General Plan

Energy Element

BACKGROUND TO THE
1993 GENERAL PLAN AS AMENDED

The background section text and maps were not updated as part of the 2011 amendments to the County General Plan.

County of Sacramento
Community Planning and Development Department

SACRAMENTO COUNTY GENERAL PLAN
ENERGY ELEMENT

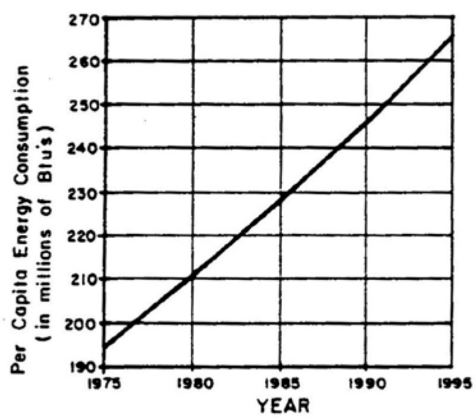
Background Section

THE ENERGY PROBLEM

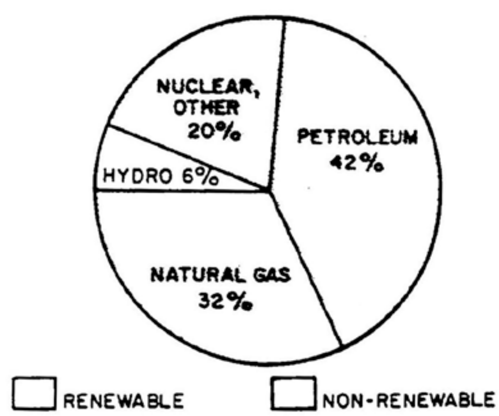
Based on past trends, annual per capita consumption of energy in Sacramento County is projected to increase from 195 million Btu's (British thermal units) in 1975 to 266 million Btu's by 1995. This increase, combined with projected population growth, would result in an 85 percent increase in total energy consumption in the county, from 134 trillion Btu's in 1975 to approximately 248 trillion Btu's in 1995.

At present, Sacramento County is heavily dependent on non-renewable energy sources, with only six percent of total energy coming from renewable sources (hydroelectricity). In fact, 74 percent of our energy comes from natural gas and petroleum, two sources which may be in critically short supply and experience very steep price increases within 20 years.

SACRAMENTO COUNTY PROJECTED
PER CAPITA ENERGY CONSUMPTION, 1975-1995



SACRAMENTO COUNTY
SOURCES OF ENERGY, 1975



In a time of increasing energy prices, such growth in energy consumption and dependency on non-renewable energy sources could place a severe strain on the economy of Sacramento County. Steps taken now towards solving this problem can be easier and more moderate than if we choose instead to wait until the last moment - our options and our opportunities would then be diminished and the "sacrifices" we would be forced to make would be much greater.

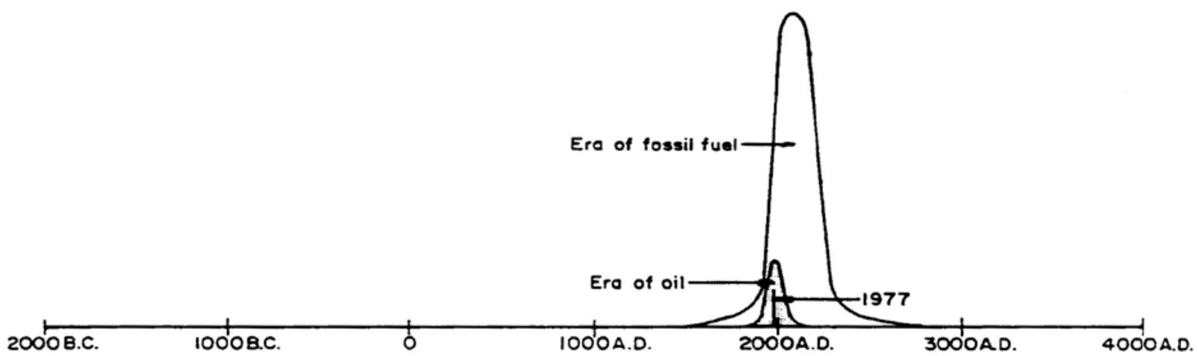
Energy has become an integral part of our economic system. Stated from an historical perspective, "[t]he United State [economy] matured in an era of abundant fuel and declining real energy prices. Energy was substituted for all other factors of production — including, wherever possible, human activity."[1] "As a result of the availability of cheap energy, the U.S. developed a stock of capital goods — such as homes, cars, and factory equipment — that uses energy inefficiently."[2] The extent to which cheap, abundant fuel has led to wastefulness is exemplified by these two facts: the U.S. uses two to three times as much energy per capita as such modern industrialized countries of Western Europe as Sweden, West Germany, and

Switzerland, which enjoy standards of living comparable to our own;"[3] and, "[i]n 1975, Americans *wasted* more fuel than was used by two-third's of the world's population."[4]

Our copious use of energy is not an economic or technological imperative, but rather a convenience, a luxury, which is the direct result of our abundant, easily accessible, and therefore cheap supply of fossil fuels. But "the United States has," in the words of one major study, "...entered a new age of energy...[in which]...we can no longer expect to get it with so little trouble and expense as we did in the recent past."[5]

There has been considerable debate as to the cause of the "Energy Crisis," however that term may be defined. Nonetheless, there is one thing certain about our energy future: energy will become increasingly expensive. While this increasing cost may not be the direct result of absolute scarcity, it will result from the fact that the remaining supplies of fossil fuels will be increasingly difficult to locate and mine and will often be found in fragile environments where both the costs of minimizing environmental damage and the consequences of its occurrence will be much higher.

What must be done, then, is to find a way to reduce as much as possible our extravagant waste of energy and to convert the base of our economy from finite to renewable energy sources in order to avoid potentially severe economic and environmental consequences.



"HUBBERT'S PIMPLE", THE WORK OF PETROLEUM GEOLOGIST M. KING HUBBERT, ILLUSTRATING HOW TRANSIENT THE ERA OF FOSSIL FUEL IS ON THE SCALE OF HUMAN HISTORY.
SOURCE: *Fortune, October 1977, pp. 246-247*

Economically, energy conservation measures are justified by their cost-effectiveness to the individual user and to the public as a whole. For instance, while natural gas and electricity are presently priced at a level which reflects current and past production costs, additional supplies will cost more to produce, and the cost of the more expensive "new" energy will be spread out to all ratepayers as increased rates. There is also a question of whether enough capital will be available to finance as much new production capacity as continuation of past energy consumption trends would require, and, if this capital can be raised, what effect this might have on the cost and availability of investment capital in other sectors of the economy.[6] In contrast, "[s]maller-scale investments in [energy] conservation...allow for easier market entry and more competition within the private sector..."[7] thereby increasing employment opportunities and reducing prices. There are also social equity reasons for conserving energy. "Increasing costs of energy have unequal impacts on different groups in the population. For low-income households, direct energy costs tend to be a higher portion of their budgets. This burden will increase over time if electricity, gas and petroleum prices increase faster than the general growth in income and prices.[8]

Dependence on fossil fuel imports, the dangers of which were dramatically illustrated by the 1973 Arab oil embargo, is one reason for turning from depletable sources of energy to renewable sources. Another is the significant dangers to environmental quality and human health and safety presented by "conventional technologies for the large-scale production and distribution of electricity and other forms of energy."[9] Finally, there is the concern of resource depletion: how soon certain resources will run out, whether other technologies and sources of energy can be developed in time to replace them, and whether energy options will be left to future generations.

In sum, there are numerous economic, social, environmental, and political reasons for making more efficient use of the energy we have and for developing renewable sources to replace our dwindling supplies of fossil fuels. In fact, it is possible in every area of human activity, "with the technology now available, to obtain at least the same level of benefits from products and services with [a] lower investment of energy."[10]

FOOTNOTES

1. Hayes, Denis, January, 1976. Energy: The Case for Conservation. Worldwatch Paper 4. Washington, D.C.: Worldwatch Institute, p. 7.
2. US. Executive Office of the President, April, 1977. The National Energy Plan. Washington, D.C.: U.S. Government Printing Office. Cited in Sacramento Regional Area Planning Commission, June, 1977. Regional Energy Plan. Final Draft, p. 88.
3. Hayes, op. cit., p. 14; and Schipper, Lee and Allan J. Lichtenberg, December 3, 1976. Efficient Energy Use and Well-Being: The Swedish Example. Science (Vol. 194), pp. 1001-1013.
4. Hayes, op. cit., p. 14. Emphasis is author's.
5. Ford Foundation Energy Policy Project, 1974. A Time to Choose. Cambridge, Mass.: Ballinger Publ. Co., p. 1.
6. California Energy Resources Conservation and Development Commission, 1977. California Energy Trends and Choices, 1977 Biennial Report. Vol. 3: Opportunities for Energy Conservation, pp. 24-25.
7. Ibid, p. 27.
8. Ibid, p. 25.
9. Ibid, pp. 25-26
10. Ibid, p. 17.

GLOSSARY

British thermal unit (Btu) - A unit of heat equal to approximately 252 calories. Also, the quantity of heat required to raise the temperature of one pound of water at its maximum density one degree Fahrenheit.

efficiency - The ratio of output to input of energy or power. For a process involving heat, efficiency is related to the initial and final temperature of the system

energy efficiency ratio - The ratio of the cooling capacity of an air conditioner, in Btu's per hour, to the total electrical input, in watts, under specified test conditions established by the California State Energy Commission.

kilowatt - The unit of power equal to one thousand watts.

kilowatt-hour - A unit of electrical energy equivalent to 3,413 Btu's of heat energy expended per hour (some sources give ranges of 3,410 Btu's).

life-cycle costing - The calculation of the cost of a product over its expected "lifetime," i.e., the initial cost of maintenance and repairs, the cost of operating - including energy requirements - during its "lifetime," and the cost of disposal.

load management - The concept of influencing the amount of energy used by utility customers at a given time. Includes techniques to change the demand for energy at peak hours and physical devices that cycle equipment off and on.

megawatt - The unit of power equal to one million watts.

modal split - In transportation planning, the ridership of one mode (bus, car, train, bicycle, etc.) versus another mode. Expressed as a ratio or percentage, and usually referring to automobiles versus public transit.

peak energy demand - A given moment when demand for energy is significantly higher than for most other times. Often refers to a period of time, such as a certain part of the day or a certain season.

power - The rate at which work is done. The rate at which energy is used.

renewable resources - Self-perpetuating types of resources; living or biotic resources. Also, resources that are in finite quantity but can be used over, such as air and water.

system load factor - Generally described as the ratio of total sales of an electric utility system to its total generating capacity. One hundred percent system load factor would be selling all electricity for which the system has generating capacity.

therm - A unit of energy measurement for natural gas, equivalent to 100,000 Btu' s.

total energy management (TEM) - An energy conservation approach based on the premise that, to affect energy savings in a building or system, all of the components of that building or system must be made as efficient as possible, with each consuming the smallest amount of energy to perform the functions required.

vehicle miles traveled (VMT) - The number of miles traveled by a given group of motor vehicles during a given period of time. It is a measure of the amount of driving and can be used to calculate the consumption of petroleum fuels used in transportation.

watt - The amount of work available from an electric current of one ampere at a potential of one volt. The watt is also the metric unit of power, and is equal to a rate of energy consumption of one joule per second. One joule is roughly one thousandth of a British thermal unit.

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* SOURCE: Sacramento Regional Area Planning Commission, June 1977. Regional Energy Plan. Final Draft, pp. 120-129.)

The United States is at a turning point. It can choose, through piecemeal programs and policies, to continue the current state of drift. That course would require no hard decisions, no immediate sacrifices, and no adjustment to the new energy realities. That course may, for the moment, seem attractive. But, with each passing day, the United States falls farther behind in solving its energy problems. Consequently, its economic and foreign policy position weakens, its options dwindle, and the ultimate transition…becomes more difficult. If the United States faces up to the energy problem now…it will have the previous opportunity to make effective use of time and resources...

The energy crises presents a challenge to the American people. If they respond with understanding, maturity, imagination, and their traditional ingenuity, the challenge will be met. Even the "sacrifices" involved in conservation will have their immediate rewards in lower fuel bills and the sense of accomplishment that comes with achieving higher efficiency. By preparing now for the energy situation of the 1980's, the U.S. will not merely avoid a future time of adversity. It will ensure that the coming years will be among the most creative and constructive in American history.

- National Energy Plan. April, 1977. Released by the White House. Cited in SRAPC, Regional Energy Plan, Final Draft, June, 1977, p. 94.

LIST OF ABBREVIATIONS

Btu's	British thermal units
CalTrans	California Department of Transportation
Energy Council	Sacramento Energy Planning and Conservation Council
ERCDC	State Energy Resources Conservation and Development Commission, or State Energy Commission
PG&E	Pacific Gas & Electric Company
RT	Regional Transit
SMUD	Sacramento Municipal Utility District

SUMMARY OF ENERGY SAVINGS

	Target Year	Total (billions of Btu's)	Per Capita (millions of Btu's)	Initial Electricity (MWH)	Natural Gas (millions of ft^3)	Gasoline, Diesel (millions of gallons)
1. Residential building standards						
2. Insulation retrofit, residential	1988	1,870	2.2	136,000	1,340	
3. Common wall dwellings	1995	1,830	2.0			
4. Neighborhood planning standards						
5. Inform public--residential		C				
6. Housing, neighborhood rehabilitation						
7. Purchase, rent energy efficient housing						
8. Transportation, land use	1995	7,700	8.3			62
9. Expand RT service		a				
10. Vanpooling, carpooling	1995	148	0.16			1.2
11. More efficient cars						
12. Inform public-transportation		C				
13. Bikeways, pedestrian-ways						
14. Labor-intensive industry						
15. Co-generation						
16. Insulation retrofit, non-residential						
17. Non-residential design standards						
18. Inform agricultural industry		C				
19. Solar heating	1995	$3,700^b$	3.9^b			
20. Solar cooling						
21. Solar rights		C				
22. Renewable sources of energy						
23. Hydroelectric generator efficiency						
24. Shifting working hours						
25. Inform public--peak load		C				
26. Peak day pricing						
27. Electronic load management						
28. Total energy management	c	48	0.07	2,630	37	
29. Life-cycle costing						
30. Recycle office waste paper						
31. Municipal solid waste	1980	$1,058^d$	1.4^d			
32. County Energy Office or Coordinator		C				
33. Energy evaluation of projects						
34. Design of new county buildings						
35. Water resources management plan	2020	444^e	0.5^e			

C - Contributes to the success of other policies. a - Included as part of preceding estimate. b - Not the result of the actions presented for this policy, but potential result under assumptions given in the Energy Evaluation for this policy. c - Savings in FY 1976-77 over FY 1975-76. d - Not all savings will accrue to Sacramento County. e - With water treatment plant Located at Folsom Lake.