw attention to its importance in the community planning process. A major goal of this element is to promote an awareness regarding the status of our long-term energy supplies and availability and that they are highly cyclical and subject to unforeseen global market forces. The Energy Element recommends implementation of guidelines for better management, use, and conservation of all energy sources and discusses the potential development of local energy resources and alternative energy options.

6.4.2 Findings

Trends in Energy Use

Understanding National and State energy use patterns is integral to Shasta County's Energy Element. The following excerpts from the 2003 California State Energy Action Plan, the Public Interest Energy Strategies Report, December, 2003, and the 2003 Energy Policy Report prepared by the California Energy Commission provides an excellent overview described below of current supply and consumption trends for the major energy components in the state.

Energy Supply

Two primary fuels drive California's energy system: petroleum and natural gas. The state produces about 16 percent of the natural gas it uses, 53 percent of the petroleum, and 75 percent of the electricity. California either produces on its own, or imports from other states, 90 percent of the energy it consumes. The remaining 10 percent consists of electricity and natural gas purchases from Canada, Pacific Northwest, Rocky Mountain states, and the Southwest; and crude oil imported from Indonesia (see Figures E-1 to E-4).

California ranks 3rd in the nation in production of crude oil, 11th in production of natural gas, 3rd in net generation of hydroelectric power, and 6th in nuclear electricity. The state ranks 2nd in the total amount of energy consumed but ranks 48th in the amount consumed per person. California ranks 1st in the use of energy in the residential, commercial, and transportation sectors and 3rd in the industrial sector. The state is 2nd in the use of natural gas, petroleum, and electricity (after Texas).[2]

ELECTRICITY

Californians consume less electricity per person than the residents of any other state. Throughout the 1990s, per capita electricity use virtually held constant, increasing at an average of 0.1 percent each year. Assuming current policies and programs, per capita consumption is expected to hold steady over the next decade. National per capita consumption is expected to increase by 0.7 percent annually between 2001 and 2025.[3]

Currently, the state uses 265,000 gigawatt hours of electricity per year. Consumption is growing two percent annually. Over the last decade, between 29 percent and 42 percent of California's in-state generation used natural gas. Another 10-20 percent was provided by hydroelectric power that is subject to significant annual variations. Almost one-third of California's entire in-state generation base is over 40 years old. California's transmission system is also aging. While in-state generation resources provide the majority of California's power, California is part of a larger system that includes all of western North America. Fifteen to thirty percent of statewide electricity demand is served from sources outside state borders .[4]

Peak electricity demands occur on hot summer days. California highest peak demand was 52,863 megawatts (MW) and occurred July 10, 2002. Peak demand is growing at about 2.4 percent per year, roughly the equivalent of three new 500-megawatt power plants. Residential and commercial air conditioning represent at least 30 percent of summer peak electricity loads. Current estimates show a statewide need for 1500-2000 MW per year. An estimated 300 MW of peaking capacity located in critical areas is needed to provide local reliability, help achieve adequate reserves, and reduce congestion and the need for new transmission lines. Peak demand growth is expected to be approximately 1,400 MW per year for the next two years, depending on weather and other factors. Included among the state's Energy Action Plan is a recommendation to implement a voluntary dynamic pricing system to reduce peak demand by as much as 1,500 to 2,000 MW by 2007. [5]

Although there has been an increase of 8,752 MW since 2001 in the state, net gains in total generation may slow due to the potential retirement of power plants built in the 1950s/1960s. An estimated 2,325 MW will retire by the end of 2005. An additional 1,037 MW could also disappear if new air quality retrofits prove too costly to implement. Another 3,870 MW could be retired because the plants are too old and costly. [6]

Overall electricity growth during the next decade is expected to start out at approximately 2.2 percent and level off to an average of 1.4 percent. A doubling of current program spending on electricity-oriented efficiency programs could reduce peak load by an additional 1,700-1,800 megawatts over the next 10 years - a 12 percent reduction in projected demand growth. The commercial sector accounts for 35 percent of the state's electricity consumption. The residential sector accounts for 31 percent and the industrial sector 20 percent. The remaining 6 percent is attributed to transportation and street lighting. Residential and commercial air conditioners and lighting contribute the most to peak demand. Adding a market reserve requirement to this trend would indicate a need for eighteen new 500 MW power plants to meet this demand without new Demand Side Management (DSM) initiatives. By 2013, peak demand may be 8,000 - 10,000 MW higher than in 2000 and overall consumption will increase by as much as 36,000 gigawatt hours.[7]

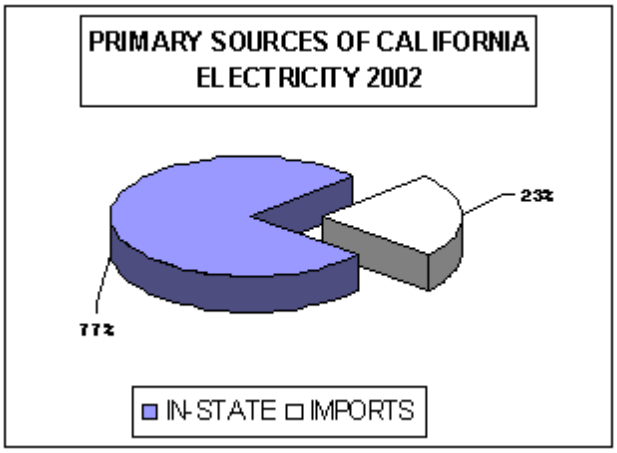
NATURAL GAS

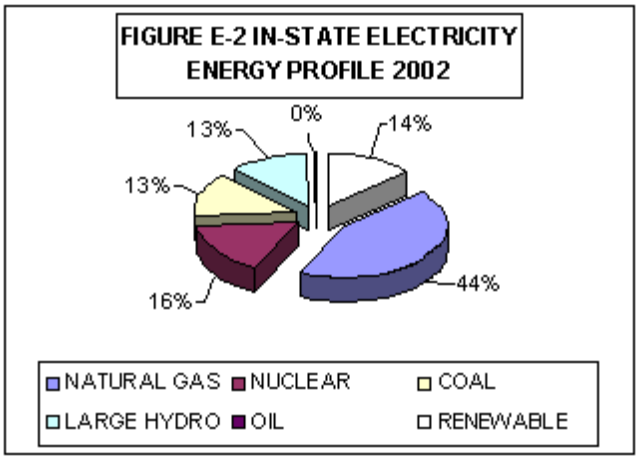
California is the second largest consumer of natural gas in the nation, taking delivery of more than 7,000 million cubic feet in 2002. The demand for natural gas in electricity generation remains the fastest growing segment of California's total natural gas demand. About 35 percent of the total gas consumed in California is used in generating electricity. The growth in natural gas demand for power generation is projected, on average, at 1.5 percent per year. Over the next ten years, use of natural gas at the end-use level, such as heating a home, is forecasted to increase at a rate of 0.6 percent per year, which is less than half the rate of growth for the nation. The combination of industrial and mining consumption accounts for 48 percent of the annual natural gas usage at the end-use level (natural gas used for power generation is not included in these figures). Residential use accounts for 37 percent and commercial buildings and agricultural activities account for the remaining14 percent. Residential use as a percentage of the total has declined since the early1990s while industrial use has steadily increased. Forecasts indicate that natural gas demand will be strongest in the commercial and residential sectors (averaging 1 percent and 0.9 percent respectively) and weakest in the industrial sector (0.1percent). Natural gas consumption increased by 1.0 percent annually during the 1990s. [8]

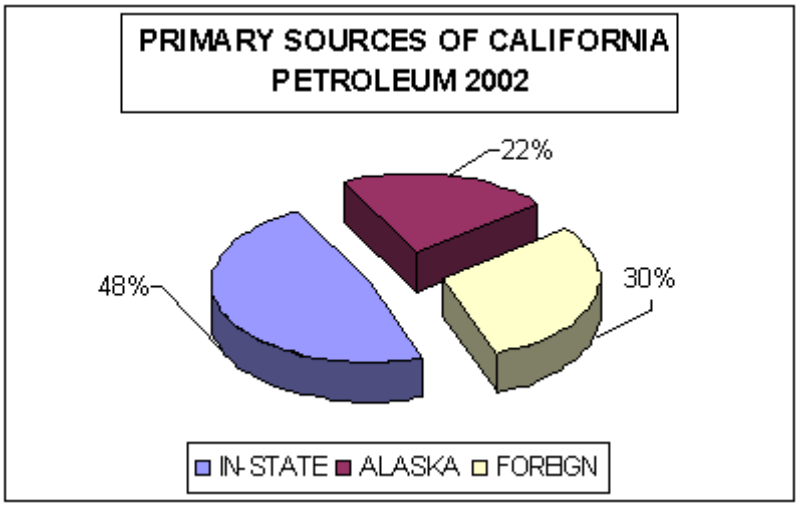
Natural gas-fired generation in California is expected to increase from 36 percent in 2004 to 43 percent in 2013. If the state can accelerate its use of renewable generation and meets the Renewables Portfolio Standards (RPS) goal of 20 percent by the 2010 instead of 2017 and continues funding energy efficiency and DSM at present levels, the state can double the natural gas savings that come from displacing natural gas-fired generation by 2013. [9]

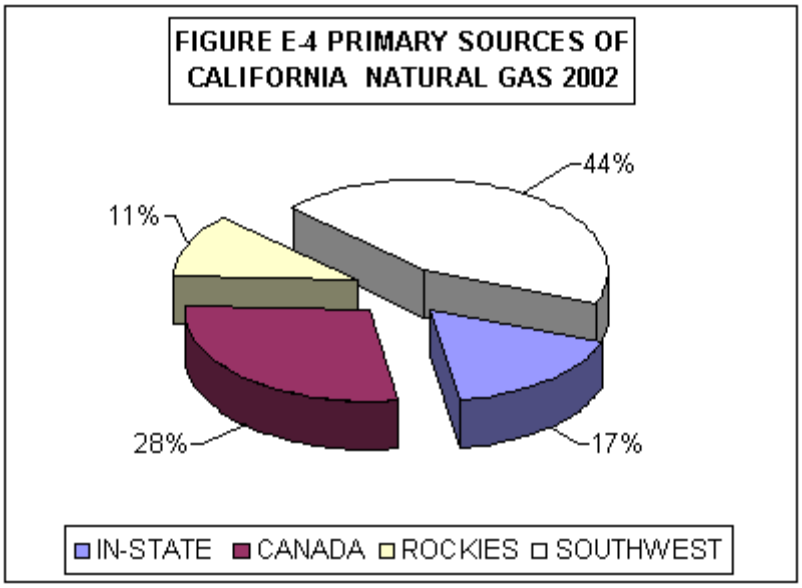
Even though prices are currently stable, Californians now pay $5 per million Btus, roughly double the price consumers paid in the 1990s. With the state located at the end of the interstate natural gas pipelines, California businesses and consumers are vulnerable to further natural gas supply disruptions and price volatility. In the last decade, three new interstate gas pipelines were built to supply California, expanding the over one million miles of existing pipelines connecting the state with gas-producing areas. At full capacity, these new pipelines will provide California with a much needed additional 2.1 billion cubic feet of natural gas per day. The California Energy Commission forecasts that, under average annual conditions, interstate pipeline capacity is adequate to meet demand through 2013 in Southern California and through 2007 in Northern California. [10]

Currently the state uses two trillion cubic feet of natural gas per year. Historically, the primary use of this fuel was for space heating in homes and businesses. Electricity generating dependence on relatively clean-burning natural gas now means that California's annual natural gas use by power plants is expected to increase. Overall, natural gas use in growing by 1.6 percent per year. Eighty-five percent of natural gas consumed in California is supplied by pipelines from sources outside the state. [11]









Source: California Energy Commission 2004

TRANSPORTATION ENERGY

Petroleum will be the primary source of California's transportation fuels for the foreseeable future. Over the next 20 years, the California Energy Commission projects that gasoline and diesel demand for on-road vehicles will increase 36 percent and the demand for jet fuel will more than double. Fifty percent of the state's energy consumption results from transporting both goods and people. Because petroleum fuels provide more than 99 percent of the state's transportation energy, events in the international petroleum market can immediately and adversely affect California gasoline and diesel fuel prices. [12]

The demand for transportation fuels in California is increasing at an alarming rate, surpassing in-state refining capacity. California's refiners rely increasingly on imported petroleum products to meet demand, and these imports enter through ocean port facilities that are reaching maximum capacity. In the past 20 years, demand for gasoline and diesel has increased 53 percent.[13]

California now consumes nearly 49.5 million gallons of gasoline and diesel each day, accounting for almost half of all the fossil fuel energy consumed in the state each year. However, while demand has increased significantly, refining capacity has not. The last refinery built in the state was in 1969. Since then, several refineries have shut down, reducing statewide refining capacity by nearly 20 percent. Today, California refineries import about four million gallons of gasoline and diesel each day. With refineries operating at close to full capacity, daily imports of gasoline and diesel will likely more than double to 10.1 million gallons by 2010. [14]

The following information is provided from the Annual Energy Outlook (AEO) for 2004 prepared by the United States Department of Energy:

World oil demand is projected to increase from 78 million barrels per day in 2002 to 118 million barrels per day in 2025. Organization of Petroleum Exporting Countries (OPEC) oil production is expected to reach 54 million barrels per day in 2025, almost 80 percent higher than the 30 million barrels per day produced in 2002. Non-OPEC oil production is expected to increase from 44.7 to 63.9 million barrels per day between 2002 and 2025. The largest share of non-OPEC oil production is expected in Russia, the Caspian Basin, non-OPEC Africa, and South and Central America. [15]

Projected United States crude oil production is forecasted to increase from 5.6 million barrels per day in 2002 to a peak of 6.1 million barrels per day in 2008 as a result of increased production off-shore, predominately from the deep waters of the Gulf of Mexico. Beginning in 2009, U.S. crude oil production is expected to decline falling to 4.6 million barrels per day in 2025 - an average annual decline of 0.9 percent between 2002 and 2025. Total domestic petroleum supply indicates an increase from 9.2 million barrels per day in 2002 to a peak of 9.7 barrels per day in 2008, then declining to 8.6 million barrels per day in 2025. In 2025, net petroleum imports are expected to account for 70 percent of demand, up from 54 percent in 2002. Net refined petroleum product imports account for a growing portion of total net imports, increasing from 13 percent in 2002 to 20 percent in 2025. [16]

Today, foreign imports make up 29.3 percent of California's petroleum supply and may likely continue to increase as in-state and Alaska production continues to decline. Alaska's supply of oil accounts for about 21.3 percent of petroleum brought into the state in 2001 (down from 50 percent in 1994). Its availability is declining more sharply than that of California-produced oil. [17]

California's transportation sector is growing faster than the population, Since 1973, the number of vehicles within the state has increased by 75 percent. Currently, the state's 22 million automobiles consume more than 13 billion gallons of gasoline, making California the third largest consumer of gasoline in the world, Only the United States as a whole and the former Soviet Union exceed this volume. [18]
The Energy Commission projects that the number of vehicles on California roads will reach over 33 million by 2023, up from about 24.4 million in 2002. Vehicle miles traveled will increase from 313

billion miles in 2002 to over 440 billion in 2023. At the same time, California's production of petroleum has been declining by about 2 percent a year and, therefore, must increasingly rely on imports. [19]

Obviously, negative impacts could occur to oil-dependent activities long before the resource is depleted. The implications of this trend to the transportation sector and all that it affects are enormous, and suggests a need for a comprehensive approach leading to secure and dependable sources of long-term, diversified energy supplies.

The implications and lessons of the last 20 years should be ample warning that we need to learn to manage energy resources in a manner which takes into account their long-term availability, cost, and affect on how we design our developed environment.

A reliable source of energy for the transportation sector is one of the greatest challenges facing the United States. A highly oil dependent transportation sector will certainly lead to adverse economic impacts during any period of decreased oil supply and increased prices in the future. Rural and resource based areas such as Shasta County can be disproportionately impacted during these periods. The problem of oil dependency in the transportation sector is further aggravated because there are no easy substitutes.

Residential Density and Transportation Planning

Land use patterns in Shasta County tend to display almost a total reliance on gas-diesel powered vehicles to move people and goods. Low density residential development in the South Central Region (SCR) makes the development of alternative transportation modes such as transit, bicycles, and walking a much more difficult and costly task. The environmental effects of low density residential development patterns resulting in increased energy use and air quality degradation have been well documented. A continued reliance on gasoline-powered vehicles commits an ever-increasing share of the urban environment to streets, highways, and parking, creating an ever-expanding demand for road maintenance as the circulation system wears out.

Density and transportation relationships are critical in estimating the total energy use of various residential development types. For example, a conventional townhouse employing exterior and interior energy conservation design features developed as part of an integrated, mixed use community consumes less energy and is cheaper to build than a low-density, solar powered, detached single family unit. The reduction in fossil fuels needed for transportation accounts for the energy efficiency superiority of the non-solar townhouse.

Residential pockets of the South Central Region are continuing to develop in a low density urban residential pattern. One consequence of this trend is that total per capita energy required, particularly for transportation needs, is higher than would otherwise be the case if higher residential density options were implemented. Numerous studies point to long-term economic risks and excessive costs associated with a continuing dependence on a petroleum-based transportation sector required to serve a low density residential urban pattern. This trend often forecloses future alternative, energy efficient transportation options due to more costly construction and implementation requirements.

Land use and transportation planning decisions made today have far-reaching impacts, in some cases permanent, on the ultimate form, function, and structure of local cities and rural communities. Therefore, enlightened integrated community planning among all local governmental agencies is essential if the major urban areas of the SCR are to achieve a higher residential density development pattern and realize significant energy efficiency savings. Complementing this effort is the need to promote implementation of land use policies which emphasize development of definable urban centers and nodal points of human and economic activity which can provide a support basis to develop an efficient transit system and other alternative modes of urban transit. Existing pedestrian- and transit-oriented community planning concepts found in many areas of the western United States

provide excellent examples of workable energy conservation strategies for urban centers, some of which can be applied to areas within Shasta County.

Building Efficiency

The construction of energy efficient buildings is one important conservation strategy. California's "Title 24" building efficiency requirements, which are implemented in Shasta County, are intended to assure significant energy savings in newly-constructed residential, commercial, and industrial buildings. Building designers can opt to provide additional energy efficiency for a structure by utilizing added insulation and passive solar strategies.

In hot valley climate zones, such as the South Central Region, landscaping with large deciduous shade trees can reduce localized peak temperatures around buildings by up to 10 degrees during summer afternoons, resulting in significant energy savings for space cooling.[20] Similar cooling results occur with the extensive planting of shade trees over paved areas, including urban streets and parking lots.

Renewable Energy Resources

Renewable energy resources, coupled with strategies to encourage conservation, are important features in the Shasta County region's energy future. In 2002, the Governor signed the Renewable Portfolio Standard (RPS), SB 1078. This standard requires an annual increase in renewable generation equivalent to at least 1 percent of electricity sales, with an aggregate goal of 20 percent by 2017. Currently renewable generation accounts for 11 percent of retail sales. California's Energy Action Plan has targeted a goal of 20 percent by 2010. [21]

Achieving the RPS could displace 20,000 tons of nitrogen oxide (Nox) emissions from gas and coal-fired generation in the Western states over the 2004-2013 time frame. Also, the use of renewable resources can reduce carbon dioxide and greenhouse gas emissions associated with global climate change. Generation of electricity from renewable energy rather than by fossil fuels can reduce CO_2 and other green-house gas emissions associated with climate change. Model simulations in one instance indicate that achieving the RPS by 2010 could reduce annual CO_2 emissions by about 62 million tons by 2013. This is equivalent to estimated annual CO_2 emissions from more than 6 million automobiles. [22]

Geothermal energy provides the largest portion of renewable electricity in California where such generation is by systems 30 MW or smaller. Renewable energy (excluding small and large hydropower) provided four percent for the region's energy production in the Western Electricity Coordinating Council (WECC) states. [23]

If renewable energy could be used to replace the estimated growth in gas-fired generation from 2004-2017, the total amount of renewable energy by 2017 would reach about 38 percent. This would make renewable energy the largest source of electricity generation in California. Overall, existing renewable energy facilities utilize a small proportion of the technical potential for renewable energy in California.[24]

Important renewable energy sources in Shasta County include solar, hydroelectricity, biomass, and cogeneration. There is also potential for development of wind, geothermal, and waste-to-energy as alternative sources of energy production. Technology improvements associated with renewable energy development will be a key to its rate of success. Renewable energy sources can be most effectively applied for space heating and cooling and for electrical generation. For the oil dependent transportation sector, renewable energy solutions involve developing marketable alternative fuel types as the cost of oil rises. Collectively, renewable energy offers a diverse and virtually inexhaustible resource, opportunities for developing new base industries, and all at substantially less

environmental cost.

Greenhouse Effect

It has long been documented that there are certain direct relationships between energy resource production and use and environmental effects. Among these impacts is global warming caused to a large extent by the "greenhouse effect." The presence of this phenomenon results in a layer of gases surrounding the earth with the ability to trap heat. The addition of greenhouse gases to the atmosphere traps a higher percentage of the outgoing infrared radiation, with some of the trapped radiation coming back toward the Earth's surface creating the warming effect. [25]

The primary source of human contribution to atmospheric concentration of greenhouse gases comes from the use of fossil fuel energy to light our cities, power our factories, supply our industrial, and fuel our transportation. The burning of gasoline, diesel, natural gas, and coal release CO_2 as a by-product of the combustion process. Another important source of greenhouse gas emissions is change in land uses and the removal of vegetation that had served as a reservoir of stored carbon. In 1999, CO_2 accounted for 84 percent of the state's greenhouse gas emissions. [26]

Three bills were signed into law by Governor Davis in 2002 that will help California significantly reduce its contributions of greenhouse gases to the atmosphere. These bills include AB 1493 which directs the California Air Resources Board to adopt regulations that achieve the maximum feasible and cost-effective reduction of greenhouse gas emission from motor vehicles, providing a direct response to the state's largest source of greenhouse gas emissions. [27]

SB 1078 created the RPS that will achieve greenhouse gas reductions by increasing the state's reliance upon non-fossil fuel energy for production of electricity. SB 812 requires the development of protocols that account for additional carbon stored in the state's forests and landscapes fostering management activities that reduce greenhouse gas emissions. [28]

The state's Energy Action Plan also recognizes that decreases in per capita electricity use, through energy conservation and efficiency, helps to minimize the need for new generation, reduces criteria and toxic air pollutants, and lowers California's emission of greenhouse gases. [29]

Solar

The sun is an abundant energy source in most of Shasta County. The value of the sun as an energy resource can be expressed most meaningfully in terms of the demand for conventional energy sources that can be displaced by its use. Solar energy can be used directly for space and water heating and for industrial process heat.

The sun is also important as its affects the demand for energy. High summer temperatures in the upper Sacramento Valley result in a high seasonal peak demand for electricity for space cooling and refrigeration. The impact of solar radiation on the cooling load of buildings can be moderated to a significant extent through building and site design, including planting of deciduous shade trees.

Passive solar design for space cooling and heating can reduce the annual primary energy demand of a typical single family detached house in the Sacramento Valley by 90% compared to a house built before 1975 without insulation. To achieve such energy savings requires nothing more than efficient construction, insulation, approximately 200-square feet of south-facing window area combined with a heat-storage mass (e.g. slab foundation) or about 1,000 square feet of window area, a roof overhang on the south side, and shade on the east and west sides of the buildings. Energy used for water heating can be reduced by 50 percent for a family of four with the use of 64-square feet of solar collectors.[30] In the mountain areas the energy used for space conditioning could be reduced

significantly as a result of passive design features.

Hydroelectricity

Existing U. S. Bureau of Reclamation electrical generation facilities at Shasta Lake, Keswick, and Whiskeytown Reservoirs provide the bulk of hydroelectricity produced in the County. Pacific Gas and Electric Company produces significant hydroelectric power from its facilities in the Pit River and Battle Creek watersheds. A number of small hydro facilities have been constructed on smaller Shasta County creeks during the late 1970's and early 1980's. The prospects for significant new large hydroelectric projects in Shasta County appear to be limited because the most efficient sites have already been utilized. However, a number of smaller retrofit projects could be implemented at existing dams that currently do not produce electricity. On the other hand, any continued development of new small hydro facilities will need to solve environmental concerns involving fish and wildlife habitat and water resource impacts.

Biomass

The use of biomass for direct heating and electrical generation is important in Shasta County. Biomass primarily involves the use of wood for residential space heating and waste wood and other wood products for electrical generation. Potential air pollution problems from concentrated use of wood for residential space heating can be in part mitigated by installation of newer high efficiency wood stoves. Ongoing forestry efforts to implement thinning plans for fire protection and improving forest growth and health could lead to a more managed and reliable availability of wood as a biomass energy source during the planning period.

Cogeneration

Cogeneration involves the use of waste heat to produce heat or electricity. Cogeneration is currently utilized by several wood products firms located in Anderson, Burney, and Redding. Although use of cogeneration technology and processes does not allow these firms to be energy self-sufficient, the systems can generate enough energy to supply a major portion of plant needs during peak demand periods.

Role of Government

The nation's energy policy is a reflection of what is being done at the local level of government. Three roles which local government may play regarding energy use are the following:

1. Act as an educator, informing and encouraging its citizens as to the benefits of energy conservation and planning. This is a major focus of the Energy Element.

2. As a large energy consumer, government can use its own actions as models for energy conservation and planning. Through its actions, local government may elect to act as a provider of incentives that encourage energy conservation. For example, conversion of an agency's vehicle fleet to alternative fuels could stimulate other firms to do the same.

3. Local government may exercise its police power to adopt regulations requiring energy conservation. Local government planning programs for air quality and congestion

management may also provide more efficient energy use.

Shasta County's energy strategy should focus on implementing policies and programs that can be most effectively achieved at the local level. Besides supporting implementation of the following objectives and policies, the County should support legislation which is consistent with its overall energy strategy.

6.4.3 Objectives

E-1 Promote energy savings by integrating transportation, land use, and air quality planning.

E-2 Increase utilization of renewable energy resources by encouraging development of solar, hydroelectric, biomass, waste-to-energy, and cogeneration sources.

E-3 Promote energy education and information as a way of assisting the public in making informed decisions regarding energy efficiency.

E-4 Conserve nonrenewable energy resources, specifically raw materials, transportation fuels, and resource land area.

6.4.4 Policies

E-a During the development and implementation of urban area plans in the South Central Region, the County, in conjunction with the Cities of Anderson, Shasta Lake, and Redding, shall work towards achieving an integrated land use pattern that would support a regional transit system.

E-b Encourage development patterns which reduce the number of miles driven in personal vehicles through consideration of higher density and mixed land uses, transit- and pedestrian-oriented developments, and increased jobs-to-housing balance. At the community level, the County shall adopt land use plans which reduce the need to travel outside the community for basic commercial services.

E-c The County should develop energy thresholds and standards which assist applicants for development projects in designing conservation features into their proposals. Energy threshold standards could also be used to assist in the evaluation of potential energy consumption impacts which may be environmentally significant.

E-d Priority shall be given to energy projects and programs that provide jobs and other economic benefits within the County for County residents.

E-e Economic development activities and grant programs should emphasize efforts that permanently improve energy efficiency in existing and new buildings, including programs involving low- and moderate-income housing.

E-f Recycling and integrated waste management goals that are designed to promote energy efficiency shall be encouraged and promoted.

E-g Revision or development of landscaping and tree protection standards should provide consideration to improving building energy efficiency and shading of streets and parking areas during the hot summer season.

E-h Subdivision design review should include standards for street and building orientation which allow appropriate solar access as well as landscape shading for cooling and heating in urban

and town centers.

E-i The County should support efforts to amend California's timber harvest rules that encourage thinning and harvest of biomass fuels for purposes of improving wildland fire protection and forest productivity in developed areas, such as in the Shingletown area, and which are capable of timber production.

E-j The County should continue to implement plans to convert more of its vehicle fleet to hybrid or alternative fuels that meet or exceed air quality standards.

E-k Encourage and promote increased telecommunication activities for both private and public sector employees in order to help decrease energy use and reduce air quality impacts.

Footnotes:

1. Between 1950 and 1990, national energy demand increased nearly two and a half times (250%) while the population increased approximately 63%.
2. "California Energy Facts", California Energy Commission, 2004, pg. 1
3. "Public Interest Energy Strategies Report", California Energy Commission, December 2003, pg. 24
4. California Energy Action Plan, May 2003, pg. 4
5. Ibid, pg. 4
6. News Release, California Independent System Operator, October 2003, pg. 1
7. "Public Interest Energy Strategies Report", California Energy Commission, December 2003, pg. 3
8. Ibid, pg. 30
9. 2003 Integrated Energy Policy Report, California Energy Commission, December 2003, pg. 26
10. Ibid, pg. 24
11. California Energy Action Plan, May, 2003, pg. 4
12. 2003 Integrated Energy Policy Report, California Energy Commission, December 2003, pg. 33
13. Ibid, pg. 31
14. Ibid, pg. 33
15. "Annual Energy Outlook 2004 with Prjoections to 2025", Energy Information Administration, U. S. Department of Energy, January 2004, pg. 2
16. Ibid, pg. 6
17. "California Energy Facts", California Energy Commission, 2004, pg. 2
18. Ibid, pg. 3
19. "Public Interest Energy Strategies Report", California Energy Commission, December 2003, pg. 15
20. Planning Solar Neighborhoods, California Energy Commission, 1980, pg. 98
21. "Public Interest Energy Strategies Report", California Energy Commission, December 2003, pg. 6
22. Ibid, pgs. 21 & 104
23. Ibid, pg. 90
24. Ibid, pg. 91
25. "Climate Change and California", Staff Report, California Energy Commission, November 2003, pg.3
26. Ibid, pgs. 5 & 16
27. Ibid, pg. 11
28. Ibid, pg. 11
29. Ibid, pg. 12
30. Shasta County General Plan, 1984

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