

## ENERGY CONSERVATION

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## **Energy Conservation**

Recently there has been wide-spread public and official concern about energy supplies, both present and future. The fundamental problems underlying the projected decreasing supply of traditional energy sources are of national or statewide scope, but there are significant contributions which can be made by local government. Land use patterns, air quality programs, growth policy, transportation, and residential densities all directly affect local energy consumption. Conservation of existing energy, both by City actions and by all City residents, is also within the scope of local government. Alternative energy sources, to provide for at least part of the City's needs, can be investigated and developed. Since unlimited supply and availability can no longer be taken for granted, energy considerations now need to be evaluated along with the other factors that enter into the formulation of City policies and decisions.

### **FINDINGS**

#### **Supply and Demand**

Before the 1973 "energy crisis," the annual growth rate of San Diego's energy use was nearly three times that of the rest of California. This annual increase has since slowed considerably, due to both conservation measures and the economic recession. But with improved economic climate and increasing population growth, the energy use growth rate is again increasing. Measures both to conserve existing supplies and to develop alternative sources are necessary to avoid the very real possibility that power demand may exceed supply within the planned future.

San Diego's energy use patterns differ considerably from those of the rest of the nation. Because local industry in general is less energy-demanding, and because the local climate requires less heating and cooling, per capita energy consumption is less here than elsewhere in the United States. However, gasoline accounts for a larger proportion of that per capita consumption. With low-density development, low mass transit use, and heavy dependence on private transportation, vast quantities of energy are used to move both people and goods.

Nearly all of the energy consumed in San Diego is in the form of electricity, natural gas, and gasoline. These end-use energy forms derive from three basic energy sources: oil, hydropower, and natural gas. One alternative to imported oil is exploitation of local off-shore oil reserves; conversion to coal, nuclear fission, or geothermal energy to replace oil in the generation of electricity are other possibilities. Hydropower currently supplies more than a third of the power used for generating California's electricity, but its possibilities for expansion are limited because the most economic sites have already been developed. Long-range projects to supplement natural gas supplies include importation of gas, by either pipeline or in a liquefied state, from other countries; various innovative processes for synthetic production of natural gas locally; and substitution of solar energy for some of the natural gas uses, mainly heating and cooling.

Various techniques exist for recovering useful forms of energy from solid waste. These include burning trash to produce steam, for heating or electricity production; pyrolysis plants to produce fuel oil from waste; and recovery of methane gas from either sanitary landfills or wastewater solids. A related reclamation approach is the recycling of specific clean materials, such as

aluminum, copper, steel and paper. Metals can be reclaimed for a small fraction of the energy required to process raw material. Recycling paper requires a much higher relative amount of energy, but still can be done cost-effectively and energy-effectively.

Apart from the controversies that surround the development of specific alternative energy sources, there appears to be general agreement on many aspects of the supply picture. Petroleum supplies are both limited and unreliable, and must gradually be replaced by other basic energy sources. There is to date no single non-petroleum energy source which has the promise of replacing petroleum; therefore, many alternatives must be explored and evaluated. It is reasonable to anticipate several decades of research, development, demonstration, and commercialization before many of the non-petroleum energy sources can make a significant impact on the whole energy problem. The era of cheap and plentiful natural gas for California appears to be over. New sources for importation may be arranged. But, as other states and other countries become increasingly concerned about their own energy supplies, these sources can be considered at best as temporary transition measures.

There is also general agreement that existing ways of life, urban patterns, transportation facilities, buildings, and equipment all reflect a past when energy was abundant and cheap. Many other countries, with living standards equal to ours, use less than half the energy per capita that is consumed in the United States. Apart from savings in transportation, the next most fertile area for improving efficiency is building and development design and land use patterns. It is indisputable that sprawled low-density urban development increases travel distances, street and highway requirements, public utility extensions, and public service costs (fire, police, schools) - all of which translate directly into increased energy use. Grouped structures and higher density development have recognized energy savings. Subdivisions in areas that are hot in summer and cold in winter, or in areas where auto dependence is mandatory, or where cultural and commercial and recreational and employment facilities are lacking, can only result in increased energy use - not only in initial development but also in yearly operation and in the more nebulous energy costs that traffic congestion, wasted water, and public services demand.

In addition to the location of development, its design can be oriented toward better use of energy. Narrow streets reduce horizontal spread, construction energy and material, and reflected summer heat. Deciduous street trees allow summer shade and winter sun on buildings and streets, and make walking and bicycling more attractive. More extensive walks and bicycle paths reduce auto use. Smaller minimum lot sizes reduce travel and utility and service distances.

Important energy savings can also be realized through energy-conservant site planning and building design techniques and principles. The solar rights of individual property should be protected: Oregon and Colorado already have laws that prevent future shading of solar equipment by neighboring structures or plantings. Flexibility in required setbacks allows buildings to be oriented to maximize natural heating and cooling factors. Designs that consider microclimates building efficiency, summer shade and winter exposure of windows, and the energy implications of colors and materials can reduce total energy operating needs by as much as 50 percent.

## **Conservation**

Conservation and efficient use and wise allocation are especially important to San Diego since nearly all of the energy used here is imported. The major exception is the electricity produced at San Onofre Nuclear Power Plant; all other energy, including vehicle fuels and natural gas and fuel oil and some electric power, is imported. There have been recent efforts to provide for a larger part of local needs locally; expansion of the San Onofre Plant, plans for additional nuclear power plants, experimental work with geothermal resources, and solid waste recovery work. However, conservation measures remain an essential part of the City's response to the long-term energy situation - both to allow more time to develop alternative sources before the world's oil supplies are exhausted, and also to achieve the major transition from cheap, abundant energy supplies to expensive, scarce ones.

The supply and disposal of water is one of the largest single users of energy in San Diego. Energy is required to pump water here, to treat it prior to use, to heat or cool it, collect and pump it to sewage treatment plants, and to treat and dispose of it in the form of waste water. Water conservation is therefore an important aspect of energy conservation, and a conservation attitude in general appears to be the appropriate direction for the near future.

The City of San Diego has already implemented major energy conservation programs. Its General Services Administration has initiated an ongoing conservation strategy which focuses on immediate and future reduction of energy use in its operations. The City Council has adopted an energy conservation policy, committing the City to a number of specific procedures for making the best use of existing resources as well as to development of innovative non-depleting energy sources. Solar heating is being installed at city-owned pools. A program is under way to convert existing street lights to a more energy-efficient type. The City has adopted the State Energy Commission's new standards for residential and non-residential buildings. And one of the central purposes of this element is to guide development patterns that make the best use of available energy.

## **GOAL**

- ASSURE ADEQUATE ENERGY SUPPLY FOR THE CITY OF SAN DIEGO THROUGH A COMPREHENSIVE PROGRAM OF ENERGY CONSERVATION, ENERGY-EFFICIENT PRODUCTION AND USE OF ALL ENERGY FORMS, UTILIZATION OF ALTERNATIVE ENERGY SOURCES, AND ENERGY-EFFICIENT DESIGN OF THE COMMUNITY.

## **GUIDELINES AND STANDARDS**

- Conservation measures, such as reduction of heat gain and loss and more efficient equipment in structures, should not be allowed to aggravate the low and middle-income housing problem: as with automobiles, a trade-off between a slightly increased initial cost and significantly lower operating costs can be a great advantage in terms of the buyer's ability to keep and use the product.

- A balance should be maintained between energy supply and environmental protection: use of alternative energy sources should not conflict with standards of air quality or other environmental pollution; where possible, both conservation measures and alternative sources that also reduce pollution should receive priority.
- The most desirable energy conservation and production tactics are those which have no significant adverse social, economic, or environmental impacts and which have minimum impact on the quality of life.
- City energy planning programs should be coordinated with federal, state and regional policies and goals.
- As much as possible, dependence on imported energy should be minimized in favor of local self-sufficiency.
- Sustained efforts should be directed toward elimination of wasteful and inefficient uses of energy: these conservation measures have the least effect on the quality of life.
- Priority should be given to energy conservation measures that also function to further the goals of other General Plan elements: Conservation Element concerns with water supply and use; efforts of the Growth Management Element to control urban sprawl and inefficient use of capital improvements; the Cultural Resources Element goal of continued reuse of quality structures.
- **On November 3, 1987, the electorate of the City of San Diego approved an initiative measure, Proposition H, amending the General Plan. The initiative amended the plan by adding the provisions presented below in italics:**

*In order to protect the public health, safety and general welfare of the people and to foster a physical environment in San Diego that will be most congenial to healthy human development, the following standards are required for solid waste facilities that will burn 500 tons or more per day of residential, commercial or industrial solid waste.*

1. *No such facility shall be built that will:*
  - a. *increase existing levels of toxic air pollutants within the City as those levels are determined by federal, state or San Diego public agencies; or*
  - b. *be located within a three mile radius of a hospital, elementary school, or child care center or nursing home for the elderly licensed by a governmental entity; or*
  - c. *make additional demands on the treated water distribution system within the City.*
2. *Any such facility built shall include recycling and separation methods whereby major sources of toxic air pollutants, including but not limited to plastics, metals, industrial wastes, and coatings, are removed from the solid waste prior to incineration.*

## **RECOMMENDATIONS**

### **Supply and Demand**

- Guide development into land-use patterns that make the best use of available energy, both by minimizing transportation and by making use of existing capital improvements.
- In reviewing development proposals, evaluate probable travel requirements and mass transit use from the proposed project.
- Support development of local non-depleting energy sources: solar, geothermal, biomass, wind, hydroelectric, tidal and ocean current movements.
- Support regional transportation system proposals that require the lowest feasible levels of energy consumption per person-mile.
- Actively encourage adequate funding at both state and federal levels for research and development of alternative energy sources.
- Evaluate energy use and energy impacts in the environmental review process.
- Use housing distribution in relation to other land uses as a tool to minimize energy consumption.
- Develop emergency contingency plans, in cooperation with other local agencies and regional suppliers, to assure essential energy supplies and radically reduce non-essential consumption during periods of sudden energy shortage.
- Actively encourage innovative building and site design and orientation techniques which minimize energy use by taking advantage of sunshade patterns, prevailing winds, landscaping, sunscreens, and choice of materials.
- Devise and implement a program to encourage use of laundry lines and clothes-drying yards.
- Improve and expand the City's network of bicycle paths.

### **Conservation**

- Maintain educational and publicity programs to sustain public awareness of the importance of energy conservation, the continued existence of energy problems, and specific conservation tactics that are recommended.
- Actively encourage utility rate revisions that provide incentives for domestic and commercial conservation and for shifting use to off-peak hours.

- Continue and expand publicity programs to discourage single-occupant auto trips and encourage more energy-efficient means of travel, such as carpools, public transit, bicycles, and walking.
- Devise and implement a system of encouraging development that conserves energy through its design, location, construction and operation.
- Enforce reduced levels of non-essential lighting, heating and cooling.
- Maintain and promote water conservation and water recycling programs as a means of conserving energy. Encourage local water jurisdictions to use state-mandated powers to enforce conservation measures that eliminate or penalize wasteful use by customers.