

Energy Element

Chapter 5

ENERGY ELEMENT

5.1 INTRODUCTION

Kern County possesses a wealth of existing and potential energy resources. The County's role as a major oil, natural gas, and electricity producer, along with its geographic position at the heart of California and on the boundaries of the State's largest gas and electric utilities, gives the County's future energy development statewide significance.

The Kern County Energy Element is a comprehensive document which defines critical energy related issues facing the County and sets forth goals, policies, and implementation measures to protect the County's energy resources and encourage orderly energy development while affording the maximum protection for the public's health, safety, and the environment.

The Energy Element has three primary objectives:

- Resource management and protection.
- Establishing development standards to provide for the protection of the environment, public health, and safety.
- Promoting and facilitating energy development.

The Energy Element proposes no substantial changes in current policy or existing institutional arrangements. Generally, Kern County's energy economy is strong and the County has effectively responded to critical energy issues as they have arisen. The Energy Element focuses on four areas:

1. Continue to improve and streamline current energy regulations; and
2. Increase County monitoring and involvement in State and federal energy legislation; and
3. Planning for future energy resource diversification; and
4. Anticipating new opportunities for development of Kern County's energy resources, including oil, natural gas, geothermal, wind and solar power.

5.2 IMPORTANCE OF ENERGY TO KERN COUNTY

Kern County not only has a long history of energy development, but it is presently a pioneer in both petroleum production technology and renewable energy techniques. While the oil, natural gas production, and hydroelectric generation initiated in the early 1900s are still thriving, the County has also been on the cutting edge in the development of new energy technology.

Kern County's oil industry is foremost in the nation in the development of thermally enhanced oil recovery techniques. Petroleum operations are becoming increasingly automated, using state-of-the-art technology. Cogeneration has developed rapidly out of the need for steam in the oil fields and as a result of regulatory and tax incentives. In addition, the County produces about one third of the State's wind energy thereby becoming a leader in wind energy production. The potential energy which may be produced by wind energy technologies in Kern County is unknown. Meanwhile, just outside the County boundaries, extensive geothermal and solar energy development is taking place. Solar resources are abundantly available in Kern County and there is also the potential for high-temperature geothermal resources. Kern County's agricultural and municipal wastes also represent vast quantities of potential fuel.

General Assumptions

Energy development is vital to Kern County's economy and will continue to be so into the future. Its petroleum resources will continue to be a valuable State and national resource. The County's renewable energy resources should also be protected and will be important to the State's electricity supply.

General Issues

Energy development in California is subject to a complicated multi-level system of governmental regulations and programs. Kern County has direct control over many of the land use decisions concerning local energy development. Many other decisions concerning energy development in Kern County, however, are made by State and federal agencies. Federal and State energy policies can significantly affect the level and types of energy development that takes place in Kern County.

The County cannot exercise direct control over the actions of other agencies. It can, however, monitor the activities of other agencies and become actively involved by testifying against or in support of actions, which affect energy development in Kern County. Federal and State agencies are usually required to consider local land use regulations and policies when making decisions.

Federal, State, and local agencies often adopt overlapping and duplicative regulations, making it costly and confusing for industry to comply with multiple permitting and reporting requirements. Local governments can work cooperatively with other agencies to address problems at more than one level or to define each agency's role.

General Goal

To assert Kern County's position as California's leading energy producer, to encourage safe and orderly energy development within the County, including research and demonstration projects, and to become actively involved in the decisions and actions of other agencies as they affect energy development in Kern County.

General Policies

1. Kern County should assert and promote its role as the State's leading energy County.
2. The County should actively monitor the actions of local, State, and federal agencies relating to energy development in Kern County, and lobby and present its position on such matters as needed to protect the County interests and avoid unnecessary impediments to energy development.
3. The County shall continue to streamline energy permitting regulations.
4. The County should actively seek State and federal energy grants and projects to assist in energy planning and development.
5. The County shall work with other agencies to define regulatory responsibility concerning energy-related issues, and shall seek to eliminate, insofar as possible, duplicative regulations.
6. The County should encourage discussion and mutual cooperation of various energy industries within the County to establish mutual understanding of common needs and issues.
7. The processing of all discretionary energy project proposals shall comply with California Environmental Quality Act (CEQA) Guidelines directing that the environmental effects of a project must be taken into account as part of project consideration.
8. The County should work closely with local, State, and federal agencies to assure that energy projects (both discretionary and ministerial) avoid or minimize direct impacts to fish, wildlife, and botanical resources, wherever practical.
9. The County should develop and implement measures which result in long-term compensation for wildlife habitat, which is unavoidably damaged by energy exploration and development activities.
10. The County should require acoustical analysis for energy project proposals that might impact sensitive and highly-sensitive uses in accordance with the Noise Element of the General Plan.

General Implementation Measures

- A. The County's Home Rule Program shall continue to monitor the development of State and federal regulations and programs to ensure that continued responsible energy development is promoted.
- B. The County shall monitor available State and federal energy grants and projects and actively pursue those which will benefit the County.
- C. The County shall maintain and periodically update the Energy Element.
- D. The County should develop an Energy Permit Handbook that will identify the necessary permits and requirements to facilitate the development of energy projects in Kern County.

5.3 PETROLEUM RESOURCES AND DEVELOPMENT

Kern County is well known for its petroleum resources and production. It has been a major oil producer since the early 1900s. Kern County has been a pioneer in the field of thermally enhanced oil recovery (TEOR), the process whereby heavy oil is heated, usually by steam or hot water injection, to make it more fluid to pump from the reservoir.

Assumptions

Petroleum production and development has been, and will continue to be, vital to the economy of Kern County and California. Levels of exploration and production in Kern County are dependent on world energy prices. Sharp fluctuations in oil prices have led to historic "boom and bust" cycles, with dramatic effects on Kern County's economy. Volatility in the world energy market can be expected to continue. Future production levels will be largely dependent on world energy prices.

Kern County's known petroleum resources are finite and will ultimately be depleted; however, exploration and development should continue for decades. Some fields and portions of fields will be depleted and abandoned, but new discoveries and technological advancements will add to presently known reserves. Experts concur that major new discoveries are most likely to take place at new producing zones in existing fields and on the margins of existing oilfields.

Technological advancements will shape future oil development in Kern County. TEOR technology will continue to progress, and will likely comprise most of Kern County's future oil development. There is also potential for development of experimental and unconventional oil extraction methods. If oil prices rise, the experimental diatomite ore mining and processing operation may be revived.

Produced oil is shipped to refineries in and outside of Kern County by pipeline, truck, and rail. With limited potential for expansion of refining capacity in Los Angeles and the Bay Area, Kern County is expected to have an important role in refining and processing petroleum products in the future.

Petroleum resources and development are very important to Kern County, raising a wide range of managing issues.

5.3.1 Urban/Residential Development in Petroleum Resource Areas

Issue

Conflict can arise when residential or urban development takes place in petroleum resource areas, or conversely, when petroleum exploration and development is undertaken in existing urban areas. In some cases, this can preclude the development of otherwise viable petroleum reserves or can cause health and safety hazards and threatens aesthetic values in urban development.

Goal

To protect oil resource areas from unnecessary urban/suburban encroachment, and in instances of urban/suburban development in oil resource areas, to provide for the development of petroleum resources in a manner compatible with the surrounding environment to minimize adverse impacts and protect health and safety.

Policies

1. The County shall continue to assure adequate minimum setbacks between wells and from any existing structure, as permitted by the Kern County Zoning Ordinance.
2. The County shall assure adequate minimum setbacks between the construction of any structure and existing wells as permitted by the Kern County Fire Department and the State Division of Oil, Gas, and Geothermal Resources (DOGGR).
3. The County shall continue to provide the opportunity for establishing drilling islands prior to final maps subdivision approval of any proposal in a petroleum resource area or a waiver of surface entry rights by the applicable mineral rights holder.
4. All oilfield development shall take place in accordance with regulations administered by DOGGR.
5. New access roads to serve oilfield development should be sited to avoid traffic impacts.
6. In areas where petroleum production occurs close to urban development, oil companies shall be encouraged to site equipment so as to avoid unnecessary disturbance to urban uses.
7. The County should work in cooperation with incorporated cities of Kern County to establish compatible standards for oil development within urban areas.

8. Reduce the public's exposure to fires, explosions, blowouts, and other hazards associated with the accidental release of crude oil, natural gas, or hydrogen sulfide gas by ensuring that discretionary development projects have adequate separation from oil and natural gas production land uses.

Implementation Measures

- A. The Drilling Island District of the Kern County Zoning Ordinance shall establish and maintain development standards to permit petroleum exploration and development on single lots and in small areas.
- B. The Petroleum Extraction Combining District of the Kern County Zoning Ordinance shall establish and maintain specific standards for ensuring compatibility with urban and petroleum development for the Estate (E), Commercial Office (CO), Neighborhood Commercial (C-1), General Commercial (C-2), and Highway Commercial (CH) zoning designations.

Oil and gas production shall be subject to provisions set forth in Chapter 19.98 of the Kern County Zoning Ordinance

- C. The County shall monitor its regulations pertaining to petroleum exploration, production, and update such regulations as necessary.

5.3.2 Kern County's Economic Dependence on the Oil Marketplace

Issue

Petroleum production and development affect the County's employment, growth, and tax revenues. The rise and fall of petroleum prices creates dramatic swings in the County's economy.

While the County is vulnerable to short-term fluctuations in the petroleum industry, it is even more vulnerable in the long run. Because petroleum resources are finite and production has begun to decline. It is generally acknowledged that Kern County's economy will continue to be influenced by oil and natural gas production issues.

Goal

To reduce the County's susceptibility to fluctuations in the petroleum production levels, and to encourage diversification of the economy.

Policies

1. The County should promote and encourage programs for retraining and educating workers unemployed as a result of the cyclical declines in the oil industry.
2. The County shall attempt, insofar as possible, to shield itself from fluctuations in its revenues resulting from fluctuations in petroleum production revenues.
3. The County shall encourage the conversion of existing petroleum-related facilities to other productive uses when they are no longer needed or productive.
4. The County should encourage the development of renewable energy industries to diversify the energy economy in Kern County.
5. The County should support efforts to provide reliable and economical supplies of natural gas to support Kern County's petroleum production, including (an) interstate gas pipeline(s), providing the project(s) is (are) consistent with the goals and policies of the Land Use, Open Space, and Conservation Element of this General Plan.

Implementation Measures

- A. Kern County shall support the Kern Economic Development Corporation in its efforts to encourage the siting of industrial and commercial projects in Kern County to broaden the local economic base.

- B. Kern County shall continue to work with Employers Training Resource and other job training entities in times of declining oil and natural gas production.

5.3.3 Waste Disposal in Petroleum Development

Issues

Oil production and refining generate large quantities of wastes. Most of these wastes are nonhazardous; the greatest volume is produced water (brine) and drilling muds (which are mostly clay).

There is a certain amount of hazardous waste produced in conjunction with oil producing and refining operations. These are transported to licensed recycling or disposal facilities. The State, however, is facing decreased hazardous waste disposal capacity.

Waste disposal is regulated by a number of State and federal agencies. Hazardous waste control laws are becoming more stringent and it is becoming increasingly difficult to site new hazardous waste disposal facilities.

Goal

To encourage the safe recycling, transportation, and disposal of wastes associated with petroleum production and processing, and to provide for the siting of disposal facilities in locations with proper access, while minimizing adverse impacts on the environment and on public health and safety.

Policies

1. The County shall continue to acknowledge the necessity to site nonhazardous oil field waste disposal sites near petroleum development to minimize transportation hazards and expenses, consistent with the provisions of the Kern County and Incorporated Cities Integrated Waste Management Plan.
2. The County shall encourage recycling and new treatment methods for hazardous and nonhazardous oil field wastes.
3. The County shall work cooperatively with appropriate State and regional agencies to provide for the proper siting of oilfield waste disposal facilities.
4. The County shall address hazardous oil field waste disposal issues in the Kern County and Incorporated Cities Hazardous Waste Management Plan policies and implementation measures.

Implementation Measures

- A. The County shall work with the California Department of Oil, Gas, and Geothermal Resources to maintain an inventory of on-site and off-site disposal

facilities in order to identify the scope of oil field waste disposal facilities in Kern County.

- B. The County shall address oilfield hazardous waste issues through the Kern County and Incorporated Cities Hazardous Waste Management Plan.
- C. The County shall continue to maintain provisions in the Zoning Ordinance to provide for oilfield waste disposal facilities.
- D. The County shall continue to maintain provisions in the Zoning Ordinance for the development of oilfield waste recycling and treatment facilities.
- E. The Oilfield Waste Subcommittee should continue to advise the Solid Waste Management Advisory Committee on matters of importance to the oil industry.

5.3.4 Petroleum Technology and Advancement

Issues

Kern County's petroleum industry is rapidly changing. Operations are becoming increasingly automated and new discoveries are continuing. Future development will move toward an increasingly technically-skilled work force. Because past petroleum production has depended on unskilled labor, this will create a gap in skill level between the existing and required work force.

Innovative and experimental techniques of fuel production and extraction will continue, and be essential to the continuance of Kern County as a fuel production center.

Goal

To encourage the continuing advancement of energy technology and to respond to the needs it creates on the work force.

Policies

1. The County should actively encourage research and demonstration projects which would be positive for Kern County and not in conflict with adopted plans and programs.
2. The County should encourage the energy resource industry to invest and research the practical advancement of technology, and allow for periodic updates or training sessions for industry workers.

Implementation Measures

- A. The County should promote a continuing dialogue with petroleum industry representatives to monitor trends in technology and anticipate needed changes to development standards.
- B. The County shall review and revise, as necessary, the Zoning Ordinance to make provisions for experimental technologies.

5.3.5 Reuse of Nonproductive Petroleum Resource Areas

Issues

The oil and natural gas reservoirs in Kern County are finite resources, which will eventually be depleted. It should be noted that recoveries from these reservoirs are only partial, and that upon abandonment; a reservoir may retain a major portion of the original oil-in-place. Based upon oil price and available technology, both individual wells and entire oilfields have been abandoned and subsequently reactivated. It is important to provide for the productive reuse of these areas. The State Division of Oil, Gas and Geothermal Resources (DOGGR) regulate abandonment of wells, including the removal of surface equipment.

Wells that were abandoned prior to the 1950's were abandoned in accordance to law and regulation in place at that time, however additional requirements have subsequently been added in order to better protect fresh groundwater and protect the public from hazards at the surface. Previously abandoned wells may not be precisely at the location on record, and may be hazardous or leaking.

Goal

To ensure the proper abandonment of petroleum production operations, in accordance with DOGGR requirements, when petroleum resource areas are depleted or are no longer productive, to provide for conversion of these areas to other land uses.

Policies

1. The County shall promote safe well abandonment in accordance with DOGGR regulations through discretionary applications.
2. The County shall work with the DOGGR to ensure the removal of all surface equipment from abandoned petroleum development sites.
3. The County shall promote and encourage the safe reuse of former petroleum production lands by developments compatible with surrounding land use designations. The guidelines for site reestablishment include the following:
 - a. Removal of oil-laden soil
 - b. Shaping of disturbed lands back to natural grade and the elimination of pad areas, settling ponds, and similar disturbances.
 - c. Stabilization of sites by seedlings and plantings as appropriate.
 - d. Other measures as may be stipulated by the State Division of Oil, Gas and Geothermal Resources.

- e. Proper identification and abandonment of all oil and natural gas wells.

Implementation Measures

- A. Upon cessation of drilling and/or producing operations in drilling islands, the County will consider initiating zone changes for such drilling islands to zoning districts compatible with surrounding land uses, provided the owner/operator demonstrates proper abandonment and cleanup in accordance with State Division of Oil, Gas and Geothermal Resources regulations.
- B. Non-petroleum related discretionary projects proposed on abandoned oilfields will be required to demonstrate that abandonment and clean up have taken place in compliance with regulations administered by DOGGR.

5.3.6 Environmental Impacts of Petroleum Development

Issues

Future petroleum development can have potential adverse impacts on Kern County's natural resources. Conversely, however, overly stringent, complex, or narrowly applied environmental regulations can have an inhibiting effect on petroleum exploration and development. Environmental issues which concern petroleum production include air quality, water quality, and endangered species protection. The impact level which results from petroleum production alone, however, is difficult to define, due to the regional and variable nature of these issues.

The San Joaquin Valley Air Pollution Control District is not in attainment for federal and State ozone standards and PM₁₀. Ozone is considered the primary component of smog and is generated primarily by stationary sources and by automobiles. The petroleum industry is the largest stationary source of air pollution in Kern County, and additional controls on oil production have been mandated in attempts to reach attainment of air quality standards. Air pollution, however, is not restrained by County boundaries. Much of Kern County's smog is transported from sources upwind, and violations of ozone standards occur primarily downwind of the Bakersfield urban area. Oil production and development may be forced to use cleaner fuels or inhibited from expansion if successful control measures are not achieved both within Kern County and in areas upwind.

The Southern San Joaquin Valley possesses a significant number of endangered species, including the San Joaquin kit fox, the blunt-nosed leopard lizard, and the giant kangaroo rat. Protection of endangered species in the area is a high priority of State and federal wildlife agencies. Kern County is developing a Valley Floor Habitat Conservation Plan to establish natural preserves to mitigate the effects of development on threatened and endangered species. The level of impacts which petroleum production may have on threatened and endangered species has not been determined. Generally, this depends on the density and location of development. Kern County is currently participating in multi-agency efforts to coordinate mitigation programs designed to protect and preserve threatened and endangered species.

Oilfield wastes must be carefully disposed of to prevent degradation of surface or groundwater supplies. Waste discharge requirements are established by the Regional Water Quality Control Board. Waste disposal is regulated by federal, State, and local agencies, depending on the type, composition of the wastes, and the disposal method.

Goal

To clearly identify and mitigate any adverse impacts on the environment from new or continued petroleum development by establishing clear and workable methods for industry compliance.

Policies

1. The County should pursue programs to address oil production as it relates to State and federal threatened and endangered species protection laws.
2. The County shall work with affected State and federal agencies and special interest groups to establish consistent policies for environmental protection activities related to petroleum production and oilfield waste disposal.
3. The County should attempt to ensure that the petroleum industry does not bear a burden of environmental regulation in excess of its contribution to the problems.
4. The County should encourage the use of clean-burning technologies in petroleum production.
5. The County should encourage air pollution control policies which apply the burden equally to local and upwind sources and to all classes of air polluters.
6. The County should work closely with State and federal agencies to avoid or minimize direct impacts to threatened and endangered species.

Implementation Measures

- A. The County shall participate in the development of the San Joaquin Valley Air Basin Study to identify measures to control sources of pollution both within and upwind of the County, which contribute to air pollution in Kern County.
- B. The County will continue to participate in programs, such as the proposed Kern County Valley Floor Habitat Conservation Plan program, which are intended to mitigate impacts of development on threatened or endangered species, including seeking State and federal funding for endangered species protection programs.
- C. The County should participate in efforts to encourage the construction of (an) interstate natural gas pipeline(s) to provide supplies of natural gas for petroleum operations, provided that the proposal(s) is (are) consistent with the goals and policies of the Land Use, Open Space, and Conservation Element of this General Plan and are environmentally sound.
- D. Energy resource industries should participate in the Kern County Valley Floor Habitat Conservation Plan to mitigate impacts to threatened and endangered species.

5.3.7 Processing and Transportation of Petroleum Products

Issues

Kern County presently exports much of its raw produced oil to refineries in Los Angeles and the Bay Area for processing and refining. Some oil is refined at facilities in Kern County: Both crude and refined products are transported via tanker truck and pipelines. Limited potential for expansion in other areas of California may spur the development of facilities in Kern County closer to their source.

The development and expansion of refineries has both negative and positive impacts on Kern County. Refineries may encourage greater petroleum development and improve the local economy, but they must be carefully sited, maintained, and operated to minimize risks.

Transportation of products by truck and rail creates air pollution and increases maintenance costs of public roads. However, without local refineries, crude oil would have to be transported by various means to refineries outside the County. Pipeline construction, although creating less visible impacts, poses potential hazards and can disturb vegetation and wildlife.

Natural gas pipelines are also needed to provide fuel for steam generation for thermally enhanced oil recovery operations.

Goal

To ensure the siting of refining facilities and pipelines in locations to provide maximum health, safety, and environmental protection; and to encourage the necessary processing and transportation facilities for Kern County's petroleum production.

Policies

1. New refineries shall be sited in accordance with provisions of the Kern County Zoning Ordinance.
2. The County shall review proposed pipelines and their alignments for their conformity with the Land Use, Open Space, and Conservation Element of this General Plan.
3. The County shall encourage the development of new pipelines with alignments that provide for environmental and the public's health and safety protection.

Implementation Measures

- A. The County shall review and revise, as necessary, the Zoning Ordinance to provide for suitable sites for refinery construction and expansion.

- B. The County shall review and revise, as necessary, the Emergency Response Plan, to provide consistent and proper procedures to address refinery accidents and pipeline ruptures.

5.4 ELECTRICITY RESOURCES AND GENERATION

Over the past ten years, electricity generation in California has undergone a transition. Historically, California has relied heavily on oil and gas fired plants to generate electricity. Spurred by regulatory measures and tax incentives, however, California's electrical system has become more reliant on renewable energy sources, including cogeneration, wind energy, solar energy, geothermal energy, biomass conversion, transformation plants, and small hydroelectric plants. Unlike petroleum production, generation of electricity is usually not tied to the location of the fuel source and can be delivered great distances via the electrical grid.

Kern County plays an important role in the electrical system, due to its location on the boundaries of the State's largest gas and electric utilities (Pacific Gas & Electric, Southern California Edison, and Southern California Gas), and the existing electrical generating plants in Kern County (primarily cogeneration, wind energy, peaker power plants, and hydroelectric). There is also potential for expansion of these kinds of electrical generating plants and the emergence of new kinds of energy development.

Assumptions

Over the past decade, regulatory incentives and tax inducements led to the rapid development of renewable energy. Government policies encouraging the development of alternative energy projects were established to reduce dependence on oil and natural gas. Renewable energy development has now exceeded most expectations. As a result, regulatory attitudes toward renewable energy have changed, and economic and tax incentives have largely been eliminated.

Although renewable energy may never again achieve the rapid pace of development of the early and mid-1980s, in the future there will be a demand for additional sources of electrical generation. Furthermore, the renewable energy industry has established itself as a viable and workable option for electrical generation. It is unlikely that new conventional (non-cogeneration) oil and gas-fired electrical generating plants will be constructed in California.

Issue, Goal, Policy, and Implementation

Electricity generation can be discussed according to specific types of generating technologies and fuels. There is a diverse mix of generating resources and methods, with distinct related issues. Generating technologies relevant to Kern County include: cogeneration, wind energy, geothermal energy, biomass/transformation, solar energy, and hydroelectric. Transmission lines accompany virtually all types of electrical generation.

5.4.1 Cogeneration

Issues

The rapid development of cogeneration in Kern County's oil fields over the last ten years is a result of two factors: the need for steam associated with thermally enhanced oil recovery, and regulatory and tax incentives encouraging the development of alternative energy projects. Cogeneration has become an accepted and successful technology. These facilities provide steam for TEOR in place of steam generators. The electricity generated is usually sold to utility companies, although in many cases all or some of the electricity generated is used to power onsite equipment. Cogeneration facilities can also be used to provide steam for other kinds of industries, including food and paper processing.

Kern County produces more electricity from cogeneration than any other County in California. Large plants (50 Megawatts (MW) or greater) are licensed by the California Energy Commission. Most of the cogeneration facilities in Kern County, however, have a capacity of less than 50 MW.

Most cogeneration plants use natural gas as fuel, although some use fuel oil as backup fuel.

Goal

To encourage the safe and orderly development of cogeneration facilities and increased utilization of cogeneration in oil production and other industries as a cleaner and more efficient means of generating both steam and electricity.

Policies

1. The County shall allow the continued development of cogeneration facilities in primary oil resource areas and industrial areas.
2. The County should monitor the activities of local, State, and federal agencies relating to cogeneration projects in Kern County, and present comment and testimony as necessary when the County's interests are affected.
3. The County should encourage the construction of (an) interstate natural gas pipeline(s) to provide supplies of natural gas for cogeneration and thermally enhanced oil recovery in Kern County, provided that proposals are consistent with the goals and policies of the Land Use, Conservation, and Open Space Element of the Kern County General Plan.

Implementation Measure

- A. The County shall continue to maintain provisions in the Zoning Ordinance to provide for the proper siting of cogeneration facilities in suitable areas.

5.4.2 Wind Energy Development

Issues

The wind energy development in the Tehachapi Mountains is one of the State's largest, responsible for about 40% of the State's total wind-generated power. In the late 1970s and early 1980s, there was rapid development of wind energy in California, spurred by federal and State tax incentives and lucrative power sales contracts with the utility companies. Individual wind turbine size has increased dramatically, from 25-110 Kilowatts (KW) size of the early 1980s, to 1-2.5 Megawatts (MW).

Initially, because it was a new industry, wind energy was developed with very little regulatory review. In 1986, the County adopted a Wind Energy Combining District of the Kern County Zoning Ordinance, which controls and minimizes the impacts of wind energy development.

Full realization of the County's wind-generated electricity may be hampered due to the lack of adequate power transmission capacity. The production from existing wind turbines is surpassing the expected generation and on exceedingly windy days, exceeds the capacity of the existing transmission lines, forcing turbines to be shut down.

Goal

To promote the safe and orderly development of wind energy as a clean method of generating electricity while providing for the protection of the environment.

Policies

1. The County should support the construction of additional transmission capacity for wind energy developments where land use and other constraints are minimal.
2. All wind energy development shall be subject to the development standards of Kern County Zoning Ordinance.
3. The County should monitor the activities of other local, State, and federal agencies relating to wind energy projects in Kern County, and present comment and testimony as necessary when the County's interests to avoid unnecessary impediments to energy development.
4. The County shall work with the wind energy industry to maximize electrical potential while assuring that military flight operations, communication facilities and visual conflicts for neighboring property owners are addressed.
5. The County should actively monitor the actions of local, State, and federal agencies relating to wind energy development in Kern County, and lobby and

present its position on such matters as needed to protect the County interests and avoid unnecessary impediments to energy development.

Implementation Measures

- A. The WE (Wind Energy) Zone District should be reviewed and amended as necessary to include adequate setbacks, buffer, aesthetic requirements, oak tree provisions, military flight corridors, and removal of nonfunctioning machines.
- B. The County should promote a continuing dialogue with wind energy industry representatives to monitor trends in wind energy development and technology.
- C. The County should conduct an aerial photometric survey of the wind energy development area to determine the effectiveness of existing soil erosion control measures and, if necessary, modify the Kern County Zoning Ordinance as appropriate.

5.4.3 Geothermal Development

Issues

A major geothermal field is located in Inyo County just outside Kern County at the Coso Known Geothermal Resource Area, on lands under the China Lake Naval Weapons Center and Bureau of Land Management jurisdictions. The Navy and private companies are developing several power plants. Development of these plants affects Kern County's economic development; much of the support and supply necessary for development comes from Ridgecrest and the Bakersfield area.

Whether significant geothermal resources exist in Kern County is still unknown. While surveys by State and federal geologic agencies do not indicate that Kern County possesses any high temperature resources, some experts believe that there may be significant new geothermal resource areas in and near Kern County capable of generating electric power.

Geothermal projects typically take about ten years for exploration, construction, and development. Geothermal power plants have significant land use impacts, requiring wells, collector lines, and transmission lines in addition to the power plant itself. Geothermal plants can also have significant environmental impacts both from surface and underground disturbances and the kinds of emissions produced. Like any new industry, however, geothermal development would be beneficial to Kern County's economic growth.

Lower temperature resources can also be directly used in applications such as space heating. Geothermal direct use projects generally have less intensive environmental impacts than electrical generating projects. Kern County is known to have low-temperature geothermal resources suitable for direct use purposes.

Goal

To provide for safe and orderly development of Kern County's geothermal resources, including direct use applications of low- and moderate-temperature resources, and electrical generation from high-temperature resources, if they are found to exist.

Policies

1. The County should support the safe and orderly development of geothermal resources at the Coso Known Geothermal Resource Area.
2. The County should support efforts for geothermal exploration in Kern County to determine whether high-temperature resources exist.
3. The County should permit geothermal development, which does not lead to significant degradation of the environment or public health and safety hazards.

4. The County should encourage direct use of low-temperature geothermal resources for heating, cooling, and other direct use applications.
5. The County should seek State and federal grants and programs, which encourage the wise development of geothermal resources.
6. The County should promote energy development in the upper Kern River Valley, including geothermal and hydroelectric energy development, which does not have significant adverse environmental impacts.

Implementation Measures

- A. At such time as high-temperature geothermal resources are discovered, the County shall consider the amendment of its Zoning Ordinance to establish a Geothermal Resource Combining District and establish specific development standards for development of geothermal electrical generating plants.
- B. The County shall support the Kern Council of Governments' geothermal evaluation studies in the Kern River Valley Area.

5.4.4 Transformation Development (formerly called Waste-to-Energy Development)

Issues

Transformation projects (also known as resource recovery projects) convert agricultural and municipal wastes, respectively, to fuel or electricity. The primary reason for most transformation projects is to dispose of the wastes, and the energy produced is a useful by-product to offset disposal costs.

Landfill gas recovery systems and methane fermentation projects produce methane gas, which can be burned in a gas turbine to generate electricity. Methane gas is recovered from Bakersfield's sewage treatment plants and converted to electricity.

Direct combustion projects, where agricultural refuse or municipal solid waste is burned to generate electricity, have greater environmental impacts and are usually more controversial than methane-producing projects. Transformation technologies are still relatively new to California.

Transformation plants have been proposed statewide as a solution to the State's diminishing landfill capacity. Proposals throughout the State, however, have sparked public opposition over issues of odor, toxic wastes, air pollutant emissions, noise, and traffic.

Kern County does produce large volumes of agricultural wastes, much of which are disposed of in open burning. Transformation plants are an alternative method of disposing of these wastes.

Goal

To provide for the careful siting of proven transformation technologies which provide for minimum risks to the environment and to public health and safety.

Policies

1. The County should encourage the use of landfill gas recovery and methane recovery projects at existing facilities.
2. The County should encourage the safe and orderly development of biomass conversion facilities as an alternative to burning agricultural wastes.
3. When evaluating proposals for transformation plants, the County should take under consideration whether the projects will produce air pollutant emissions in quantities that could reduce the ability to site other energy projects.
4. New transformation facilities shall be in conformance with the Kern County General Plan and the Kern County and Incorporated Cities Integrated Waste Management Plan.

5. Encourage the utilization of anaerobic digesters from the conversion of waste from Confined Animal Facilities.

Implementation Measure

- A. The County shall continue to maintain provisions in the Kern County Zoning Ordinance to provide for the safe and orderly development of transformation projects.

5.4.5 Solar Energy Development

Issues

Because of favorable climatic conditions in the desert and valley regions of Kern County, large-scale use of solar energy represents a major potential energy resource.

Despite excellent resource potential, no commercial solar development has occurred in Kern County to date. The reason for this is not completely clear. Explanations include the greater amount of the desert in San Bernardino County, Kern County's air quality regulations limiting emissions from the natural gas backup turbines frequently used by solar plants to provide power during peak periods, and the familiarity of solar developers with San Bernardino County's policies and regulations.

Solar development was spurred by federal and State tax incentives and the availability of lucrative power sales contracts with the utility companies. These economic incentives have been eliminated, which will slow solar development, at least for the near term.

Solar power plants are very land intensive compared to conventional power plants, requiring acres of reflectors, pipelines, and transmission lines.

Small solar generators for domestic and business use will probably become more widely used.

Goal

Encourage safe and orderly commercial solar development.

Policies

1. The County shall encourage domestic and commercial solar energy uses to conserve fossil fuel and improve air quality.
2. The County should attempt to identify and remove disincentives to domestic and commercial solar energy development.
3. The County should permit solar energy development in the desert and valley planning regions that does not pose significant environmental or public health and safety hazards.
4. The County should encourage solar development in the desert and valley regions previously disturbed, and discourage development of energy projects on undisturbed land supporting State or federally protected plant and wildlife species.

Implementation Measures

- A. The County shall continue to maintain, and update as necessary, provisions in the Kern County Zoning Ordinance to provide adequate development standards for commercial solar energy development.
- B. The County should work with affected State and federal agencies and interest groups to establish consistent policies for solar energy development.

5.4.6 Future Hydroelectric Development

Issues

Much of Kern County's major hydroelectric resource potential has already been captured by the five hydroelectric facilities on the Kern River. Originally thought to be the most environmentally benign energy technology, the rapid pace of small hydroelectric development has raised environmental protest. In addition to rivers and streams, small hydroelectric plants can be sited in irrigation canals, and water treatment plants.

Much of Kern County's hydroelectric development takes place on federal lands, and is thus not under direct County jurisdiction.

Goal

To provide for the development of small hydroelectric projects which have minimal environmental impacts.

Policies

1. The County should promote the development of hydroelectric technologies with minimal environmental impacts at existing facilities, (e.g., irrigation canals and water treatment plants).
2. The County shall attempt to protect the Kern River from adverse effects due to new hydroelectric development.
3. The County should investigate existing development and future development potential of the upper Kern River Valley to assess hydroelectric energy development and to establish appropriate development standards in accordance with the standards and regulations of the Federal Energy Regulatory Commission.

Implementation Measures

- A. The County should seek State funding for hydroelectric energy studies for the Kern River and various agricultural water conveyance systems.
- B. The County should review all proposed hydroelectric projects in Kern County on federal lands or other lands not under County jurisdiction, and provide comment as necessary.

5.4.7 Transmission Lines

Issues

Transmission lines are often the most noticeable and disruptive part of energy development. Increased development of electrical generating plants will require new transmission line construction. For some kinds of technology, transmission lines can be constructed in developed areas. In resource areas, which are presently undeveloped, construction will require greater disturbance and may have more significant impacts.

New transmission lines may also be constructed by the utility companies to increase capacity in transporting power to areas in and outside of Kern County.

Goal

To encourage the safe and orderly development of transmission lines to access Kern County's electrical resources along routes, which minimize potential adverse environmental effects.

Policies

1. The County should encourage the development and upgrading of transmission lines and associated facilities (e.g., substations) as needed to serve Kern County's residents and access the County's generating resources, insofar as transmission lines do not create significant environmental or public health and safety hazards.
2. The County shall review all proposed transmission lines and their alignments for conformity with the Land Use, Conservation, and Open Space Element of this General Plan.
3. In reviewing proposals for new transmission lines and/or capacity, the County should assert a preference for upgrade of existing lines and use of existing corridors where feasible.
4. The County should work with other agencies in establishing routes for proposed transmission lines.
5. The County should discourage the siting of above-ground transmission lines in visually sensitive areas.
6. The County should encourage new transmission lines to be sited/configured to avoid or minimize collision and electrocution hazards to raptors.

Implementation Measures

- A. The County should monitor the supply and demand of electrical transmission capacity locally and statewide.
- B. The County shall continue to maintain provisions in the Zoning Ordinance and update as necessary to provide for transmission line development.

5.5 RELATIONSHIP TO OTHER COUNTY PLANS AND PROGRAMS

The Energy Element contains a number of policies and implementation measures which relate directly to other County plans and programs. Energy related policies and programs have been addressed in the development and revisions of numerous existing County plans and programs over the years, including the Land Use, Open Space, and Conservation Element of this General Plan, the Kern County and Incorporated Cities Integrated Waste Management Plan, and various sections of the Kern County Zoning Ordinance. The Energy Element is consistent with these plans and programs.

Other issues raised in conjunction with energy development are being addressed in ongoing and proposed programs, including the Kern County and Incorporated Cities Hazardous Waste Management Plan, and the Valley Floor Habitat Conservation Plan.

The following briefly describes existing, ongoing, and proposed plans and programs that relate to issues and policies discussed in the Energy Element.

- **Land Use, Open Space, and Conservation Element of the Kern County General Plan**

The Land Use, Open Space, and Conservation Element of the General Plan provides designations for permitted uses throughout the County. The "Resource" designation specifically provides for protection of resources areas, including petroleum and wind resource areas, and provides for large minimum parcel sizes. A total of 3,568,697 acres, or approximately 67 percent of land designated under the General Plan has a Resource designation.

The "Industrial" designation provides for the development of oil refineries, power plants, and other energy-related industries.

- **Kern County and Incorporated Cities Integrated Waste Management Plan**

The Kern County and Incorporated Cities Integrated Waste Management Plan addresses issues pertaining to nonhazardous waste disposal and other waste facilities.

- **Kern County Zoning Ordinance**

The Kern County Zoning Ordinance contains provisions and standards for most types of energy development. The Zoning Ordinance has two combining districts which set out standards specifically for two types of energy development: the Wind Energy (WE) Combining District and the Petroleum Extraction (PE) Combining District.

The Drilling Island (DI) Special Purpose District sets out standards for the development of petroleum resources in single lots and small areas in subdivisions.

Provisions and standards for various kinds of energy development are made in appropriate zoning districts.

- **Kern County and Incorporated Cities Hazardous Waste Management Plan**

The Kern County and Incorporated Cities Hazardous Waste Management Plan analyzes information on hazardous waste generation in the County, describes existing disposal facilities and assesses the need for new and expanded facilities, analyzes potential for waste reduction, and creates programs for local hazardous waste management.

- **Draft Kern County Valley Floor Habitat Conservation Plan**

A program involving various government, environmental, and industry representatives who are developing a strategy to protect State and federally-listed threatened and endangered species in the San Joaquin Valley portion of Kern County through the issuance of State and federal incidental take permits.