# THE CALIFORNIA ENERGY OUTLOOK

Karen Edson, Commissioner
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

ABSTRACT

The 1970's saw runaway growth in demand for electrical energy, reduction in oil supplies, and dramatic increase in the price of oil. More recently utilities and government have redirected their efforts toward energy conservation and development of alternative renewable sources. A central California Energy Commission policy is to reduce dependence on oil and to increase development of renewable energy resources. This policy is expected to contribute to improving air quality, but other impacts will merely shift from urban to rural areas. An increase in water consumption is expected and other cumulative effects could become significant. Through the California Energy Commission power plant siting process, consultations with other agencies, and implementation of mitigation measures, it is hoped that adequate energy supplies and protection of natural resources can remain compatible goals.

## CHALLENGES OF THE 1970'S AND OUTLOOK FOR THE 1980'S

During the 1970's California faced the overwhelming challenge of runaway growth in the demand for electrical energy. Utilities were proposing to construct a large number of central power stations fueled by nuclear and coal to meet the rapidly escalating demand. Consumer and environmental groups were arguing that the projects were not needed. The heated policy debate that ensued resulted in creation of the Energy Commission with responsibility for independently forecasting energy demand, siting power plants and promoting conservation and alternatives. However, controversy continued, fueled by a major transformation in the overall energy picture.

Twice during the 1970's, consumers were rudely awakened to our energy crisis. The Arab oil embargo of 1973 and the sudden drop in OPEC oil production in 1979, although only causing a 5% shortfall in petroleum supplies, created long lines at gas stations and shortages in industrial and agricultural sectors, making California and the nation painfully aware of our vulnerability.

Oil prices increased dramatically during the 1970's -- from about $13.50 a barrel to over $37.00 between 1976 and 1981. Although oil prices have recently dropped and stabilized, the state's forecasters expect price increases to resume around 1987 and then rise on the average of 3 percent per year in real terms until the end of the century. Similarly, the price of natural gas, which is tied to the price of oil, will escalate due to federal decontrol by the mid-1980's and then stabilize at 85 percent of oil prices after 1985 (California Energy Commission 1983: 9-3).

Over the last eight years the Energy Commission's independent forecasts as well as these dramatic changes have led California's electrical utilities to cut their estimates of demand by more than half. In 1974, statewide electrical sales were expected to grow at an annual rate of nearly 6 percent per year. In 1983, sales are expected to grow by less than 2 percent per year, and even that is probably high. This reduced demand, however, does not indicate that California's problems are solved.

Today, California utilities are requesting massive rate increases from the California Public Utilities Commission to account for their increased fuel costs. For example, ratepayers of the state's three largest investor-owned utilities are paying nearly $4 billion more per year for electricity than they did in 1978 due to rate increases (California Energy Commission 1983: 6-3). The response has been an unprecedented customer outcry as electric and gas bills soar and these costs enter the ratebase.

In 1983 California continues to rely heavily on oil and natural gas for 90 percent of its energy needs. About 58 percent of California's energy comes from oil and 32 percent comes from natural gas (California Energy Commission 1983: 2-1). Nuclear, geothermal, hydroelectric, coal and a variety of alternative energy sources supply the remaining 10 percent, almost entirely as electricity. As a result, the problems of continued oil dependence and escalating energy prices have become the major preoccupation of the 1980's.

Both government and utilities have redirected their efforts away from construction of large central generating stations toward promoting energy conservation and the development of alternative, renewable energy sources. Common sense and sound government policy point to energy conservation and alternative, renewable sources, including solar, geothermal, wind, biomass, and small hydroelectric sources, as the cheapest, quickest way to meet demand and reduce our dependence on oil.

## STATE POLICY CHOICES: THE CONVENTIONAL ENERGY PATH VERSUS THE LESSER COST SCENARIO

Since 1979 the Commission has established as state energy policy the increasing role that energy conservation and alternative energy sources play in guaranteeing adequate, reliable future energy supplies (California Energy Commission 1979:1). Recognizing that the "energy problem" in California today is predominantly an economic problem, the state continues to promote these preferred energy options because of their long-term economic and societal benefits. Increased use of conservation and renewables offer stable fuel prices, less environmental risk, and greater diversity of supply than their conventional counterparts. More importantly, conservation and alternatives have shorter lead times, require smaller increments of capital to construct, and therefore are able to more rapidly displace oil.

California's ability to displace oil as its primary energy source depends on the choice between competing energy paths. Under the current "business as usual" path, in the year 2002 California will continue to rely on oil for approximately 55 percent of its energy compared to 58 percent in 1981. Natural gas will supply 24 percent of the state's needs versus 32 percent in 1981 (California Energy Commission 1983: 9-4). In addition, business as usual is likely to lead to the need for coal-fired power plants in California's Southeastern desert causing inevitable, serious environmental problems, particularly air pollution. Continued oil dependence in the electric and transportation sectors may again leave California vulnerable to the social and economic impacts of oil supply disruptions and price shocks such as those experienced in 1973 and in 1979.

Under the preferred energy path, oil would supply 51 percent of California's energy needs and natural gas use would drop to 23 percent (California Energy Commission 1983: 9-4). Alternative, renewable sources would supply 18 percent of the electrical energy in California by displacing the energy equivalent of over 400,000 barrels of oil per day by the year 2002. Cost effective conservation programs would further reduce demand for oil, gas and electricity and substantially lessen the need for new power plant construction. By implementing government policies to encourage this shift to renewables and conservation, California can achieve a greater proportion of lower cost, more secure energy and more environmentally benign sources in its overall supply mix.

Yet, even under the preferred energy scenario with reduced demand, and emphasis on cost-effective conservation and alternatives, many environmental issues associated with energy development will continue to require the attention of regulatory agencies. In the case of California, several general trends point to the need to anticipate different kinds of environmental issues. Generally speaking, environmental impacts from energy use are expected to shift from urban to rural areas by the end of the century. Overall, air

quality in the state will improve with the retirement of existing oil and gas-fired power plants in urban areas and with fuel switching to burn gas in place of oil. However, water consumption is expected to increase as geothermal development in the Imperial Valley proceeds and numerous solar thermal installations come on line. The cumulative effects of continued energy development on land use, biology, public health and safety, and local public services could become significant issues in some areas of the State.

## ENVIRONMENTAL PROTECTION IN APPROVAL OF NEW POWER PLANTS

As the agency in state government responsible, among other things, for statewide energy planning and forecasting, the Energy Commission must carefully balance the need for adequate, reliable energy supplies with environmental protection goals when approving new power plant sites. Since its creation by the California State Legislature in 1975, the Commission has reviewed utility power plant proposals fueled by oil, gas, coal, nuclear fission, geothermal steam, and the sun. The Commission has also examined the environmental consequences of photovoltaics, biomass, wind, and small hydro-electric projects.

We have learned over the past few years that even alternative, renewable energy sources are not without environmental consequences. For instance, certain renewable energy sources, including geothermal and biomass sources, cause adverse air quality effects while others, such as solar energy, employ technologies which consume large quantities of water for power plant cooling. Wind generators and solar photovoltaics require large tracts of land for their power generating facilities and associated transmission lines, and can compete with other land uses. Of particular concern are the combined effects on land use, biology, public health and safety, and local public services which accumulate from numerous small projects sited in a single geographic area.

Over the past year and a half, the Commission has been investigating the cumulative impacts resulting from geothermal power plant development at the Geysers. In the Geysers Cumulative Impact proceeding, where I have presided as the lead Commissioner, the Commission has arrived at a practical solution for mitigating the additional costs to local school districts and county road departments of increased levels of development. The Commission has also evaluated the combined environmental effects of geothermal development on biology, water quality, water supply, and air quality.

As professional fishery and wildlife biologists, I'm sure you have come to know first hand the detrimental effects to land, air, water, fish and wildlife resources that can occur if energy development is not properly controlled. Through its power plant siting and approval process, the Commission imposes conditions upon the construction and operation of new power plants sized at 50 megawatts or greater to prevent unnecessary environmental damage.

For example, as a requirement for approval of a power plant, the Commission often requires a utility or developer to conduct specialized studies designed to protect rare, threatened, or endangered species from disturbance. In some cases, the Commission requires compensation for loss of wildlife habitat through acquisition of comparable tracts of land or may require changes in construction and operation practices to avoid any permanent loss or disturbance to fish and wildlife or their habitats.

As a more specific example, the Commission recently approved the construction of the Solar 100 project, a 100-megawatt solar electric power plant to be located at the Lucerne Valley site near Palm Springs. In that siting case, the Commission found that the project site, which covered 3 square miles in that high desert region of San Bernardino County, would impact the habitat of the fully protected desert tortoise and at least one threatened plant species. As a condition of power plant approval, the Commission required the utility to capture and remove the tortoises from the area prior to construction, and to conduct research to develop a more detailed mitigation plan. Limits were placed on earth movement and vegetation removal during construction to avoid disturbing sensitive or threatened plant species wherever possible.

The Commission works very closely with the federal and state government agencies, such as the California Department of Fish and Game and the U.S. Fish and Wildlife Service, to incorporate their concerns and recommendations into our power plant siting decisions. By consulting the experts, the Commission has insisted on mitigation measures for a variety of species, including the desert tortoise, salt marsh harvest mouse, ringtail cat, and peregrin falcon.

With the support of governmental agencies and utilities and geothermal developers, the Commission has established a regional aquatic monitoring program to sample fish and benthic organisms in the Geysers Known Geothermal Resources Area in northern California. Investigations are underway there on the ringtail population, the serpentine jewel flower, and sensitive flora of the Mayacmas Mountains. Working together, we can make a difference when it comes to protecting our fish and wildlife resources.

I might add that I share many of the concerns raised by the National Audobon Society in its recent report on the potential side effects of renewable energy sources. Clearly, California state energy policy prefers use of clean, renewable energy sources over conventional sources, such as coal, nuclear, or oil. Yet, as the Audubon Society report points out, the environmental consequences of alternative energy systems, although less severe, should be carefully researched and evaluated to identify and eliminate any undesirable side effects. Russell Peterson, National Audubon Society president, sums up the report's conclusions by stating: "Even with solar energy, there's no such thing as a free lunch" (Peterson 1983: 53).

I strongly agree that care should be given in siting wind turbines and solar installations to avoid any critical habitats, choosing technologies that don't pollute the air or consume large quantities of water, or selecting existing canals and pipelines rather than constructing new dams for the placement of small hydroelectric generators.

In conclusion, let me summarize that the future energy outlook for California remains an optimistic one. Even with recent California increases in consumer electric rates, expectations of renewed oil price increases, and mounting concern over the price impacts of federal decontrol of natural gas, California can achieve energy security through diversity. Furthermore, recognizing the potential environmental problems we face, I am hopeful that with the aid of professionals like yourselves, we can ensure that the provision of adequate energy supplies, maintenance of a strong economy, and protection of our State's valuable natural resources remain compatible goals.

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