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I. INTRODUCTION

Increased interest in alternative energy forms was stimulated by concern over the steady depletion of nonrenewable energy resources such as natural gas, oil, and coal. Solar energy, as a supplement to the nation's energy supply, is a feasible alternative energy source when one considers the increasing costs of fossil fuels, the environmental problems associated with high-sulfur coal, and the safety and environmental impacts of nuclear energy. The use of solar energy is also consistent with this nation's interest in resource conservation and eventual energy independence. Solar energy is available everywhere, essentially inexhaustible, environmentally clean, and capable of reducing fossil fuel consumption.[1]

Approximately 25% of the national total energy consumption consists of space heating, water heating, and air conditioning.[2] Decentralized or onsite solar technologies (those designed to be located on or near the buildings to which heat or electricity is provided) have the greatest potential in serving residential and commercial heating and cooling demands.[3] Large-

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1. *See* R.G. JONES, H.M. SRAMEK, & J.M. PELSTER, ANALYSIS OF STATE SOLAR ENERGY POLICY OPTIONS 3-4 (June 1976) (prepared by the Energy Policy Project of the National Conference of State Legislatures for the Federal Energy Administration, FEA Contract No. CO-12-60496-00) [hereinafter cited as SOLAR POLICY OPTIONS]. This report contains analyses of solar market economics, tax incentives, the relationship between solar energy and electric utilities, and the implications for state policies.

2. *See id.* at 3; 1 OFFICE OF TECH. ASSESSMENT, APPLICATION OF SOLAR TECH. TO TODAY'S ENERGY NEEDS 19 (June 1978) [hereinafter cited as OTA REP.]. Residential and commercial energy uses, *i.e.*, hot water, space heating, air conditioning, electricity for lighting and other miscellaneous uses, and gas for cooking, accounted for approximately 36% of the total U.S. energy demand in 1975. Transportation accounted for 26% with the remaining 38% demanded by the industrial sector. *Id.*

3. *See* H. RAU, SOLAR ENERGY 59 (1964); OTA REP., *supra* note 2, at 18. It has been claimed that (1) onsite solar hot water systems are economically competitive with electric hot water systems in most parts of the United States today; (2) onsite solar space heating is, or soon should be, marginally competitive with heat pump and electric resistance heating systems in many areas of the United States; (3) decentral-

scale, centralized generation of electricity by solar technologies seems promising by the 1990's.[4] Both decentralized and centralized applications of solar technologies are discussed below.

A. *Onsite Solar Technologies*

Onsite solar technologies generally include both passive solar energy systems and active solar systems consisting of solar collectors and solar electric systems. Passive solar energy systems are the result of skillful architectural designs of buildings and landscaping (1) to maximize the amount of solar energy incident upon and absorbed by a building during winter months and (2) to maximize natural convective cooling and minimize solar heat absorbed during the summer months.[5] Passive solar designs for the maximum utilization of solar energy are achieved through orientation of the building, the location of trees, the use of awnings, overhangs, or shutters, optimum window size and location, wall thickness, and the use of movable insulation.

Active solar energy systems generally consist of (1) a solar collector exposed directly to the sun that converts sunlight into a heated fluid or gas, or, in the case of solar cells (photovoltaics), that convert light directly into electricity, (2) an energy storage system, *e.g.*, a large water tank or underground rock bed, that stores excess energy for use during periods when direct sunlight is unavailable, and (3) an energy-conversion system that converts a heated fluid or gas into mechanical energy or electricity.[6] Solar energy collectors can either be nontracking or of the type that follows the sun during the day. The costs for flat plate collectors range between $32 and $145 per square meter (sq. m.) of surface area. For tracking collectors, costs can run as high as $1,800 per sq. m. for two axis tracking.[7]

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ized solar space heating and hot water systems may be competitive with oil or gas fired applications by the mid-1980s; and (4) onsite solar air conditioning devices will apear economically attractive in the 1980s. *See id.* at 3-4, 19.

4. *See* Bradley, *Designing and Siting Solar Power Plants,* 48 CONSULTING ENGINEER, March 1977, at 80, 83 (issue no. 3).

5. *See* OTA REP., *supra* note 2, at 36.

6. *See id.* at 36-37. Not all active solar systems make use of an energy storage system. Fewer yet employ an energy conversion system.

7. *See id.* at 286-89. One axis tracking collectors move along one axis to track the sun's movement during the day whereas two axis tracking collectors move independently about two axes to follow the sun. Flat plate collectors can provide temperatures generally ranging between 57°C and 97°C. Where higher temperatures are required for industrial processes, or to operate heat engines, concentrating or tracking collectors

During periods when direct solar energy is not available, solar users can either burn fuel for energy at an onsite facility, purchase auxiliary energy service from a utility company, or store energy collected during high solar radiation periods in onsite storage devices.[8] The most common energy storage devices for thermal solar applications are hot water tanks or bins of heated rocks. Electricity producing solar technologies use batteries for the storage of electrical energy. Current costs of low temperature (below 250°F) thermal storage facilities range from $.50 to $5 per kilowatt-hour (KWH) of capacity of the storage unit.[9] Costs rise significantly where it is desired to store energy in a medium at higher temperatures.[10]

B. *Electricity Producing Solar Technologies*

Compared to onsite solar technologies, solar and wind applications for the large scale generation of electricity are more likely to find practical application in the long term. Sunlight can be used directly to generate electricity in two ways: (1) by heating fluids or gases to operate a heat engine[11] to turn an electric generator and (2) by using photovoltaic or solar cells, *i.e.*, solid-state devices which use the sun's energy to produce electricity directly.[12] Wind applications for the generation of electricity make use of the wind's energy through a horizontal or vertical axis propellor to turn an electric generator.

1. Solar Thermal Power Plants

Solar thermal technologies for the generation of electricity collect concentrated solar energy and convert it to thermal energy which in turn is transferred to a working fluid. The fluid is then used to drive a Rankine-cycle turbine or gas turbine

would be required. For an extensive analysis of collector designs, environmental impacts, collector costs, and collector performance, *see id.* at 243-326.

8. For a detailed feasibility and cost analysis of energy storage technologies including thermal, mechanical, and chemical forms, *see id.* at 427-503.

9. *See id.* at 40.

10. The average costs of battery storage for storing electricity in chemical form range from $63 to $93 per kilowatt-hour. *See id.* at 470. The prices stated above apply to lead-acid batteries lasting 500-1000 charge/discharge cycles and capable of storing 5 megawatt-hours of energy with a 10-hour discharge. Automobile type batteries are unsuitable for power applications since repeated full discharge will result in damage to the batteries. Industrial traction batteries used in forklifts and similar equipment have lifetimes of 2000 cycles and are available for $80 per kilowatt hour. *Id.*

11. For a technical discussion of the costs and performance of a variety of heat engine devices, *see id.* at 327-89.

12. *See id.* at 37.

that turns a conventional electric generator. Electric power production by solar thermal applications is thus similar to that of fossil fuel and nuclear power plants. Two designs of solar thermal generating systems are being considered (1) the solar power tower concept and (2) energy collection through distributed receivers.[13] The solar power tower concept features a central boiler or receiver located atop a tower of specified height. The tower is surrounded by mirrors (heliostats) that track the sun throughout the day and focus sunlight on the central receiver. The distributed receiver concept uses distributed collector systems and receivers through which the heated working fluid is piped from each receiver unit to the turbine generator. This design avoids the cost of a tower but has added costs due to an extensive network of insulated piping.

A solar thermal power plant of the power tower design with a capacity of 5 megawatts (MW)[14] has been constructed for the United States Department of Energy (DOE) at Sandia Laboratories in Albuquerque, New Mexico. Field evaluation of the array of 222 heliostats focused upon a 200 ft. tower at Sandia began in 1978.[15] DOE's solar thermal program also includes the construction of a $120 million 10 MW pilot plant in the Mohave Desert near Barstow, California.[16] The pilot plant is to be built before 1981 and will require about 100 acres of land to accommodate the heliostats. It is estimated that approximately 2000 heliostats, each with about 40 sq. m. of reflective surface area, will be utilized to focus sunlight upon a 328-459 foot tower. DOE's solar thermal program plan envisions solar thermal demonstration plants ranging in capacity from 50 MW to 100

13. *See* Bradley, *supra* note 4, at 80-84; ELECTRIC POWER RESEARCH INSTITUTE, *Spinning a Turbine with Sunlight*, 3 EPRI JOURNAL, March 1978, at 14-19 (issue no. 2) [hereinafter cited as EPRI *Solar-Thermal*]. *See generally* D. SPENCER, SOLAR ENERGY: A VIEW FROM AN ELECTRIC UTILITY STANDPOINT 13-21 (prepared by the Electric Power Research Institute for the American Power Conference in Chicago, Ill., April 21-23, 1975).

14. A watt is a unit of power equal to one joule per second. A kilowatt (KW) is 1,000 watts and a megawatt represents 1,000,000 watts. One horsepower is equivalent to 746 watts. Energy can generally be expressed as the product of power and time. Thus, a 1,000 watt light bulb burning for one hour consumes one kilowatt-hour (KWH) of energy.

15. The cost of the Sandia test facility was approximately $21 million. *See* EPRI *Solar-Thermal*, *supra* note 13, at 17.

16. *See* Bradley, *supra* note 4, at 81-82; EPRI *Solar-Thermal*, *supra* note 13, at 17.

MW to be operational by 1985. Commercial plants of 100 MW to 300 MW capacity are expected to be operational after 1985.[17]

The greatest hindrance to the development of solar thermal electric generating plants is their cost. The federal program goal cost of the heliostat component of a solar thermal power plant is $70 per sq. m. of mirror surface area. Designs for the heliostats to be tested at Albuquerque are estimated to cost between $500 and $750 per sq. m.[18] Using the $750 cost figure, the heliostat array for the 10 MW Barstow plant would cost $60 million or 50% of the project's total estimated cost. This figure equals $6000 per Kilowatt (KW) of plant capacity, only for the heliostats. By comparison, costs of conventional power plants range between $200 and $1,000 per KW of rated generating capacity. Liquid metal fast breeder reactor nuclear power plant costs are expected to be as high as $2,500 per KW,[19] but this figure is still low compared with the costs of a solar thermal power plant.

2. Photovoltaic Power Plants

Photovoltaic devices, similar to the solar cells used to provide power for spacecraft, convert sunlight directly into electric energy.[20] With the absence of mechanical moving parts, photovoltaic devices can operate reliably and quietly with essentially no adverse environmental impacts. Photovoltaic devices have been used as power sources for spacecraft, remote railroad signal stations, microwave repeater stations and agricultural applications (including an irrigation pump and fans for drying grain).[21] A large array of photovoltaic cells would be required for a central electrical generating power source, but tracking heliostats could be used to focus sunlight upon the cells and thereby reduce the area of the arrays.[22] However, the current

17. *See* Bradley, *supra* note 4, at 83.

18. *See* EPRI *Solar-Thermal, supra* note 13, at 17.

19. *See* Brancato, *New Approaches to Current Problems in Electric Utility Rate Design*, 2 COLUM. J. ENVT'L L. 40, 47-49 (1975).

20. For a general discussion of the operation, costs, and applications of photovoltaic energy conversion systems, *see* ELECTRIC POWER RESEARCH INSTITUTE, *The Sun on a Semiconductor*, 3 EPRI JOURNAL, March 1978, at 20-25 (issue no. 2) [hereinafter cited as EPRI *Solar-Photovoltaics*]; OTA REP., *supra* note 2, at 391-426; D. Spencer, *supra* note 13, at 21-28.

21. *See* EPRI *Solar-Photovoltaics, supra* note 20, at 23.

22. *See* D. Spencer, *supra* note 13, at 24.

market for photovoltaics is essentially confined to decentralized or onsite applications.[23]

From a utility perspective, photovoltaic plants have a high energy value,[24] but as with solar thermal power plant aplications, photovoltaic costs are very high. Current photovoltaic costs range from $11,000 per KW to $15,000 per KW of output.[25] Electricity from currently available photovoltaic systems cost from $1.50 to $2.00 per KWH,[26] compared with electricity prices from conventional electric utilities averaging between $.02 and $.07 per KWH for residential service.

3. Wind Power Plants

Use of the wind as a power source is not a new concept. Windmills were used extensively in Europe for milling grain. An electric power generating windmill, the Smith-Putnam machine, was located atop Grandpa's Knob in Vermont and supplied power to the Central Vermont Public Service Corporation's system intermittently from 1941 through 1945.[27] The Smith-Putnam machine utilized a 175 ft. rotor and had a generating capacity of 1.25 MW. A .1 MW wind turbine generator has been operational since 1975 at NASA's Plumb Brook Station at Sandusky, Ohio.[28] The Plumb Brook machine utilizes a 125 ft. diameter twin-bladed single rotor mounted at the downwind end of a streamlined generator housing. The entire unit is perched atop a 100 ft. tower and is mounted on bearings so that it may rotate to face the wind at all times. Power is generated when the velocity of the wind exceeds 8 miles per hour. The 100 KW rated output is achieved when the wind velocity reaches 18 miles per hour. A .2 MW machine similar to the Plumb Brook machine was completed early in 1978 at Clayton, New Mexico. Two machines identical to the Clayton machine are under construction at Culebra Island and Block Island and

23. *See* EPRI *Solar-Photovoltaics, supra* note 20, at 24-25.

24. *See id.* at 22, 24.

25. *See id.* at 21; OTA REP., *supra* note 2, at 393-94.

26. *See* OTA REP., *supra* note 2, at 393. DOE's present goals are to cut photovoltaic costs (1) to $7,000 per peak KW in fiscal year 1979, (2) to between $1,000 and $2,000 per KW by the end of fiscal year 1982, (3) to $500 per KW by the end of fiscal year 1986, and (4) to between $100 and $300 per KW by the end of fiscal year 1990. *See id.* at 394.

27. *See* ELECTRIC POWER RESEARCH INSTITUTE, *The Earth as a Solar Heat Engine*, 3 EPRI JOURNAL, March 1978, at 43, 43-44 (issue no. 2).

28. *See id.* at 44.

are expected to be operational by the end of 1978.[29] Federal contracts have been let for the construction of larger wind turbine generators having rotor diameters as large as 300 ft. and with generating capacities as high as 3 MW.

As large scale generation of electricity by wind turbine generators is still basically in the development stage, capital costs are high. The capital cost of the .1 MW Plumb Brook machine was $5,500 per KW of rated capacity.[30] It is anticipated that these costs can be reduced through the federal wind energy program, which has as its goals the development and commercialization of economically viable wind energy systems.[31]

C. *The Relationship Between Solar Energy Development and Utility Companies*

The roles assumed by six institutional actors will have a significant impact upon the development, economic viability, and commercialization of both onsite and centralized solar technologies. These primary actors include (1) investor-owned and publicly-owned (municipal) utility companies, (2) federally-owned utility agencies, (3) state public utilities commissions (PUCs), (4) federal and state governments, (5) the solar industry, and (6) solar consumers.

The extent to which both investor- and publicly-owned utilities are allowed to enter the solar market and own, lease, or sell onsite technologies will affect the allocation of costs between either the utilities or the solar consumers. Manufacturers of solar equipment are concerned that utility policies could foster only a chosen few of the industry while effectively eliminating other solar manufacturers from a substantial share of the market. As onsite solar technologies require conventionally fueled auxiliary systems to assure continuous service during periods of adverse weather, solar users will be concerned about the rates utilities charge for this backup service. Moreover, since investor- and publicly-owned utilities enjoy a mo-

29. *See id.* at 45.

30. *See id.*

31. The structure of the program encompasses five areas: (1) program development; technology; applications of wind energy; legal, social, and environmental issues; and wind characteristics, (2) small machines (less than 100 KW capacity), (3) 100 KW-scale systems, (4) megawatt-scale systems, and (5) large multiunit systems or "wind farms." *See id.*

nopoly in the energy supply market, competition by solar utilities may be foreclosed.

Federal regulation of the solar industry may govern the extent to which utilities are allowed to own, lease, or sell onsite solar devices. While federal power agencies are primarily involved with the wholesale sales of electric energy, it is conceivable that federal agencies could distribute onsite solar devices or manage solar utilities that compete with existing conventional utilities. Since state public utilities commissions regulate the entry of utilities into the energy supply market as well as the rates charged for utility services, commission policies could also affect a utility's ability to market onsite solar devices and a solar utility's ability to compete with existing conventional utilities. A state legislature could statutorily govern the roles of utilities in solar energy development and commercialization.

Three major issues thus emerge involving the relationship between solar energy development and utility companies. There exists the possibility that utility companies will seek to own, lease, or sell solar devices. It is also possible that a solar company would seek to enter the energy supply market in competition with existing regulated electric utilities. Third, it is likely that existing utilities may establish a rate structure that would penalize decentralized use of solar technologies. This article will address the first two of these issues.

The article will first consider the legal issues associated with public utility ownership of decentralized or onsite solar heating and cooling (SHAC) devices that may be placed on individual homes, shopping centers, apartment complexes, or may be used by other small scale consumers of solar power. Second, it will evaluate the legal issues that may arise should a solar power company (both privately- and publicly-owned) compete in providing electric service with existing regulated electric utilities. Both situations are considered in light of applicable existing and proposed federal and Colorado law.

II. UTILITY OWNERSHIP OF DECENTRALIZED SHAC DEVICES

Although many of the SHAC-related issues also pertain to utility ownership of non-SHAC devices, the implications of utility ownership of non-SHAC decentralized solar technologies, *e.g.*, small-scale wind or photovoltaic energy conversion systems, will not be addressed below. The following legal

issues confined solely to utility ownership of non-SHAC devices are therefore not discussed: (1) the rates to be charged for electric energy generated onsite and sold to customers, (2) in the case of wind systems, the acquisition of an all direction wind easement, and (3) the legal control of decentralized generating devices.

To what extent, then, may utility companies, whether investor- or publicly-owned, own decentralized SHAC devices and thereby market them on a selling or leasing basis? The two decentralized non-generating solar technologies that will be particularly affected by utility ownership policies are solar thermal space conditioning and solar thermal water heating. Recall that these two technologies generally utilize both flat plate collectors to capture solar radiation and a working medium of water or air to store the resulting heat.

A. *Utility Interest in the Marketing of Solar Devices*

A Department of Housing and Urban Development (HUD) investigation of solar marketing and market acceptance concluded that: "[u]tility policies . . . have the potential to act as barriers to the market acceptance of solar housing."[32] Among the utilities surveyed by HUD were gas and electric companies that (1) supplied utility service for backup purposes to HUD solar grant homes, and (2) did not provide auxiliary service to HUD solar homes but possibly did to other solar buildings.

Over 50% of the second category of the utilities stated that they were providing either heating, ventilating, or air conditioning service to a solar assisted building.[33] Approximately one fourth (24%) of all utilities surveyed expressed an intention to lease SHAC devices and to the question of whether they would become involved in the servicing of solar equipment, 27% replied yes. The utilities were further asked if they foresaw some alternative utility involvement in the form of marketing, providing technical assistance or public relations advice, or monitoring solar homes. A majority of the utilities replied yes (59%) while only 27% replied no.[34] Many utilities (45%) also believed

32. 1 DEP'T. OF HOUSING AND URB. DEV., WORKING PAPERS ON MARKETING AND MARKET ACCEPTANCE, ch. 6 at 14 (Spring 1978) (Preliminary Findings and Analysis, prepared for the Solar Demonstration Program, Division of Energy, Building Technology and Standards, Office of Policy Development and Research, U.S. Dept. of Housing and Urban Development).

33. *See id.*

34. *See id.* at 20.

there was a greater need for solar energy in their regions,[35] while 40% viewed solar energy as a practical alternative to conventional fossil fuel.[36]

The results of the HUD investigation revealed that many utilities believed there was a greater need for and likelihood of solar energy commercialization within their regions. A significant number considered solar energy to be a practical alternative to traditional energy sources, and further suggested that they may become involved in the leasing of solar devices. Even more utilities stated that they were likely to become involved in the servicing of solar equipment, and a majority contemplated at least some form of involvement with residential applications in the development of solar energy. In short, it appears that utilities expect to play a substantial role in the development and commercialization of solar power.

B. *Alternative Utility Ownership Policies*

If utilities seek to enter the SHAC market, what policies should be considered concerning utility ownership of SHAC devices? The four utility ownership policies most frequently advanced are: (1) utilities, being classified as regulated monopolies, are given exclusive monopoly franchises to own, sell, lease, or market SHAC systems, (2) utilities are allowed to enter the solar market, but without exclusive franchises (*i.e.*, they may be regulated in their solar activities and will be in competition with private solar companies), (3) nonregulated utility subsidiary companies are allowed to enter the solar market but would face competition from private SHAC system suppliers, and (4) utilities are prohibited from owning, for lease or sale, SHAC systems located upon a customer's premises.[37]

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35. *See id.* at 18.

36. *See id.* at 19.

37. *See* S. FELDMAN & B. ANDERSON, THE PUBLIC UTILITY AND SOLAR ENERGY INTERFACE: AN ASSESSMENT OF POLICY OPTIONS 178-79 (Dec. 31, 1976) (prepared for the Energy Research and Development Administration—Division of Solar Energy, ERDA Contract No. E(49-18)—2523) [hereinafter cited as UTILITY AND SOLAR INTERFACE]. A variation of the same analysis appears in R. BEZDEK, J. MARGOLIN, T. SPARROW, G. SPONSLER, A EZRA, R. SPONGBERG, A. MILLER, F. MEEKER, E. ROSEMAN, & M. MISCH, ANALYSIS OF POLICY OPTIONS FOR ACCELERATING COMMERCIALIZATION OF SOLAR HEATING AND COOLING SYSTEMS 220-22 (Feb. 1978) (prepared by the Behavioral Studies Group, Program of Policy Studies in Science and Technology, The George Washington University, for the Department of Energy, Assistant Secretary for Conservation and Solar Applications—Division of Solar Applications, Contract No. EX-76-G-01-2534) [hereinafter cited as SHAC POLICY OPTIONS]. *See also* R. Noll, *Maintaining Competi-*

These four ownership policies have been implemented in connection with the operation of other regulated industries.[38] Prior to the FCC's *Carterfone*[39] decision, telephone companies had exclusive control over the interconnection devices that were used in the telephone system—a situation reflected above in the first policy option. Under this scheme, a customer was required to purchase the internal interconnection system from the local telephone company. If this ownership policy applied to solar, a customer who desired to install a SHAC device, designed to receive backup energy from a utility company, would be required to purchase or lease the system from the utility having exclusive rights to serve that area.

Since *Carterfone,* the telephone industry has been doing business under a scheme like the second policy option. Telephone companies are allowed to sell terminal devices, but they no longer have an exclusive monopoly to do so. Telephone customers have the option of (1) obtaining their telephones and other terminal devices from the telephone company at a regulated rental price, or (2) purchasing this equipment from an unregulated competitive supplier. Under a similar scheme, a solar customer could lease the SHAC system from a utility at a regulated rental rate, or, at his option, purchase the system from an unregulated supplier.

Policy option three is found when regulated gas and electric utilities control unregulated subsidiary companies that engage in such activities as mining, energy resource exploration, and the selling of appliances. If this third policy option

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tion in Solar Energy Technology in FEDERAL TRADE COMMISSION, THE SOLAR MARKET: PROCEEDINGS OF THE SYMPOSIUM ON COMPETITION IN THE SOLAR ENERGY INDUSTRY 179, 181 (June 1978) (presented at the Dec. 15-16, 1977 Solar Energy Symposium sponsored by the Federal Trade Commission's Bureau of Competition).

38. *See* R. Noll, *supra* note 37, at 182; SHAC POLICY OPTIONS, *supra* note 37, at 222-24; UTILITY AND SOLAR INTERFACE, *supra* note 37, at 180-81.

39. *In re* Use of the Carterfone Device in Message Toll Telephone Service, 13 F.C.C.2d 420 (1968). In this case, the telephone companies sought to apply penalties contained in a tariff to customers who used the Carterfone interconnection device. According to the tariff, use of such equipment conferred a right upon the telephone company to remove or disconnect the device or to suspend or terminate service. *Id.* at 427 (app. A). The FCC agreed with and adopted the examiner's findings that the Carterfone filled a need and did not adversely affect the telephone system. It was held that "application of the tariff to bar the Carterfone in the future would be unreasonable and unduly discriminatory." *Id.* at 423. The FCC further concluded that "the tariff has been unreasonable, discriminatory, and unlawful in the past, and that the provisions prohibiting the use of customer-provided interconnecting devices should accordingly be stricken." *Id.*

were applied to the solar industry, an unregulated utility subsidiary would be in competition with other solar suppliers in the marketing of SHAC devices. The extent of direct utility involvement with SHAC system marketing through the subsidiary would be governed by the nature of PUC jurisdiction over the utility.[40] This means that, depending upon the scope and interpretation of a state's public utility law, there may be no PUC jurisdiction over a utility's marketing of SHAC devices.

The American Telephone and Telegraph Company is faced with the fourth ownership policy, *i.e.*, prohibition from engaging in a certain business activity. AT&T is prohibited from engaging in unregulated business, except to a limited degree, in the sale of certain communications equipment. Following a 1956 consent decree that settled an antitrust complaint against the Bell System,[41] AT&T cannot enter businesses such as data processing. For example, computer time sharing services that utilize telephone lines for connecting remote data terminals to central computers can be offered by telephone utilities not affiliated with the Bell System, but cannot be offered by Bell affiliates. Under a similar policy, the solar industry would not be faced with competition from utilities or their unregulated subsidiaries.

1. Regulated Utility Ownership of SHAC Devices

The legal issues associated with utility ownership of SHAC systems located upon a customer's property are evaluated below under policies representing (1) a regulated monopoly situation guaranteed the utility within its service area, (2) a regulated business operation by the utility in competition with unregulated solar suppliers, and (3) utility involvement only through unregulated subsidiary companies of the utility. This discussion is followed by arguments for and against such utility participation and involvement in the solar market.

40. The text accompanying notes 42-55 *infra* addresses whether a utility in Colorado that is somehow involved in the ownership of SHAC devices located upon a customer's premises would be subject to PUC regulation of such activity.

41. United States v. Western Electric Co., [1956] Trade Reg. Rep. (CCH) ¶ 68, 246. According to the decree, AT&T is enjoined from engaging in the manufacture of any equipment of a type not sold or leased to companies of the Bell System for use in furnishing common carrier communications service, except equipment used in the manufacture or installation of equipment of a type so sold. The decree also provides that AT&T is enjoined from engaging in any business other than the furnishing of common carrier communications services. *Id.*

a. *Regulation by Public Utilities Law*

In Colorado, the Public Utilities Law[42] provides for public utility commission (PUC) regulation controlling (1) entry into the public service market, (2) the rates and charges for utility services, and (3) the standards and conditions of service. In addition, a Colorado constitutional provision vests all power to regulate the facilities, service, rates, and charges of every corporation, individual, or association operating within the state as a public utility in the PUC.[43] "Public Utility" is statutorily defined to include every gas corporation, electrical corporation, person, or municipality operating for the purpose of supplying the public for domestic, mechanical, or public uses and every corporation or person declared by law to be affected with a public interest.[44] The statute further provides that such public utilities are subject to the jurisdiction, control, and regulation of the PUC and to the provisions of the Public Utilities Law.[45]

Under the statutory definition, an investor-owned electric or gas utility is subject to the PUC regulation in accordance with the Public Utilities Law. However, the state's jurisdictional provisions provide little indication as to whether a regulated utility supplying SHAC devices would be subject to such regulation. An argument could be made that a utility company, in supplying SHAC devices to the public, is engaging in an activity affected with a public interest and therefore subject to the general jurisdiction of the PUC. Indeed, the Supreme Court of Colorado, in *Western Colorado Power Co. v. Public Utilities Commission,* has held that any business or activity that is affected with a public interest may be regulated under the police power of the state.[46] Should utility ownership of SHAC devices be declared to be "affected with a public interest," then such activity would be subject to the general jurisdiction of the PUC.

What legal significance attaches to utility status and PUC jurisdiction thereover? In order for a utility to enjoy monopoly status in the ownership of SHAC devices consistent with policy

42. COLO. REV. STAT. § 40-1-101 to 111 (1973).

43. COLO. CONST. art. XXV.

44. COLO. REV. STAT. § 40-1-103(1).

45. *Id.*

46. 159 Colo. 262, 279, 411 P.2d 785, 794, *appeal dismissed* and *cert. denied*, 385 U.S. 22, *rehearing denied*, 385 U.S. 984 (1966).

one, PUC control of entry into the business of supplying SHAC systems would be required. Before a utility begins the construction of a new facility, plant, system or an extension thereto, it must first obtain from the PUC a certificate that the present or future public convenience and necessity will require such construction.[47] The installation of SHAC devices upon a customer's premises could be considered the construction of a new system or a new extension to the utility's existing system. If so, a means exists for conferring monopoly status upon a utility for its activity in supplying the public with SHAC devices as it has been held by the Colorado Supreme Court that the purpose of the certification process is to avoid duplication of facilities and competition between utilities.[48] The certification process would be absent under policy two as competition from other regulated entities as well as unregulated solar manufacturers is allowed under that policy.

The Public Utilities Law requires that all charges demanded or received by any public utility for any product or commodity furnished, or any service rendered, shall be just and reasonable. The law further provides that every unjust or unreasonable charge is prohibited.[49] The rental rates charged by a utility for the leasing of SHAC devices would be subject to the statutory "reasonableness" test as administered by the PUC. Rate regulation would therefore be applicable under the first and second policy options.[50]

Adequacy of solar service would seem to be governed by a Colorado statute requiring every public utility to provide adequate, just, and reasonable service as will promote the safety, health, and convenience of its patrons.[51] All utilities leasing

47. COLO. REV. STAT. § 40-5-101.

48. Western Colo. Power Co. v. Pub. Util. Comm'n, 159 Colo. 262, 273, 411 P.2d 785, 791, *appeal dismissed* and *cert. denied*, 385 U.S. 22, *rehearing denied*, 385 U.S. 984 (1966).

49. COLO. REV. STAT. § 40-3-101(1).

50. For a detailed presentation of public utility rate regulation as one aspect of the regulatory process, *see* J. BONBRIGHT, PRINCIPLES OF PUBLIC UTILITY RATES 147-283 (1961); P. GARFIELD & W. LOVEJOY, PUBLIC UTILITY ECONOMICS 27-189 (1964); 1 A. PRIEST, PRINCIPLES OF PUBLIC UTILITY REGULATION 45-226 (1969). *See also* Huntington, *The Rapid Emergence of Marginal Cost Pricing in the Regulation of Electric Utility Rate Structures*, 55 B.U.L. REV. 689, 698-718 (1975); R. Feuerstein, Utility Rates and Service Policies as Potential Barriers to the Market Penetration of Decentralized Solar Technologies (1978) (unpublished paper, prepared for the Solar Energy Research Institute, on file with the authors).

51. COLO. REV. STAT. § 40-3-101(2).

solar devices to customers would have to abide by the principle that serving some but not all customers within a utility's service area constitutes a practice that is discriminatory and illegal.[52] In an analogous case the Colorado PUC held that a water utility's actions in providing service to some but not all patrons located in the area covered by its certificate not only constitutes prejudice and discrimination,[53] but also that the issuance of a certificate by the commission and its acceptance by a utility obligates it to furnish service to all the inhabitants of the territory covered by the certificate.[54] Any utility that receives a certificate to supply SHAC devices within its service area is therefore under an obligation to provide solar service to those customers who make such a demand.

With respect to adequacy of service, the Colorado PUC has held that a public utility is under a duty to provide reasonably satisfactory and efficient service, and that it cannot perform negligently, carelessly, inefficiently, or in any other unsatisfactory manner.[55] Thus, any solar service furnished by a utility under the first or second policy options would be subject to the adequacy and efficiency standards of service.

Another matter needing consideration should a utility provide SHAC devices under policies one and two is whether the equipment used to provide solar service can be included in the rate base. The rate base of a utility is generally defined as the actual legitimate cost of plant and equipment used in providing the public service, with reasonable allowances for working capital less accumulated depreciation.[56] The amount of revenue utilities are allowed to recover from the rates they charge is proportional to the rate base. Therefore, it would be imperative that utility-owned solar devices be included into the rate base in order for the utility to provide solar service. The Supreme Court of Colorado, in an early case dealing with the issue

52. *See* LaBate v. North Fed. Water Sys., 62 P.U.R. (n.s.) 92, 102 (Colo. Pub. Util. Comm'n 1945).

53. *In re* LaBate, 64 P.U.R. (n.s.) 411, 413 (Colo. Pub. Util. Comm'n 1946).

54. *Id.*

55. Farmers Elec. & Power Co. v. Town of Ault, P.U.R. 1920 D, 214, 225 (Colo. Pub. Util. Comm'n 1920).

56. *See generally* J. BONBRIGHT, *supra* note 50, at 159-237; P. GARFIELD & W. LOVEJOY, *supra* note 50, at 56-83; 1 A. PRIEST, *supra* note 50, at 139-90.

of property included in the rate base, held that the test is whether such property is used and useful in supplying the service that the utility has undertaken to furnish.[57] Under this principle, it seems likely that a utility's investment in SHAC devices would be included in the rate base as being property useful in providing solar service.

If Colorado were to adopt the third policy option, it would appear from a review of Colorado's Public Utilities Law that the PUC would have no direct regulatory authority over a utility's wholly owned subsidiary. The extent of the regulation, if any, would appear to be indirect. For example, in *People's Natural Gas Division of Northern Natural Gas Co. v. Public Utilities Commission,* a recent decision of the Colorado Supreme Court, it was held that the PUC has authority to include only that portion of the capital structure of a diversified entity that (1) accurately reflects the actual capitalization of the utility operation or (2) finances the rate base thereof in the calculation of rates.[58] The court concluded that the PUC had authority to pierce the corporate structures of corporations that operate utility divisions to separate the utility capital structure from that of nonutility operations and subsidiaries of the corporation.[59] Under this principle, the investment associated with ownership of SHAC devices by a utility subsidiary could not be imputed to the utility as part of its rate base. Utility operations and the regulation thereof would be totally separate from the subsidiary's activities to the extent that the utility's customers would not be financing the solar operation. Such a conclusion would be favorable to nonsolar utility customers under policy option three who might otherwise be faced with the possibility of subsidizing a utility subsidiary's solar operations.

Two other issues should be mentioned that are relevant to SHAC system ownership by utilities that involve PUC regulation. First, since SHAC systems are not perfect substitutes for conventional heating and air conditioning systems, a solar user requires a certain amount of auxiliary energy. It is likely that this demand for conventional service from an electric or gas utility for backup purposes will occur during periods of extended cloudy weather or extreme cold conditions. The rele-

57. Glenwood Light and Water Co. v. City of Glenwood Springs, 98 Colo. 340, 343, 55 P.2d 1339, 1340 (1936).

58. 567 P.2d 377, 380 (1977).

59. *Id.* at 380-81.

vant issue, which is beyond the scope of this article, is whether a utility may charge different than traditional rates for service provided to solar users for backup purposes. In other words, may a utility discriminate for or against solar users in its rate-making practices?[60]

In addition, it is important to note that the optimum balance of regulation and competition shifts with time and can affect the market penetration rate of solar devices. Where regulation tends to be overly conservative, it can supplant rather than supplement free competition.[61] As an example, cable television grew rapidly from about 1950 to the early 1960s as an unregulated industry. After the early 1960s, the FCC assumed regulatory jurisdiction and stunted the industry's growth for the four-year period from 1968 to 1972. The period was characterized by intense political bargaining between the industry, broadcasters, and other parties where the government acted as an arbitrator. Such bargaining resulted in a retardation of the growth of the new technology both during the four-year period and thereafter.[62] A similar result is possible should SHAC system marketing be overly regulated, either by PUCs or the federal government.

b. *Arguments Against Utility Ownership of Decentralized SHAC Devices*

A common argument of those opposed to utility ownership of SHAC devices is that through unfair competition utilities may foreclose other solar manufacturers from the market.[63] It

60. This issue and others pertaining to utility rate and service policies toward solar users are given extensive treatment in R. Feuerstein, *supra* note 50.

61. *See* 2 A. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS 1 (1971).

62. The cable television discussion was adapted from H. Peterson, Resource Allocation Under Alternative Regulatory Scenarios (Sept. 21, 1976) (Utah State University, unpublished paper, on file with the authors). The paper presents a microeconomic and mathematical analysis of various situations that may occur in the development of the solar industry. The three regulatory and organizational arrangements considered are: (1) no regulation of solar or conventional energy supplies, (2) regulated monopoly providing both solar and conventional energy, and (3) regulated monopoly providing conventional energy and an unregulated industry providing solar.

63. *See* K. Bossong, *The Case Against Private Utility Involvement in Solar/Insulation Programs*, SOLAR AGE, January 1978 at 23, 24; GEORGE WASHINGTON UNIVERSITY, SUMMARY OF PROCEEDINGS OF SOLAR HEATING AND COOLING COMMERCIALIZATION WORKSHOP 14, 22 (May 1977) [hereinafter cited as PROCEEDINGS]; A. HIRSCHBERG, SOLAR ENERGY INDUSTRIES WORKSHOP: SUMMARY PAPER 12 (April 20, 1978) (prepared for the Department of Energy's Solar Energy/Utility Conference held on March

is possible that this result could occur by three means. First,

> [r]egulated utilities can use solar technology strategically as a means to create internal subsidies within their price structures and, thereby, to recapture some of the monopoly profits that regulation takes away as well as to foreclose competition in the solar energy business. For example, a joint solar/gas utility would have to work out a method of allocating its costs between solar-assisted and gas-only services. If it could effect an allocation that, in fact, attributed too much cost to gas, it would succeed in taking advantage of its monopoly in the gas business to subsidize its solar energy business.[64]

Such subsidization could occur when conventional utility operations contribute to the utility's or the subsidiary's solar activities. A strict regulatory policy by PUCs would be required to prevent the utility's conventional service ratepayers from lowering solar costs for the solar operation. One effect of this subsidization would be lower costs of SHAC devices, which in turn would result in a utility or subsidiary being able to charge lower than market prices for its SHAC systems. Such a price differential could potentially force unregulated solar competitors from the market.

A second means by which unregulated solar suppliers could be foreclosed from the solar market is where utilities or their subsidiaries do not themselves manufacture SHAC devices, but instead give "just a few companies the lion's share of the business, [through their purchasing policies] rather than spreading around their purchases . . . . [Such a policy would allow utilities to] effectively decide which solar companies will be allowed to continue in business."[65] Those unregulated companies not enjoying the business from utility purchases would likely be forced to discontinue operations.

Utilities may also find it economic to acquire the solar manufacturing company rather than to continue purchasing

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28-29, 1978, at George Washington University); SHAC POLICY OPTIONS, *supra* note 37, at 225-26; G. SWETNAM, F. ELDRIDGE, & D. JARDINE, ENERGY RATE INITIATIVES STUDY OF THE INTERFACE BETWEEN SOLAR AND WIND ENERGY SYSTEMS AND ELECTRIC UTILITIES 82 (March 31, 1977) (prepared by the Mitre Corp. for the Federal Energy Administration, Office of Synfuels, Solar, and Geothermal Energy, Contract No. PO5-77-4242-0) [hereinafter cited as ENERGY RATE INITIATIVES]; UTILITY AND SOLAR INTERFACE, *supra* note 37, at 183-84.

64. R. Noll, *supra* note 37, at 184.

65. K. Bossong, *supra* note 63, at 24. *See also* A. HIRSCHBERG, *supra* note 63, at 14.

SHAC devices from it. Utilities would thus become vertically integrated in much the same way as the nation's large oil companies are. Such practices suppress competition, allow price maneuvering within the different levels of the industry and chill innovative research and development.

It has been argued that since utility profits are proportional to the value of property included in the rate base, utilities have a tendency to overcapitalize, *i.e.*, to invest in overly durable equipment so as to increase the value of the rate base.[66] Overcapitalization under regulation for the purpose of expanding the rate base and hence utility profits is known as the Averch-Johnson, and Wellisz (A-J-W) effect.[67] If the first and second policy options were implemented, the A-J-W effect could lead to utilities investing in solar technology that was excessively efficient in converting sunlight to heating or cooling energy, and that required inefficiently little maintenance. If PUCs allowed such "gold plating" of the rate base from utility-owned SHAC devices, excessive solar costs and prices, as well as a possible slowdown in the adoption of innovative SHAC technologies, might result.

There also seems to be a lack of evidence that utility ownership of SHAC devices is justified under a natural monopoly theory.[68] The natural monopoly concept arises from the theory that it is better to have a fewer utilities providing a certain service within a given area than to allow any number of entities to compete for business under a competitive market structure.[69] Natural monopolies are recognized and legitimated in special cases since the unit cost of providing service is lower under a regulated monopoly than under competition. This fact arises because of (1) the elimination of costly duplication of facilities, (2) decreasing average unit costs as output increases, and (3) economies of scale resulting from the purchases of large

66. *See* A. HIRSCHBERG, *supra* note 63, at 15; R. Noll, *supra* note 37, at 183; SHAC POLICY OPTIONS, *supra* note 37, at 224-25; UTILITY AND SOLAR INTERFACE, *supra* note 37, at 182-83.

67. *See* H. Averch & L. Johnson, *Behavior of the Firm Under Regulatory Constraint*, 52 AMER. ECON. REV. 105 (Dec. 1962).

68. *See* R. Noll, *supra* note 37, at 183; SHAC POLICY OPTIONS, *supra* note 37, at 224; UTILITY AND SOLAR INTERFACE, *supra* note 37, at 181-82.

69. *In re* Application of the Long Acre Elec. Light & Power Co., 1 P.S.C.R. 226, 249-50 (1st Dist. N.Y. Pub. Serv. Comm'n 1908). *See also* J. BONBRIGHT, *supra* note 50, at 10-13; P. GARFIELD & W. LOVEJOY, *supra* note 50, at 15-19; 1 A. PRIEST, *supra* note 50, at 361-65. *But see id.* at 321-24.

quantities. Utility ownership of individual self-contained SHAC devices does not exhibit the same economies of scale as those present in utility ownership of a large electric power plant.

It has been contended that utilities, which are generally state regulated, are not really accountable to the public.[70] Customers of the utility are essentially a captive market with no choices since a particular service within a given area is generally provided by only one company. Should policy one be implemented, the resultant lack of competition could lead to slow development of advanced technologies and provide no incentive to the utilities to be responsive to the wishes of the public. The main existing means of accountability, PUC proceedings, are costly and time consuming. Lack of accountability by a utility to its solar customers might therefore prove detrimental to rapid solar development.

Finally, a significant policy argument against utility ownership of SHAC devices is that utilities should not be given the authority to "own the sun" by owning and marketing SHAC devices.[71] Such control would seemingly allow too much discretion in utilities as to the rate of solar commercialization and the development of more innovative technologies. If utilities or their subsidiaries were to vary the rate of solar commercialization based on its profit yeilding characteristics, the use of solar energy could invariably be slowed while more emphasis was being placed on conventional energy supply.

c. *Arguments for Utility Ownership of Decentralized SHAC Devices*

Utility advocates list several advantages of utility participation in the marketing of SHAC devices.

> First, although solar energy utilities the "free" energy from the sun, it requires additional first or capital cost. Since the construction industry is highly "first-cost intensive," we expect that solar energy will have some difficulty finding early, rapid acceptance. A utility company is used to high first-cost (capital intensive) business ventures. Utility company sponsorship in the "lease to the user" mode will do a lot to reduce this barrier . . . .

70. *See* K. Bossong, *supra* note 63, at 25.

71. *See id.* at 26. *See also Utilities and Solar Energy: Will They Own the Sun?*, PEOPLE & ENERGY, Oct. 1976, at 2; Northcross, *Who Will Own the Sun?*, THE PROGRESSIVE, April 1976, at 14-16.

> Second, the sponsorship of a utility company may help to overcome market "fragmentation." If the utility company buys the equipment and leases it in a large-scale fashion, the solar industry will face at least one aggregated market (to the gas company). This may provide a large enough incentive to actively stimulate a solar energy system fabrication industry.
>
> Third, because a utility company already has a sales/distribution/service network which operates within the housing industry, the Utility Company scenario provides a way of "product fitting" solar energy systems.
>
> Finally, because of the traditional anti-innovation bias within the industry (a bias which is quite understandable given the industry environment), utility company sponsorship will help overcome some of the traditional "institutional-cultural biases" against solar energy which exist within the housing industry.[72]

In addition, since SHAC devices have the potential to adversely affect electric utility system load factors,[73] utility ownership might insure that the devices are designed to be used as an effective load management tool, *i.e.*, designed to mini-

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72. Dean & Miller, *Utilities at the Dawn of a Solar Age*, 53 N.D. L. REV. 329, 350-51 (1977) (quoting Hirshberg & Schoen, *Barriers to the Widespread Utilization of Residential Solar Energy: The Prospects for Solar Energy in the U.S. Housing Industry*, 5 POL'Y SCI. 453, 468 (1974)). For a variation of the Dean and Miller article see N. Dean & A. Miller, *Plugging Solar Power Into the Utility Grid*, 7 ENVT'L L. REP. 50069 (1977); ENVIRONMENTAL LAW INSTITUTE, LEGAL BARRIERS TO SOLAR HEATING AND COOLING OF BUILDINGS 86 (March 1978) (prepared for the Department of Energy, Assistant Secretary for Conservation and Solar Applications, Division of Solar Applications, Contract No. EX-76-C-01-2528); SHAC POLICY OPTIONS, *supra* note 37, at 358.

73. *See, e.g.*, H. LORSCH, IMPLICATIONS OF RESIDENTIAL SOLAR SPACE CONDITIONING ON ELECTRIC UTILITIES ch. 1 at 3 (Dec. 1976) (prepared by The Franklin Institute Research Laboratories for the National Science Foundation, Contract No. NSF-C1033(AER-75-18270)). *But see* S. FELDMAN & B. ANDERSON, UTILITY PRICING AND SOLAR ENERGY DESIGN (Sept. 1976) (prepared for the National Science Foundation, Grant No. APR-75-18006).

Feldman and Anderson found that SHAC devices, depending on climatic regions, collector sizing, and the utility's system, do not necessarily adversely affect an electric utility's load factor and concluded that:

> [n]o general statement can be made regarding the impact of SHAC upon the load curve of the electric utility industry. This analysis must be performed on an individual utility basis, since variations in the ambient weather conditions, load curves and generation mixes of utilities will be the prime determinants in the magnitude of the impact.

Id. at 117.

Load factor is a measure of an electric utility's average use of its capacity as a percentage of the maximum capacity, or the ratio of average power to peak power for a given period. Utilities strive to operate at high load factors to achieve the optimum and most efficient use of facilities for a given generating capacity, thereby improving profits and ensuring relative reductions in electricity price. SOLAR POLICY OPTIONS, *supra* note 1, ch. IV, at 4.

mize any adverse impact upon the system load factor.[74] For example, SHAC designs that are currently potentially beneficial to the utility's system load factor use auxiliary energy only during offpeak periods. Such systems may also be capable of recharging their storage devices by offpeak auxiliary energy to be used during periods of adverse weather. Under utility ownership, the SHAC devices could be controlled by the utility to assure that auxiliary demand did not occur coincidentally with the system's peak.

Utility ownership and leasing is also "an option which can potentially bring solar energy to the public at attractive cost levels, with the solar system cost incorporated in a monthly utility bill. Utilities could potentially derive substantial economic benefits from controlling the utilization patterns of solar systems."[75] In other words, utility ownership is a means of circumventing the barrier of high first cost through utility purchasing in a climate attendant to the energy business. Moreover, utilities have existing service, maintenance, and administrative operations (*e.g.*, billing procedures which could easily be adapted to include the providing of solar service) that might easily be adaptable to a solar leasing scheme.

Utility ownership of solar devices might even help assure solar users of product quality.[76] Utilities, having technical competence and expertise, could insure that the product leased to a consumer not possessing such knowledge meets certain reliability, safety, and performance criteria. Utility ownership, however, is only one solution to the product quality problem. The imposition of federal and/or state quality standards could instead solve the product quality problem. Solar warranties, be they state- or industry-initiated, may offer another solution to quality control.

Contrary to one of the arguments advanced against utility ownership of SHAC devices, utilities can seemingly achieve

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74. *See* SHAC POLICY OPTIONS, *supra* note 37, at 227-28; UTILITY AND SOLAR INTERFACE, *supra* note 37, at 186.

75. BOOZ-ALLEN & HAMILTON, INC., THE EFFECTIVENESS OF SOLAR ENERGY INCENTIVES AT THE STATE AND LOCAL LEVEL, ch. I at 6 (March 1976) (prepared for the Federal Energy Administration, Office of Synfuels, Solar and Geothermal Energy, Contract No. CO-05-50272-00).

76. *See* SHAC POLICY OPTIONS, *supra* note 37, at 228-29; UTILITY AND SOLAR INTERFACE, *supra* note 37, at 187-88. *See also* PROCEEDINGS, *supra* note 63, at 21.

economies of scale in providing solar service to the public.[77] It is possible that economies of scale can be realized through (1) large-volume purchases of the equipment and (2) designs incorporating the use of centralized collector and storage systems. Under the latter configuration a number of individual homes or apartments would receive heat or air conditioning from one collector/storage facility.

A final argument for utility ownership of SHAC systems takes into account the nature of the energy supply business and its policies of operation. It has been stated that utilities are the only organizations at present that face the proper incentives for optimizing the choice among energy alternatives. Since most consumers are not charged the marginal costs of providing conventional energy service, they are not faced with sufficient incentives to change to solar energy. Utilities can better weigh all factors contributing to the costs of various conventional and auxiliary energy sources so as to reach the most economic allocation of resources.[78]

2. Federal and State Limitations on Utility Ownership of SHAC Devices

a. *Utility and Utility Subsidiary Ownership of SHAC Devices and the Federal Antitrust Laws*

Any discriminatory practice against either a solar user or the solar industry by utilities or subsidiaries having substantial control of solar development through their ownership policies may give rise to an action based on the antitrust laws.[79] The earliest and most authoritative antitrust statute is the Sherman Act of 1890,[80] of which section two prohibits monopolization or attempts by persons or corporations to monopolize.

77. *See* ENERGY RATE INITIATIVES, *supra* note 63, at 81.

78. *See* SHAC POLICY OPTIONS, *supra* note 37, at 229; UTILITY AND SOLAR INTERFACE, *supra* note 37, at 188. *See also* ENERGY RATE INITIATIVES, *supra* note 63, at 81; PROCEEDINGS, *supra* note 63, at 21-22.

79. *See* Dean & Miller, *supra* note 72, at 336-37. *See also* D. Zillman, *Solar Energy, Public Utilities, and the Competitive Economy*, THE SOLAR MARKET: PROCEEDINGS OF THE SYMPOSIUM ON COMPETITION IN THE SOLAR ENERGY INDUSTRY 214, 217-22 (June 1978) (presented at the Dec. 15-16, 1977, Solar Energy Symposium sponsored by the Federal Trade Commission's Bureau of Competition). For a more in depth discussion of federal antitrust laws and their impact on solar energy commercialization, see J. Gross, Impact of the Antitrust Laws on the Commercialization of Solar Energy (1978) (unpublished paper, prepared for the Solar Energy Research Institute, on file with the authors).

80. 15 U.S.C. §§ 1-7 (1976).

Over the years, however, a huge body of antitrust law has grown through an accumulation of statutes, regulations, case law decisions, and policies.[81]

Of particular relevance to solar power and utilities is *Otter Tail Power Co. v. United States*,[82] where the Supreme Court ruled upon a section two[83] monopoly charge against an electric utility. Otter Tail, a major investor-owned electric utility, refused to sell wholesale power and declined to wheel power from another source to small communities seeking to establish municipal electric distribution systems. Otter Tail contended that the Federal Power Commission (FPC) regulation of wholesale sales, wheeling, and interconnection shielded them from application of the antitrust laws and therefore barred antitrust action. The Supreme Court held that Otter Tail, by reason of its regulation by the FPC, was not immune to application of antitrust regulation as the Federal Power Act does not exempt electric utilities from the antitrust laws.[84] Of more importance is the Court's holding that the actions of Otter Tail in refusing to sell at wholesale to or to wheel power for the municipalities constituted anticompetitive and monopolistic practices in violation of section two of the Sherman Act.[85] After Otter Tail, a utility company's refusal under the first policy option to lease SHAC devices to certain consumers, or to purchase SHAC devices from certain solar manufacturers, (grounded on a desire to protect its monopoly position) may be deemed anticompetitive and in violation of the Sherman Act. Utilities operating under the first and second policy options, by virtue of their

81. Many treatises are available that provide helpful discussions of the antitrust laws. *See* E. GELLHORN, ANTITRUST LAW AND ECONOMICS (1976); AMERICAN BAR ASSOCIATION SECTION OF ANTITRUST LAW, ANTITRUST LAW DEVELOPMENTS (1975); R. POSNER, ANTITRUST LAW: AN ECONOMIC PERSPECTIVE (1976); P. AREEDA, ANTITRUST ANALYSIS (1974). The basic antitrust statutes begin at 15 U.S.C. § 1 (1976).

82. 410 U.S. 366, *rehearing denied*, 411 U.S. 910 (1973).

83. Section two of the Sherman Act provides that:

> Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony, and, on conviction thereof, shall be punished by fine not exceeding one million dollars if a corporation, or, if any other person, one hundred thousand dollars, or by imprisonment not exceeding three years, or by both said punishments, in the discretion of the court.

15 U.S.C. § 2.

84. 410 U.S. at 372-75.

85. *Id.* at 377-79.

regulation, would not be immune from application of the antitrust laws. Moreover, under the second and third policy options, the acquisition of a competitor that has the effect of substantially lessening competition in the sale or purchase of SHAC devices may violate the antitrust laws.[86]

Another decision of relevance to solar energy and utilities is *Cantor v. Detroit Edison Co.*,[87] where the Supreme Court examined the relation between state regulatory authority and the antitrust laws. For several years, Detroit Edison followed a policy of supplying free light bulbs to its residential customers—a marketing practice approved as part of its rate structure by the Michigan Public Service Commission. A retail druggist and seller of light bulbs challenged the practice by arguing that Edison used its monopoly status to restrain competition in the sale of light bulbs in violation of the Sherman Act. Edison maintained that the state action exemption to application of the antitrust laws applied and was triggered by the state commission's approval of the marketing practice. The lower federal courts held, on the authority of *Parker v. Brown*,[88] that the commission's approval of the practice constituted state action and exempted the practice from federal antitrust laws.[89] The Supreme Court reversed, stating that "state authorization, approval, encouragement, or participation in restrictive conduct confers no antitrust immunity."[90] The Court concluded that "neither Michigan's approval of the tariff filed by respondent, nor the fact that the lamp-exchange program may not be terminated until a new tariff is filed, is a sufficient basis for implying an exemption from the federal antitrust laws for that program."[91] After *Cantor*, a commission-approved utility practice regarding solar ownership under the first or second policy options would not exempt the practice from the antitrust laws.

The state action exemption as applied to municipally-owned utilities was recently considered by the Supreme Court

86. *See, e.g.*, United States v. American Tobacco Co., 221 U.S. 106, 175-84 (1911).

87. 428 U.S. 579 (1976).

88. 317 U.S. 341 (1943).

89. Cantor v. Detroit Edison Co., 392 F. Supp. 1110 (E.D. Mich. 1974), *aff'd*, 513 F.2d 630 (6th Cir. 1976) (affirmed without published opinion), *rev'd*, 428 U.S. 579 (1976).

90. 428 U.S. at 592-93.

91. *Id.* at 598.

in *City of Lafayette v. Louisiana Power & Light Co.*[92] Cities owning municipal electric utilities brought an action against a privately-owned utility (LP&L) on the basis of violation of federal antitrust laws, and LP&L counterclaimed on the same basis. The case involved claims by the cities that LP&L had conspired to restrain trade and attempted to monopolize by preventing the construction and operation of competing electric systems and by foreclosing supplies from markets served by the company. In the counterclaim, LP&L alleged that the cities had conspired to displace LP&L in certain areas by requiring customers thereof to purchase electricity from the cities as a condition of continued water and gas service.

A decision by the district court dismissing the counterclaim was reversed and remanded by the court of appeals.[93] The Supreme Court affirmed the decision of the court of appeals by rejecting an automatic immunity from federal antitrust laws for municipally-owned utilities. The Court concluded that actions of state agencies or subdivisions are exempt only to the extent that such actions are "engaged in as an act of government by the State as sovereign, or, by its subdivisions, pursuant to state policy to displace competition with regulation or monopoly public service."[94] Under the *City of Lafayette* principle, a municipality adopting discriminatory practices in the purchasing or selling of SHAC devices under the first or second policy option may be subject to federal antitrust laws. Only where it appears that a municipality has acted pursuant to the state's command would the state action exemption apply.[95]

Another portion of the federal antitrust laws, the Robinson-Patman Price Discrimination Act, prohibits price discrimination in goods of like grade and quantity where the effect of such conduct is to substantially lessen competition or to tend to create a monopoly.[96] One case decided by the Su-

92. 98 S. Ct. 1123 (1978). The special case of municipal utility ownership of decentralized SHAC devices is considered in the text accompanying notes 120-34 *infra*.

93. City of Lafayette v. Louisiana Power & Light Co., 532 F.2d 431 (5th Cir. 1976), *aff'd*, 98 S.Ct. 1123 (1978).

94. 98 S.Ct. at 1137.

95. *See* Parker v. Brown, 317 U.S. 341 (1943).

96. 15 U.S.C. §§ 13, 13a, 13b, 21a (1976). The Act provides in part:

> It shall be unlawful for any person engaged in commerce, in the course of such commerce, either directly or indirectly, to discriminate in

preme Court under the Robinson-Patman Act may be applicable to utilities who own and lease SHAC devices. In *Federal Trade Commission v. Morton Salt Co.*, the practice of selling salt transported in interstate commerce at quantity discounts constituted a violation of the Robinson-Patman Act when only some purchasers were able to take advantage of the discount.[97] The Court stated that:

> [t]he Robinson-Patman Act was passed to deprive a large buyer of such advantages except to the extent that a lower price could be justified by reason of a seller's diminished costs due to quantity manufacture, delivery or sale, or by reason of the seller's good faith effort to meet a competitor's equally low price.[98]

Furthermore, the Court reiterated previous holdings to the effect that harm in fact need not necessarily result to competition; only a reasonable "possibility" of such harm would be sufficient to base a cause of action.[99] Where a utility or a subsidiary receives quantity discounts in the purchase of SHAC devices as an instrument of favor from certain solar suppliers, such a transaction will be a possible violation of the Robinson-Patman Act.

A Clayton Act violation may occur if a utility or a subsidiary enters into an agreement with its SHAC system supplier to exclusively deal in the supplier's products rather than those of

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> price between different purchasers of commodities of like grade and quality, where either or any of the purchases involved in such discrimination are in commerce, where such commodities are sold for use, consumption, or resale within the United States . . . where the effect of such discrimination may be substantially to lessen competition or tend to create a monopoly in any line of commerce, or to injure, destroy, or prevent competition with any person who either grants or knowingly receives the benefit of such discrimination, or with customers of either of them: *Provided*, That nothing herein contained shall prevent differentials which make only due allowance for difference in the cost of manufacture, sale, or delivery resulting from the differing methods or quantities in which such commodities are to such purchasers sold or delivered . . . *And provided further*, That nothing herein contained shall prevent persons engaged in selling goods, wares, or merchandise in commerce from selecting their own customers in bona fide transactions and not in restraint of trade: *And provided further*, That nothing herein contained shall prevent price changes from time to time where in response to changing conditions affecting the market for or the marketability of the goods concerned . . . .

Id. at § 13(a).

97. 334 U.S. 37 (1948).

98. *Id.* at 43.

99. *Id.* at 46.

a competitor. Under this federal statute, a company may not sell goods on the condition that the recipient not buy the goods of a competitor if the effect of such a transaction may substantially lessen competition or tend to create a monopoly.[100] For example, in *Atlantic Refining Co. v. FTC*,[101] Atlantic had agreed, in return for a certain commission, to assist Goodyear in promoting the sales of products to the oil company's retail service station dealers and wholesale outlets. Noting Atlantic's economic power in inducing its outlets to buy Goodyear products, the Court found the practice to be anticompetitive under the Clayton Act and therefore unlawful.[102] A similar result is likely should utilities prevent buyers of utility-owned SHAC devices from purchasing such devices from competitors.

b. *Utility and Utility Subsidiary Ownership of SHAC Devices and Colorado Trade Law*

The legislative declaration of the Colorado Unfair Practices Act[103] is "to safeguard the public against the creation or perpetuation of monopolies and to foster and encourage competition by prohibiting unfair and discriminatory practices by which fair and honest competition is destroyed or prevented."[104] One significant section of the statute declares that it is unlawful for any corporation engaged in the sale of any product or service to discriminate between different locations by selling the product or service at lower rates in different

100. 15 U.S.C. § 14 (1976):

> It shall be unlawful for any person engaged in commerce, in the course of such commerce, to lease or make a sale or contract for sale of goods, wares, merchandise, machinery, supplies, or other commodities, whether patented or unpatented, for use, consumption, or resale within the United States or any territory thereof or the District of Columbia or any insular possession or other place under the jurisdiction of the United States, or fix a price charged therefor, or discount from, or rebate upon, such price, on the condition, agreement, or understanding that the lessee or purchaser thereof shall not use or deal in the goods, wares, merchandise, machinery, supplies, or other commodities of a competitor or competitors of the lessor or seller, where the effect of such lease, sale, or contract for sale or such condition, agreement, or understanding may be to substantially lessen competition or tend to create a monopoly in any line of commerce.

101. 381 U.S. 357, *rehearing denied*, 382 U.S. 873 (1965).

102. *Id.* at 371.

103. COLO. REV. STAT. § 6-2-101-117 (1973). For a detailed analysis of Colorado trade regulation laws, *see* Ducker, *Antitrust and the Lay Lawyer*, 44 DEN. L.J. 558 (1967).

104. COLO. REV. STAT. § 6-2-102.

locations.[105] However, the statute provides an exception for any service or product sold or furnished by a public utility subject to regulation by the PUC or by any municipal regulatory body.[106] Where utility ownership of SHAC devices under the first or second policy option is regulated by the PUC, rental prices will not be subject to scrutiny under this statute. However, the rental charged by a subsidiary under policy three, as well as the prices charged by solar manufacturers who supply SHAC devices to either utilities or subsidiaries, would be subject to scrutiny under the Colorado Act.

The Act would further require that the prices that would be charged by SHAC device suppliers to utilities or subsidiaries be no less than the cost to the manufacturer.[107] Cost is defined to be the sum of the cost of raw materials, labor, and all overhead expenses of the producer.[108] The Colorado Supreme Court has held that where a merchant was selling below cost (as defined within the statute) with an intent to destroy competition, such a practice was in violation of the statute.[109]

Moreover, every agreement or contract intended to prevent competition is an illegal restraint of trade in Colorado.[110] Corporations engaging in any combination, conspiracy, or agreement restraining trade, or combining or conspiring to monopolize any part of the trade in Colorado are guilty of an unlawful conspiracy.[111] Unlike the price discrimination section discussed above, no exemption from application of these stat-

105. *Id.* at § 6-2-103(1).

106. *Id.* at § 6-2-103(2).

107. *Id.* at § 6-2-105(1).

108. *Id.* at § 6-2-105(2).

109. Dikeou v. Food Distributors Ass'n, 107 Colo. 38, 47-49, 108 P.2d 529, 533-34 (1940).

110. COLO. REV. STAT. § 6-4-101 (1976 Cum. Supp.):

> Every contract or combination in the nature of a trust or conspiracy in restraint of trade or commerce is declared illegal. Every combination, conspiracy, trust, pool, agreement, or contract intended to restrain or prevent competition in the supply or price of any article or commodity constituting a subject of trade or commerce in this state, or every combination, conspiracy, trust, pool, agreement, or contract which controls in any manner the price of any such article or commodity, fixes the price thereof, or limits or fixes the amount or quantity thereof to be manufactured, produced, or sold in this state, or monopolizes or attempts to monopolize any part of the trade or commerce in this state, is declared an illegal restraint of trade.

111. COLO. REV. STAT. § 6-4-102 (1973).

utes is afforded to investor- or municipally-owned public utilities.[112] Therefore, contracts, combinations, or conspiracies between a SHAC system supplier and a utility or subsidiary would be suspect as being illegal where the effect of such an arrangement is to restrain trade, to attempt to monopolize, or to prevent competition from other SHAC system suppliers.[113]

3. Prohibition of Utility Ownership of SHAC Devices

If the fourth policy option were implemented, utilities and their subsidiaries would be prohibited from owning decentralized SHAC devices located upon their customer's premises. Such a prohibition would result in a competitive supply market consisting of large and small businesses engaged in the manufacture, installation, leasing or sale of SHAC devices. The state would regulate these businesses the same as it does any other entities doing business in Colorado.

The creation of this competitive market structure could be achieved by either of two methods. First, to the extent that the PUC has jurisdiction over the ownership of SHAC devices by a utility, the PUC could prohibit such activity in either its rules and regulations or its general policy positions.[114] Before the PUC could prohibit a utility from owning SHAC devices it must be shown that such ownership "affects" or "could affect" the utility's regulated business.[115] It is likely that this affection test could be satisfied when one considers (1) the utility's desire to include the capital cost of SHAC ownership in its rate base, and (2) the possibility of interservice rate subsidization between the utility's solar service and conventional energy service. In light of these two factors, the PUC would have a legal basis for prohibiting utility ownership of SHAC devices if it chose to do so.

A second possible means of preventing utilities from entering the solar market is by state statute. Under a state's police power to adopt regulations promoting the health, safety, general welfare, and morals of its citizens,[116] a state could pass

112. *See id.* at § 6-4-103.

113. For a recent federal case interpreting section 101 *see* Q-T Markets, Inc. v. Fleming Companies, 394 F. Supp. 1102, 1106-07 (D. Colo. 1975).

114. *See* Dean & Miller, *supra* note 72, at 355-56.

115. *See id.* at 355 (citing G. TURNER, TRENDS AND TOPICS IN UTILITY REGULATION 20 (1969)).

116. *See* Noble State Bank v. Haskell, 219 U.S. 104 (1911). Justice Holmes, speaking for the Court, said: "the police power extends to all the great public needs [citation

legislation that either prohibited utility participation in the ownership of SHAC devices or prescribed the extent to which a utility or its subsidiary could become involved in the solar market. Legislation governing the extent of solar participation by investor-owned utilities or their subsidiaries does not exist in Colorado. However, precedent exists elsewhere for such a law. Legislation has been passed in California that requires the authorization of the PUC in the event that an electric utility, gas utility, or a subsidiary thereof desires to manufacture, lease, sell, or otherwise own or control any solar energy system.[117]

The basic disadvantage in completely prohibiting utility involvement in the ownership of SHAC systems lies in the possibility that solar designs might not be optimized for utility load management programs. The greatest concern is that SHAC devices would not be designed so as to utilize only off-peak auxiliary energy. There is a more remote possibility that SHAC devices would be of poor quality without some controls imposed by utilities.

A summary of the implications of utility ownership of SHAC devices under the previously discussed four alternative ownership policies is presented below.[118]

Ownership Policy	Potential Negative Implications	Potential Positive Implications
1. Regulated but Monopolistic Ownership of SHAC by Utilities	1. Absence of Regulated Monopoly Justifications 2. Regulatory Issues 3. Antitrust Issues	1. Optimized SHAC Design for Utility System Operation 2. High Quality of SHAC Device and Service
2. Regulated but Competitive Ownership of SHAC by Utilities	1. Regulatory Issues 2. Antitrust Issues	1. Same as Above 2. Advantages of Competition

omitted] . . . . It may be put forth in aid of what is sanctioned by usage, or held by the prevailing morality or the strong and preponderant opinion to be greatly and immediately necessary to the public welfare." *Id.* at 111.

117. Cal. A.B. No. 2984 (Sept. 1978) (adds § 2775.5 to the CAL. PUB. UTIL. CODE). This legislation and the events leading to its passage are considered more fully in the text accompanying notes 140-63 *infra*.

118. Derived in part from SHAC POLICY OPTIONS, *supra* note 37, at 234; UTILITY AND SOLAR INTERFACE, *supra* note 37, at 198.

3. Unregulated Competitive Ownership of SHAC by Utility Subsidiaries	1. Internal Subsidization 2. Antitrust Issues	1. Same as Above
4. Utilities and Subsidiaries Prohibited from Owning SHAC	1. Inferior Product Quality 2. Nonoptimized SHAC Design from Utility Perspective 3. Regulation may Develop if Competitive Market Functions Improperly	1. Avoidance of Regulatory Issues

C. *The Special Case of SHAC Device Ownership by Municipal Utilities*

A unique situation arises if municipally-owned utilities are permitted to own SHAC devices under the first and second policy options. In Colorado, an exemption for municipally-owned utilities from regulation by the PUC is provided in the Colorado constitution[119] and is also recognized in the PUC jurisdiction section of the Public Utilities Law.[120] The Colorado Supreme Court has held that the PUC has no jurisdiction to regulate a municipally-owned utility operating wholly within the territorial boundaries of a home rule city.[121] In another decision the Colorado Supreme Court held that a state constitutional provision prohibiting the PUC from regulating utilities operated by a municipality within its boundaries did not prohibit the PUC from regulating municipally-owned utilities to the extent of their operations outside city boundaries.[122] Therefore, the extent of PUC regulation of SHAC device ownership activities by a municipally-owned utility in Colorado would be confined to solar service provided outside municipal boundaries.

If a municipality were to furnish solar service to its citizens within the municipal limits, the city itself, through its proper officers, would possess the sole power of fixing general rental

119. COLO. CONST. art. XXV.

120. COLO. REV. STAT. § 40-1-103(1).

121. City and County of Denver v. Pub. Util. Comm'n, 181 Colo. 38, 45-46, 507 P.2d, 871, 874-75 (1973).

122. City of Loveland v. Pub. Util. Comm'n, 580 P.2d 381, 383-85 (Colo. 1978).

rates or regulation.[123] The extent of utility regulation by a municipality's legislative body is generally provided in the city charter. For example, the municipal charter for one Colorado city (Colorado Springs) provides that the city council shall "by ordinance or resolution establish rates, rules and regulations and extension policies for the services provided by the Department of Utilities."[124] The city council of Colorado Springs maintains a policy of approving and applying the same utility rates within municipal boundaries that the PUC has approved for service outside the municipality.[125] It is possible, then, that in similar cities charges for solar service provided by a municipality outside municipal limits would also apply to solar service provided within municipal limits if such charges were approved by the PUC.

Since municipally-owned utilities may be regulated only in part either by the PUC or the municipality, it is important to discuss whether such utilities should or may own SHAC devices. It has been suggested that utility ownership of SHAC devices, if confined to municipally-owned utilities, is preferable to ownership by investor- or privately-owned utilities.[126] This preference arises from the fact that a municipal utility is (in theory at least) significantly more accountable to the public because (1) it is a public entity, (2) it is subject to direct control by publicly-elected officials, and (3) it does not have a profit motive and thus would be unlikely to charge solar consumers heavy add-ons to retail cost.[127] This argument has merit in Colorado when one considers that PUC commissioners are not directly elected officials, but rather are appointed by the Governor with the consent of the state senate.[128] On the other hand, should a municipal utility seek to displace competition in the solar market by taking advantage of its monopoly status, such action would be state policy and therefore its anticompetitive SHAC system ownership activities would qualify for the state action exemption from application of federal antitrust laws.[129] It appears, however, that a municipal utility's relation-

123. *See* City of Lamar v. Town of Wiley, 80 Colo. 18, 23, 248 P. 1009, 1010 (1926).

124. COLORADO SPRINGS, COLO., CHARTER art. VI § 34.1 (1977).

125. *See* Colorado Springs, Colo., Ordinance 77-144 (Sept. 27, 1977).

126. *See* K. Bossong, *supra* note 63, at 6.

127. *See id.*

128. COLO. REV. STAT. § 40-2-101(1).

129. *See* City of Lafayette v. Louisiana Power & Light Co., 98 S.Ct. 1123, 1137 (1978) and the text accompanying notes 92-95 *supra*.

ships with SHAC device manufacturers or distributors would be subject to Colorado's restraint of trade laws.[130]

Existing Colorado statutes seem to authorize ownership and control of SHAC devices by municipally-owned utilities. The governing body of each municipality in Colorado has the power:

> (a)(I) *To acquire* waterworks, gasworks, and gas distribution systems for the distribution of gas of any kind or electric light and power works and distribution systems, including geothermal and *solar systems,* and all appurtenances necessary to any of said works or systems or to authorize the erection, ownership, operation, and maintenance of such works and systems by others.
>
> . . . .
>
> (d) To assess from time to time, when constructing such water, gas, geothermal, *solar,* or electric light works and in such manner as it deems equitable, upon each tenement or other place supplied with water, gas, heat, cooling, or electric light, such water, gas, heat, cooling, or electric light rent as may be agreed upon by the governing body.
>
> (3) To condemn and appropriate so much private property as is necessary for the construction and operation of water, gas, geothermal, *solar,* or electric light works in such manner as may be prescribed by law; and to condemn and appropriate any water, gas, geothermal, *solar,* or electric light works not owned by such municipality in such manner as may be prescribed by law for the condemnation of real estate.[131]

It is not particularly clear whether the "solar works" referred to in this statute consist of decentralized SHAC devices or centralized systems such as solar power towers. Conceivably, the broad solar language could be interpreted to include both decentralized and centralized solar technologies since the services specifically referred to include heat, cooling, and electric light, all of which can be produced by both types of solar technologies. If this interpretation is correct, the law would seem not only to authorize municipal utilities to engage in SHAC ownership, but also to lease SHAC devices and assess rent in a manner agreeable to the governing body.

Municipal utility ownership of SHAC devices moved from theory to reality in 1973 in the City of Santa Clara, Califor-

130. *See* COLO. REV. STAT. §§ 6-4-101-109. *See also* the text accompanying notes 103-13 *supra.*

131. COLO. REV. STAT. § 31-15-707 (emphasis added).

nia.[132] The city-owned Santa Clara utility currently leases SHAC devices for heating swimming pools to approximately 100 customers. In addition, the city has installed, on a trial basis, SHAC devices for space heating in five homes. The city's program is now part of a California Energy Commission proposal to extend the role of local government entities in the development and commercialization of solar energy. The California municipal solar utility proposal states in part that:

> [m]unicipally-operated utilities are ideally suited to introduce solar energy to consumers who are reluctant to assume the full financial and technical risks of a solar investment. Whether the utility leases or sells solar systems, the consumer is assured that his equipment will be effectively maintained and repaired. When a utility leases solar equipment or leases it with the option to buy, the consumer avoids the problems and risks of selecting, purchasing, and installing a system.[133]

The proposal is designed to result in a joint California Energy Commission-DOE funding effort that will provide local government entities with the information and assistance necessary to initiate their roles in solar commercialization. Among the goals of the proposal are to (1) develop and initiate marketing efforts to establish 50 to 100 operating municipal solar utilities by 1981, (2) initiate three to four large-scale pilot solar retrofit projects for domestic water heating in various housing applications (*e.g.*, low/fixed income, high-rise residential units; low/middle income apartments; single family tracts), and (3) establish municipal financing options that are independent of state and local tax support.[134] Should this effort succeed, and be duplicated elsewhere, it will thrust municipal utilities to the forefront of SHAC system commercialization.

D. *Alternative Utility Ownership Policies*

One alternative to the four previously discussed SHAC device ownership policies is to permit utilities to finance or insure solar systems.[135] This alternative appears legally feasible when one considers that several PUCs have expressly authorized programs by utilities to finance the installation of insulation to conserve natural gas.[136] Such an option would directly

132. *See* CALIFORNIA STATE ENERGY COMMISSION, PROPOSAL FOR THE DEVELOPMENT OF MUNICIPAL SOLAR UTILITIES 8 (June 14, 1978, revised July 8, 1978) (submitted by the California Energy Resources Conservation and Development Commission to the Department of Energy).

133. *Id.* at 1.

134. *See id.* at 2.

135. *See* Dean & Miller, *supra* note 72, at 356.

136. *E.g.*, *Re* Pacific Power & Light Co., 69 P.U.R.3d 367 (Idaho Pub. Util.

help resolve the high "first cost" problem now plaguing solar consumers as well as indirectly assure solar consumers of the product's quality. Additionally, this alternative could result in SHAC system designs more favorable to the operation of the utility's system, *i.e.*, solar systems requiring auxiliary energy only during periods other than peak. Since the Colorado PUC has the authority to investigate the practices of any utility and to establish new practices in lieu thereof,[137] it could establish a solar financing program for any utility within its jurisdiction. Unfortunately, utilities are not likely to favor this option because they would be required to assume all the risks without the financial benefits that would follow from including solar financing in the rate base. In addition, solar financing would require the utility to expend additional capital beyond that already expended in its conventional energy service operations.

Other alternatives have been suggested by those opposed to utility involvement in the ownership of SHAC devices.[138] First, local governments could establish community cooperatives that could purchase large quantities of SHAC devices and thereby take advantage of these economies of scale and assure product quality. The devices could then be sold at a price equivalent to cost plus administrative expenses. Second, the unregulated solar industries themselves could establish leasing or financing programs. A leasing program of this nature is underway in Florida. A third alternative is to limit utility participation in the solar market to servicing or maintenance programs. In conjunction with such programs, utilities could be used as a means for collecting and distributing solar and other energy conserving consumer information. The National Energy Act envisions such a role for utilities.[139] While these alterna-

Comm'n 1967); *Re* Michigan Consol. Gas Co., 1 P.U.R. 4th 229 (Mich. Pub. Serv. Comm'n 1973).

137. COLO. REV. STAT. § 40-3-111(2).

138. The following alternatives were obtained primarily from K. Bossong, *supra* note 63, at 6.

139. The National Energy Act is comprised of five separate acts: Public Utility Regulatory Policies Act of 1978, Publ. L. No. 95-617 (1978); Energy Tax Act of 1978, Pub. L. No. 95-618 (1978); National Energy Conservation Policy Act, Pub. L. No. 95-619 (1978); Power Plant and Industrial Fuel Use Act of 1978, Pub. L. No. 95-620 (1978); Natural Gas Policy Act of 1978, Pub. L. No. 95-621 (1978). For a general summary of the five acts, *See* OFFICE OF PUBLIC AFFAIRS, DEPARTMENT OF ENERGY, INFORMATION: THE NATIONAL ENERGY ACT (Nov. 1978); ENVIRONMENTAL STUDY CONFERENCE, NATIONAL ENERGY ACT FACT SHEET (1978).

tives have the benefit of preventing utilities from foreclosing competition in the solar market, the rate of solar commercialization and development may be less than under a program encouraging active involvement by utilities.

E. *A Case Study of the Implications of SHAC System Ownership by Utilities in California*

1. Investigation by the California PUC Energy Conservation Team

The California experience with utility involvement in ownership of SHAC devices is instructive to other states considering some degree of utility participation in the solar market.

In 1976, the California PUC Energy Conservation Team investigated the role of solar energy in supplying the state's energy needs. The investigation culminated in the preparation of a report that generally concluded that California should promote the accelerated use of solar energy. This conclusion was reached because of (1) the rising costs of fossil fuels, (2) the uncertainty regarding the availability of fossil fuel resources, (3) the abundance of solar energy, (4) the soon cost-effective uses of solar energy for space conditioning and water heating, and (5) the fact that government incentives can facilitate the transition to the use of renewable and more abundant energy resources.[140] The report also concluded that the role of utilities should be to (1) provide their customers with SHAC device information, *e.g.*, brand names of SHAC systems meeting interim specifications and the names of reputable solar contractors, (2) provide their customers with assistance in maintaining their SHAC devices, (3) assist their customers in financing SHAC devices until a significant sales level of solar systems

Under the National Energy Conservation Policy Act, governors and nonregulated utilities will submit to Department of Energy energy conservation plans requiring utilities to inform residential customers of suggested energy conservation measures including devices to utilize solar energy or wind power. As part of this informational requirement, utilities must make public lists of installers and lenders who might install and finance these energy conservation measures. For each residential customer, utilities are required to offer to inspect his residence and inform him of the estimated cost of purchasing and installing the suggested measures as well as the expected energy savings that are likely to result. In addition, utilities are required to offer to arrange for the installation and financing of the suggested measures. Pub. L. No. 95-619, at §§ 213-15.

140. *See* CALIFORNIA PUBLIC UTILITIES COMMISSION ENERGY CONSERVATION TEAM, A STUDY OF THE VIABILITY AND COST-EFFECTIVENESS OF SOLAR ENERGY APPLICATION FOR ESSENTIAL USES IN THE RESIDENTIAL SECTOR IN CALIFORNIA ch. 1 at 1-2 (Oct. 7, 1977).

business is established, and (4) develop incentive offpeak rates for backup energy service to solar equipped buildings.[141] The informational, maintenance, and financing services were estimated not to require significant additional utility expenditures. Where subsidies from other nonsolar ratepayers were considered, such subsidies seemed best limited to the development of domestic water heating and passive space conditioning systems.[142]

Of great significance was the Team's determination that utilities have a potential advantage over private enterprise in the marketing of SHAC devices. Utilities, if they were in the solar business today, were estimated to be able to cut costs over any competitor by about $200 on each system.[143] The California Team found that volume purchasing by a utility could reduce unit costs on all SHAC device components by as much as 40% to 50%, and that the utility could reduce the cost of installation by $100 or more on a typical water heating system.[144] And with a customer service and maintenance department already established, a utility could easily expand into the solar market.

The Team concluded that utility involvement in the direct sales of SHAC systems was a policy question,[145] and recommended that the legislature prescribe the degree to which utilities should be allowed to manufacture, sell, or lease solar equipment.[146] One unanimous policy recommendation was to prohibit utility companies or their subsidiaries from manufacturing, selling, installing, and leasing SHAC equipment unless the legislature declared that solar service was a utility service *subject to regulatory jurisdiction.*[147] Noting that a utility subsidiary engaged in the marketing of SHAC devices may not fall within PUC jurisdiction, the Team recommended that the regulated utility be precluded from using utility personnel, financial resources, and vehicles to promote the subsidiary's activities.[148]

141. *See id.* ch. III at 1-3.
142. *See id.* at 5.
143. *See id.* at 9.
144. *See id.* at 8-9.
145. *See id.* at 9.
146. *See id.* at 11.
147. *See id.*
148. *See id.* at 9.

2. The "Sunflower" Opinion

While this report by the California PUC Energy Conservation Team was being prepared, the Southern California Gas Co. (SoCal) applied to the California PUC for authority to engage in a solar demonstration project. The demonstration project, called "Operation Sunflower," was to include construction and operation of approximately 315 solar systems in various residential, commercial, and industrial structures at a cost over the five-year life of the project of nearly $11 million. SoCal also applied for authority to include in its rates the amounts necessary to fund the solar energy program. SoCal alleged in its application that the goals of the project included (1) the investigation and determination of system costs, performance characteristics, feasibility, building and other code revisions, safety hazards, and the scope of the utility's role in the commercialization of solar assisted appliances, (2) analysis of legal problems associated with solar energy, and (3) the testing of demonstration units to accelerate development of existing technologies.[149]

Seven days of public hearings were held during which interested parties representing consumers' organizations, local governments, gas consumers, the PUC, and the State Energy Commission presented testimony. The reaction to the SoCal proposal was overwhelmingly negative. In the words of the eventual PUC opinion, "[t]o say that [the consumer organizations] . . . did not support SoCal's application would be an understatement."[150] The other interested parties also opposed the project on three grounds. First, it was thought that additional solar expense should be borne by the utility's shareholders and not the utility's ratepayers. Second, the question of utility involvement in the solar industry seemed an issue that would be more properly resolved after an investigation by the PUC and the Energy Commission. Third, many opposed the thought of spending $11 million of ratepayer funds to accomplish SoCal's goals.[151] It is probable that the response would be

149. The solar law issues included those related to sun rights and ownership of solar installations. Application of Southern California Gas Co. for Authority to (a) Engage in a Solar Demonstration Project and (b) to Include in its Rates the Amounts Necessary to Fund a Solar Energy Program, Decision No. 88224, at 2 (Cal. Pub. Util. Comm'n, Dec. 13, 1977).

150. *Id.* at 3.

151. *Id.* at 4-5.

the same should a Colorado utility make a similar proposal.

Not surprisingly, the California PUC denied the application by SoCal to increase rates. The basis of the decision was that "at this time it is not in the public interest to have SoCal's ratepayers fund this 'demonstration project.'"[152] The PUC further pointed out that the proposal may have been premature in that the state Energy Commission was legislatively charged with carrying out studies assessing the nature of solar energy resources to meet the needs of the state.[153] Since such studies were not complete, proposals such as SoCal's would not be favorably received.

3. 'Legislation Regarding Utility and Subsidiary Manufacture, Leasing, Sales and Ownership of Solar Energy Systems

California's interest in regulating utility involvement with solar matters did not end with the PUC Energy Conservation Team investigation and the Sunflower opinion. A joint investigation by the PUC and the Energy Commission was instituted in 1976 to determine whether solar technologies might supply a significant part of the state's future energy needs. The initial phase of the proceeding encompassed twenty-two days of hearings and resulted in proposed joint findings and conclusions from both staffs.[154] On the issue of direct utility involvement in

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152. *Id.* at 5.

153. *Id.* at 5 n.1. The particular legislation cited in the opinion charging the Energy Commission to carry out research into alternative sources of energy is CAL. PUB. RES. CODE §§ 25401, 25216(c) (West 1977).

154. Joint Investigation by the Pub. Util. Comm'n and the Energy Resources Conservation and Development Comm'n into the Availability and Potential Use of Solar Energy in California, CPUC Case No. 10150, ERCDC No. 76-R&D-1 (April 14, 1978) (proposed joint findings and conclusions of the staffs). The California PUC ordered that:

> an investigation is instituted by the California Public Utilities Commission to determine and evaluate the proposed programs for the sales, leasing, installation and *related* servicing of solar devices by public utilities subject to this Commission's jurisdiction. This investigation is for the purpose of adopting rules or appropriate orders to insure that such programs preserve the competitive nature of the solar industry and protect the interests of individual solar product consumers, while placing no undue burden on the utilities' ratepayers.
>
> . . . .
>
> . . . no utility under the jurisdiction of this Commission may proceed, in a manner which utilizes ratepayer funds, with the implementation of a program for the direct sales, leasing, installation and *related* servicing of solar devices without authorization from this Commission.
>
> . . . any utility under the jurisdiction of this Commission which now

sales, leasing, and ownership of SHAC devices it was found that (1) utilities appeared to have a distinct and potentially unfair marketing advantage over others seeking to sell or lease SHAC devices, (2) California utilities were interested in entering the solar energy field, and (3) representatives of the solar industry and various consumer groups opposed utility ownership, sales, or leasing of SHAC equipment.[155] From these findings it was concluded that utilities should be allowed to enter the solar market on a limited basis only when such entrance was approved and monitored by the PUC. The extent to which utilities may be able to own, sell, or lease SHAC devices was left unsettled. However, it was thought that since utilities could be used as a means of accelerating the commercialization of solar energy, they should be able to finance, service, and collect data on SHAC systems.[156]

As a follow up to this investigation, California enacted a statute in late 1978 which provided the state with a mechanism for regulating privately-owned utilities desiring to enter the solar market through the manufacture, sale, leasing, ownership or control of solar systems.[157] The legislative findings and declarations are significant. They acknowledge the need for and desirability of a truly competitive solar market, and seek to guarantee such a market by PUC regulation of utilities. The legislature deduced that:

> it is in the best interest of the state to ensure competition in the solar energy industry [and to ensure that] . . . the solar energy industry . . . has the potential to be a truly competitive energy industry.
>
> . . . the current uncertainty with regard to the role of electrical and gas public utilities with regard to solar energy develop-

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> or in the future intends to proceed with a program for the direct sales, leasing, installation and *related* servicing of solar devices, notwithstanding the above order, must file with this Commission a full description and report on present and proposed programs for the sale, leasing, installation and *related* servicing of solar energy systems by each respondent utility, discussing [various enumerated concerns] . . . , within 30 days from the effective date of this order.

Order Instituting Investigation by the Public Utilities Commission into Intended Programs for the Sales, Leasing, Installation and *Related* Servicing of Solar Devices by Public Utilities, O.I.I. No. 13, at 2-3 (April 4, 1978).

155. CPUC Case No. 10150 at 27-28.

156. *Id.* at 28-29.

157. Cal. A.B. No. 2984 (Sept. 1978) (adds § 2775.5 to the CAL. PUB. UTIL. CODE).

> ment hinders the full-scale development of the solar energy industry, and therefore requires legislative clarification.
>
> . . . there may be an inherent conflict for a public utility which furnishes gas and electricity on the one hand and develops solar energy on the other hand, and . . . it would be detrimental to the solar energy industry and to the state if privately owned public utilities used their status as monopolies to dominate the solar energy industry or exercise unfair market power.
>
> . . . the basis for regulation of public utilities extends to their participation in solar energy development as well as in the production and delivery of energy from conventional sources.
>
> It is, therefore, the intent of the Legislature that the Public Utility Commission be given a clear and explicit mandate to regulate the involvement of privately owned public utilities in solar energy development, and to ensure that the solar energy industry develops in a manner which is competitive and free from the potential dominance of regulated electrical and gas corporations.[158]

Under this statute when an electrical or gas corporation or any subsidiary thereof desires to manufacture, sell, lease or otherwise own or control any "solar energy system," it must first obtain the authorization of the PUC.[159] "Solar energy system" means equipment that uses solar energy to provide heating, cooling, or electricity and which has a useful life of at least three years. An electric plant is expressly excluded from the definition.[160] PUC authorization is not required where a utility decides to own or control any solar system for "experimental or demonstration purposes," or where the utility engages in a limited program of installation or use whose sole purpose is to investigate the cost-effectiveness of a solar application.[161]

Once the utility has formally described its proposed solar program, the PUC is directed to grant authorization for the program if it finds that (1) the program will neither restrict competition nor restrict growth in the solar energy industry, (2) the program will not unfairly employ any financial, marketing, distributing, or generating advantage the company may exercise by virtue of its public utility status, and (3) the program will accelerate the development and use of solar energy systems

158. *Id.* at § 1.
159. *Id.* at § 2(a).
160. *Id.* at § 2(d).
161. *Id.* at § 2(a).

for the duration of the program.[162] The PUC also has the authority to suspend or terminate any authorization whenever it finds the solar program no longer meets the above requirements.[163]

Of course, the California statute must be implemented by the state PUC before its impact can be known. It seems, though, that California policy reflects the tension that exists regarding the marketing of SHAC devices. On the one hand, the state will not tolerate utilities using their inherent advantages to foreclose or discourage competition by industries manufacturing or selling SHAC devices. On the other hand, the state wishes to speed the market acceptance of solar technologies and seeks to rely on utilities (and their marketing strengths) to be a primary instrument in this accelerated commercialization effort. The state's PUC is responsible for reconciling these competing policies and it remains to be seen how it will do so.

F. *Utility Ownership, Sale, and Leasing of SHAC Devices and the National Energy Act.*

In 1977, President Carter submitted to Congress a draft of proposed legislation to establish a comprehensive national energy policy.[164] After a year of modification by the House and Senate, the Congress passed a National Energy Act (NEA) which was signed by the President in 1978.[165] Under the NEA,

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162. *Id.* at § 2(b).

163. *Id.* at § 2(c).

164. The President of the United States, National Energy Act: A Draft of Proposed Legislation to Establish a Comprehensive National Energy Policy, H.R. Doc. No. 95-138, 95th Cong., 1st Sess. (1977).

165. The House version of the National Energy Act was passed by that body on Aug. 5, 1977. H.R. 8444, 95th Cong., 1st Sess. (1977). As with the President's proposal, the House version contained provisions requiring each state regulatory authority and nonregulated utility to submit a residential energy conservation plan to the federal government. These plans were to include utility programs consisting of, *inter alia*, procedures whereby a utility will offer to install or finance certain conservation measures provided that the program adequately prevented unfair, deceptive, or anticompetitive acts. Within the Act, residential energy conservation measures were defined to include "devices to utilize solar energy or windpower for any residential energy conservation purpose, including (but not limited to) heating of water, space heating or cooling." H.R. 8444 at 101(10)(I). After two years from the date of enactment of the proposed House bill, utilities would be required to offer to install suggested energy conservation measures included in the utility programs. Utilities would have been prohibited from installing residential energy conservation measures under the House proposal if (1) it was determined by the PUC or FEA that a sufficient number of

utilities are prohibited from supplying or installing any energy conservation measures except for (1) clock thermostats, (2) devices to increase the efficiency of furnaces (*e.g.*, flue constrictors), and (3) load management devices (*e.g.*, equipment that allows utilities to control a customer's load). This prohibition does not apply to energy conservation measures that were required or permitted by a law or regulation in effect on or before the date of enactment of the NEA, or to measures that were being installed or supplied by a utility on or before the enactment date. Moreover, the Secretary of Energy is authorized to waive the prohibition upon petition of a utility and if it is found that (1) fair and reasonable prices would be charged and (2) such activity would not be inconsistent with the prevention of unfair or deceptive practices.[166] Therefore, utilities appear to be prohibited from "installing" or "supplying" SHAC devices, although the legislation is silent as to whether utilities may own such devices. Utilities are allowed to make small loans of no more than $300 for the purchase or installation of specified conservation measures, including solar and windpower equipment for water heating, space heating, and space cooling.[167]

National concern regarding the role of utilities in solar commercialization was expressed in ways other than in the NEA. In 1978 the White House initiated a Domestic Policy Review of solar energy which concluded that the federal gov-

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suppliers of suggested measures existed within the area served by the utility, (2) the PUC, FEA, or FTC determined that supplying or installing such measures by a utility would have a substantial anticompetitive effect, or (3) the PUC or FEA determined that prohibiting utilities from engaging in such activities would not substantially reduce the number of residential customers likely to have such measures installed. In effect, both regulated and nonregulated utilities would have been permitted to install, supply, or finance SHAC devices under the House's National Energy Act proposal.

The Senate's proposal, passed by that body on Sept. 13, 1977, would have allowed the governor of each state and each nonregulated utility to submit residential energy conservation plans to the FEA. H.R. 5037, 95th Cong., 1st Sess. (1977). As with the House proposal, these plans were to include utility programs which allowed utilities to offer to install or finance suggested measures as prescribed by the Administrator of the FEA. Utilities would have been prohibited from installing residential energy conservation measures or making a loan to finance the purchaser installation of such measures. Therefore, under the Senate's version, the extent to which a utility could become involved in the installation or financing of SHAC devices would have been left to the discretion of the Administrator of the FEA (now the Department of Energy).

166. National Energy Conservation Policy Act, Pub. L. No. 95-619 § 216 (1978). *See also* Conference Report: National Energy Conservation Policy Act, S. Rep. No. 95-1294, 95th Cong., 2d Sess. at 99-100 (1978).

167. Pub. L. No. 95-619 at § 216.

ernment should establish a role for utilities that will accelerate solar implementation without threatening competition, product innovation, small solar businesses, or the opportunity of firms and citizens to enjoy the benefits of privately-owned SHAC systems.[168] The Domestic Policy report suggested federal action to (1) encourage utility programs leading to increased solar system installations, (2) encourage utility supply planning consideration of decentralized and centralized solar applications, (3) explore the feasibility of using utilities or cooperatives to provide solar-derived heat, gas, or electricity on a community scale, and (4) support research and development to insure the availability of future systems for utility applications.[169]

It is significant to note that the Domestic Policy report specifically recommended that the federal government encourage utilities to finance, sell, lease, install, and service onsite solar equipment. It also thought it appropriate for federal agencies to support PUCs that consider solar technologies in their supply planning and decisionmaking processes.[170] Thus, while the NEA may be silent as to utility roles regarding the sale, leasing, and servicing of SHAC devices, the federal government is not unaware of the issues and in fact is considering strategies that promote solar commercialization and at the same time maintain competition in the solar energy industry.

III. Solar Utility Competition With Existing Regulated Electric Utilities

To what extent may a solar utility legally compete with existing regulated utilities in providing electric service? To answer this question requires an understanding of the nature of a solar utility. A solar utility produces electricity by means of some centralized electricity-producing solar technology. The three technologies that may be used by such a utility are conversion of sunlight to heat (solar thermal), direct conversion of wind to electricity (WECS), and direct conversion of sunlight to electricity (photovoltaics). Solar utilities, like existing electric utilities, may be investor-owned, municipally-owned, or federally-owned.

168. *See* Status Report on Solar Energy Domestic Policy Review ch. VI at 8 (Aug. 28, 1978) (Public Review Copy, Draft).

169. *See id.* at 9-11.

170. *See id.*

The discussion that follows addresses the legal barriers that may be presented to a solar utility that seeks to compete with an existing electric utility for electric service customers. Significant legal issues arise once a solar utility is able to compete for service, but such issues are beyond the scope of this article. Some of these issues include (1) power plant siting, (2) securing access to sunlight and/or wind easements, (3) securing easements on or over those of another public utility, (4) financing capital expenditures, (5) environmental issues, (6) adequacy of service regulations, and (7) ratemaking and other regulatory concerns.

A. *Competition by Investor- or Privately-Owned Solar Utilities*

1. PUC Jurisdiction

Article XXV of the Colorado constitution[171] recognizes the broad authority of the PUC to regulate the facilities, service, rates, and charges of any public utility within Colorado. In Colorado, suppliers of electrical energy, including cooperative electric associations or nonprofit electric corporations, are classified as public utilities and are therefore subject to PUC jurisdiction, control, and regulation and to the Public Utilities Law.[172] The Supreme Court of Colorado has interpreted the Colorado Constitution and the Public Utilities Law to mean that jurisdiction over the adequacy, installation, and extension of power services, as well as jurisdiction over the facilities nec-

171. The Colorado constitutional provision provides that:

> In addition to the powers now vested in the General Assembly of the State of Colorado, all power to regulate the facilities, service and rates and charges therefor, including facilities and service and rates and charges therefor within home rule cities and home rule towns, of every corporation, individual, or association of individuals, wheresoever situate or operating within the State of Colorado, whether within or without a home rule city or home rule town, as a public utility, as presently or as may hereafter be defined as a public utility by the laws of the State of Colorado, is hereby vested in such agency of the State of Colorado as the General Assembly shall by law designate.
>
> Until such time as the General Assembly may otherwise designate, said authority shall be vested in the Public Utilities Commission of the State of Colorado; provided however, nothing herein shall affect the power of municipalities to exercise reasonable police and licensing powers, nor their power to grant franchises; and provided, further, that nothing herein shall be construed to apply to municipally owned utilities.

172. COLO. REV. STAT. § 40-1-103(2) (1973).

essary to supply, extend, and connect the service, is exclusively vested in the PUC.[173]

Under these principles, a solar company that desired to supply electric energy to the public or to members of an association formed by the company would be subject to PUC jurisdiction. So too, if a group of home, condominium, or apartment owners forms an association and erects facilities to provide solar generated electricity to themselves, the association may be classified as a public utility and find itself subject to PUC jurisdiction. Conceivably, a shopping center, research park, or other facility operating a solar powered generating system for its own use may also be classified as a public utility if its tenants are considered to be "members" of an association.

The majority court rule confirms these conclusions. Most courts hold that public utility status is accorded to a company if it has "dedicated its property to public use."[174] In *Munn v. Illinois*,[175] the Supreme Court established the principle that when one devotes his property to a use in which the public has an interest, *i.e.*, when used in a manner to affect the community at large, he must submit to be regulated. The owner may then have to face the prospect of having the property and its operations controlled by the public for the common good. The Colorado Supreme Court has agreed that:

> to fall into the class of a public utility, a business or enterprise must be impressed with a public interest and . . . those engaged in the conduct thereof must hold themselves out as serving or ready to serve all members of the public, who may require it, to the extent of their capacity.[176]

Any organization that so holds itself out as serving some of the public's power needs through solar technologies may be considered a utility.

Under the minority rule, certain activities that do *not* involve a dedication of property to the public use may nonetheless be "so affected with the public interest" as to give rise to PUC jurisdiction. This rule was applied in *Cottonwood Mall*

173. Intermountain Rural Electric Ass'n v. District Court, 160 Colo. 128, 134, 414 P.2d 911, 914 (1966). *See also* City and County of Denver v. Pub. Util. Comm'n, 181 Colo. 38, 43-44, 507 P.2d 871, 873 (1973).

174. E.g., Allen v. R. R. Comm'n of California, 179 Cal. 68, 175 P. 466 (1918).

175. 94 U.S. 113, 126 (1877).

176. City of Englewood v. City and County of Denver, 123 Colo. 290, 300, 229 P.2d 667, 672-73 (1951).

Shopping Center, Inc. v. Utah Power & Light Co.,[177] where a shopping center constructed an electric generating plant designed to supply power to its tenants. The court held that since both the shopping center tenants and the public at large would benefit from the supply of power, the activity conferred public utility status upon the shopping center. The shopping center was then subject to PUC regulation.[178] Under either rule, it seems certain that a private solar company desiring to generate electricity for public distribution both within a municipality and in other areas would qualify as a public utility and be subject to PUC jurisdiction.

2. Consequences of PUC Jurisdiction

Colorado public utilities law has a key impact on the ability of solar utilities to compete with existing regulated utilities. By Colorado statute, the construction of either a new facility or an extension of an existing system by a public utility cannot begin until the utility first obtains a certificate stating that the present or future public convenience and necessity requires the construction.[179] In *Western Colorado Power Co. v. Public Utilities Commission*,[180] the Colorado Supreme Court held that this certification statute is the foundation of the regulated monopoly principle and was designed to prevent the duplication of facilities and competition between utilities. Therefore, the statute subjects proposals for the construction of new or expanded facilities to the judgment of the PUC.

A further provision provides that when the PUC finds that there is or will be a duplication of service by public utilities in any area, the PUC shall in its discretion (1) issue a certificate assigning specific territories to one or each of the utilities, or

177. 440 F.2d 36 (10th Cir. 1971).

178. *Id.* at 42.

179. COLO. REV. STAT. § 40-5-101(1). Certain exemptions from application of the statute are provided for extensions of facilities necessary in the ordinary course of business (1) within any city, county, or town within which a utility is already lawfully operating, (2) into territory either within or without a city, county, or town contiguous to the utility's facilities and not already served by a public utility providing the same service, and (3) within or to territory already served by the utility. In Western Colo. Power v. Pub. Util. Comm'n, 163 Colo. 61, 428 P.2d 922 (1967) the Supreme Court of Colorado stated that these exceptions are for "housekeeping" purposes, allowing the legislature to permit extensions necessary in the ordinary course of business without further application for a certificate. *Id.* at 71, 428 P.2d at 927.

180. 159 Colo. 262, 273, 411 P.2d 785, 791, *appeal dismissed* and *cert. denied*, 385 U.S. 22, *rehearing denied*, 385 U.S. 984 (1966).

otherwise define the conditions of rendering service and (2) order the elimination of the duplication upon "just and reasonable terms."[181] Under the statute, it is mandatory that the applicant, prior to the construction of any new plant or system, prove that the public convenience and necessity requires such construction.[182] Where a utility has not expanded service into an uncertified area, that area remains open for certification by the usual procedures.[183] However, an intruding utility may not claim service in an area already adequately served by an existing utility.[184]

A solar company desiring to construct a solar electric generating plant, as well as the necessary facilities for distribution, would therefore be required to seek and obtain a certificate. It is the certificate that will prove the major obstacle to a solar utility participating in the power generation market. At present, the likelihood of a solar utility being able to acquire a certificate is extremely limited because, except for a few uninhabited areas, the entire state is certified to existing utilities for electricity.[185] There are only two ways for a solar utility to acquire a certificate—(1) if existing utilities were found to be inadequate, or (2) if solar generated electricity were considered to be a "new" utility service. Unfortunately, the PUC has rarely determined that utility service is inadequate.[186] Nor is there historical basis for the PUC to distinguish between electricity supplied by fossil fuel plants and that generated by other means—hydroelectric, nuclear, or solar.[187]

Even assuming solar generated electricity constitutes a new utility service, the ability of a solar utility to acquire a certificate would depend on whether the proposed solar service

181. COLO. REV. STAT. § 40-5-101(2).

182. Western Colo. Power Co. v. Pub. Util. Comm'n, 159 Colo. 262, 273, 411 P. 2d 785, 791, *appeal dismissed* and *cert. denied*, 385 U.S. 22, *rehearing denied*, 385 U.S. 984 (1966).

183. *See* Western Colo. Power Co. v. Pub. Util. Comm'n, 163 Colo. 61, 71-72, 428 P.2d 922, 927-28 (1967).

184. Pub. Util. Comm'n v. Home Light & Power Co., 163 Colo. 72, 83, 428 P.2d 928, 934 (1967).

185. *See* K. HILLHOUSE, LEGAL AND INSTITUTIONAL PERSPECTIVES ON SOLAR ENERGY IN COLORADO 65, 73 (Nov. 1977) (prepared for the National Science Foundation, Grant No. APR-75-18247).

186. *See* Town of Fountain v. Pub. Util. Comm'n, 167 Colo. 302, 447 P.2d 527 (1968).

187. *See* K. HILLHOUSE, *supra* note 185, at 65.

area is certified to an existing utility for electric service. If the area is already certified, the solar utility would be required, in addition to establishing the necessity and public convenience of the solar electric service, to show that the existing utility is either unwilling or unable to satisfy the demand for solar electric service.[188] The likelihood of such a showing is diminished by the fact that the existing utility's right to provide utility service under its certificate within its defined area constitutes a property right that cannot be taken without due process of law.[189]

In *Town of Fountain v. Public Utilities Commission,*[190] the Colorado Supreme Court indicated the conditions that must be present before a utility (*e.g.* a solar utility) may apply for and properly receive a certificate from the PUC to provide utility service in an area previously certified to another utility. Fountain received a certificate to supply electricity to the area surrounding the town. The eastern one-half of this area contained no lines or distribution facilities from which to provide service. Another utility, Mountain View Electric Association, Inc., was certified in areas adjacent to Fountain's area and subsequently received authorization from the PUC to extend operations into Fountain's certified but unserved area. The reason for the decision was that the public convenience and necessity required Mountain View's service. Fountain objected to the PUC's determination but the court affirmed, holding that "[a] utility may apply for a certificate to serve in a certified area if it appears that the certified utility is either unwilling or unable to serve any existing or newly developing load within its certified territory . . . ."[191] After *Fountain,* if a solar utility desires to acquire a certificate to serve an area already certified to another utility, the former must show that the latter is unwilling or unable to adequately provide the service. In *Fountain,* an absence of facilities appeared to be the key fact indicating an inability to serve the area. A similar showing would probably be necessary before a solar utility could be certified.

188. *See* text accompanying notes 190-94 *infra.*

189. Western Colo. Power Co. v. Pub. Util. Comm'n, 163 Colo. 61, 69, 428 P.2d 922, 926-27 (1967). *See also* K. HILLHOUSE, *supra* note 185, at 73.

190. 167 Colo. 302, 447 P.2d 527 (1968).

191. *Id.* at 307, 447 P.2d at 529. *See also* Pub. Util. Comm'n v. Home Light and Power Co., 163 Colo. 72, 428 P.2d 928 (1967).

It is conceivable that other factors could be used to prove an unwillingness or inability to provide service. For example, economic infeasibility[192] or fuel shortages might constitute the existence of an inadequate existing service.[193] A legislative or PUC declaration that solar generated electricity is a "new" utility service may also lessen the burden on a solar electric utility seeking to establish an unwillingness to serve—particularly where an existing certified utility chooses not to generate by means of solar. However, it has been held that the first utility certified should be given the opportunity to supply any needed service before any other utility is allowed to compete with it.[194]

No guidelines exist as the PUC criteria regarding approval of a certificate of public convenience and necessity to construct a public utility facility.[195] With such broad discretion in making its decision on a certificate, the PUC could consider the economic interests of the utility's customers or even the economic feasibility of constructing a solar power plant over one fueled by conventional energy sources. There is at present no requirement that the PUC take into account such social costs as environmental degradation and depletion of nonrenewable resources, but should the PUC consider economic factors in its decisionmaking deliberations, such costs must be included.

The Colorado Supreme Court has in one instance sanctioned an economic feasibility analysis that suggested the usefulness of decisions that factor in costs of a social nature. In *International Union, UMW of America v. Public Utilities Commission,*[196] it was implied that a PUC decison granting a certificate could be questioned where another type of power

192. *See* text accompanying notes 196-97 *infra.*

193. *See* Pub. Serv. Co. of Colo. v. Pub. Util. Comm'n, 142 Colo. 135, 350 P.2d 543, *cert. denied,* Union Rural Elec. Ass'n v. Pub. Serv. Co. of Colo., 364 U.S. 820 (1960). In this case, the Colorado Supreme Court recognized the authority of the PUC to grant extension rights to utilities for service to areas certified to other utilities if adequate service is not being provided and the public convenience and necessity so requires. *Id.* at 151, 350 P.2d at 551. *See also* Western Colo. Power Co. v. Pub. Util. Comm'n, 159 Colo. 262, 411 P.2d 785, *appeal dismissed* and *cert. denied,* 385 U.S. 22, *rehearing denied,* 385 U.S. 984 (1966).

194. Pub. Serv. Co. of Colo. v. Pub. Util. Comm'n, 142 Colo. 135, 149, 350 P.2d 543, 550, *cert. denied,* Union Rural Elec. Ass'n v. Pub. Serv. Co. of Colo., 364 U.S. 820 (1960) (quoting South Suburban Motor Coach Co. v. Levin 269 Ill. App. 323 (1934)).

195. *See* K. HILLHOUSE, *supra* note 185, at 72.

196. 170 Colo. 556, 560; 463 P.2d 465, 467 (1970).

plant had a distinct and measurable economic advantage over the type certified.[197] Thus, when the solar thermal power plant alternative becomes economically competitive, a solar utility could argue that present economic and technical conditions support certification of a solar plant over one conventionally fueled. As times change and future social costs become more of a factor in policy considerations, the PUC might begin consideration of these costs as part of an economic feasibility analysis. When this change occurs, a solar utility would be in a good position to point out the social and environmental advantages of solar thermal generation over conventional power generation.

Another method by which a solar utility can gain entry into the electric service market is to purchase an existing utility's certificate of public convenience and necessity. A Colorado statute provides that:

> any certificate of public convenience and necessity or rights obtained under any such certificate held, owned, or obtained by any public utility, may be sold, assigned, or leased as any other property other than in the normal course of business *but only upon authorization by the Commission and upon such terms and conditions as the Commission may prescribe.*[198]

The ability of a solar utility to purchase a certificate from an existing utility thus rests in the discretion of the PUC. This discretion would nevertheless be substantially limited by the bargaining position of the existing utility. The authority of the PUC to exercise discretion relating to the sale of a certificate does not give the PUC the power to order the sale, for to do so might constitute a taking of property without just compensation.[199]

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197. In the UMW case, Public Service Co. of Colorado applied for a certificate to construct the nuclear generating station at Ft. St. Vrain. The UMW contested the issuance of the certificate on the grounds that (1) there was a lack of evidence upon which the economic feasibility of the project could be determined and (2) the nuclear plant would constitute an undue risk to the health and safety of the general public. The court stated that changes in technology, pollution regulations, and the cost of fuel may in the future make fossil fueled plants economically unfeasible. The court further stated that sufficient evidence existed in the record to support the PUC's finding that neither a fossil-fueled plant nor a nuclear plant had a measurable economic advantage over the other and that the proposed project was therefore economically feasible. *Id.* at 560-61, 463 P.2d at 467.

198. COLO. REV. STAT. § 40-5-105 (1973) (emphasis added).

199. Pub. Util. Comm'n v. Home Light & Power Co., 163 Colo. 72, 85, 428 P.2d 928, 935 (1967).

An additional disincentive awaits solar utilities wishing to provide service within a municipality. As with other utilities, a privately-owned solar utility desiring to operate exclusively within a municipality would be subject to the certification process.[200] In addition, either local laws might require a private utility serving the customers in a municipality to obtain a franchise, or a utility might seek a franchise on its own initiative.[201] However, in attempting to compete for service within a municipality, a solar utility may be in violation of an earlier franchise granted to an existing utility. Whether a violation would in fact occur by the competing solar utility depends on the specific provisions of the franchise. Nevertheless, since the municipal franchises are analogous to the monopoly status that is conferred by a certificate, such franchise could represent yet another barrier to a private solar utility's ability to compete with existing utilities.

3. Suggested Alternatives

There are several means by which the aforementioned barriers to electric service competition by a privately-owned solar utility may be removed. It has been suggested that PUCs could simply declare that they will choose not to exercise jurisdiction over solar electric generating facilities. Such a policy could be beneficial to solar development and electric customers if the policy was confined to certification procedures. Otherwise consumers of solar generated electricity would not be accorded the protection that rate[202] and service[203] regulation normally provides. Utilities threatened by competition would also likely respond that under the PUC jurisdictional statute,[204] the PUC is compelled to exercise jurisdiction over any entity declared as a matter of law to be affected with a public interest. Solar utilities would fall within this definition and would therefore be subject to PUC jurisdiction.

Another possible means of allowing competition by a solar utility is to permit competition legislatively. A statute could

200. *See* note 171 *supra.*

201. *See* K. HILLHOUSE, *supra* note 185 at 80.

202. *See* COLO. REV. STAT. § 40-3-101(1) requiring that all charges received by any public utility for any service rendered be just and reasonable.

203. *See id.* at § 40-3-101(2) wherein it is provided that utility service shall promote the public safety and in all respects be just and reasonable.

204. COLO. REV. STAT. § 40-1-103.

simply state that the public interest demands that a utility providing solar generated electricity be permitted to compete with existing utilities. Such a law would either remove the certification requirement or could be drafted to exempt solar utilities from PUC jurisdiction. Once competition is allowed, electric consumers could not be compelled to take service from one utility, but rather would be able to select service from the utility of their own choice.[205]

Since a certificate in Colorado grants a utility a right to serve the public within its certified area, such a right constitutes a legally protected property right.[206] Therefore, either of the two above alternatives would be contested by the certified utility as amounting to a taking of property without due process.[207] It is true that the Constitution's protection against the taking of private property for a public use without just compensation is limited by a state's ability to regulate pursuant to the police power. However, when the regulation goes too far it may be recognized as a taking without just compensation.[208] A law that voids an existing utility's certificate which results in a significant loss of customers may be an example of regulation going too far.

California law offers a final example of how one state has approached the issue of solar utility competition with existing, regulated electrical utilities. In 1976, the California legislature enacted legislation encouraging the development of new sources of natural gas and electricity.[209] Private energy producers are broadly defined within the legislation to include persons or entities generating electricity from other than conventional sources for their own use and not for sale to others.[210] The statute to a certain extent exempts privately-owned solar utilities from PUC jurisdiction as it provides that: "[a] private energy producer shall not be found to be an electrical corporation . . . as defined in this code solely because the electricity

205. *See, e.g.*, Blue Ridge Elec. Membership Corp. v. Duke Power Co., 258 N.C. 278, 128 S.E.2d 405 (1962); Cass County Elec. Coop. v. Otter Tail Power Co., 93 N.W.2d 47 (N.D. 1958).

206. Western Colo. Power Co. v. Pub. Util. Comm'n, 163 Colo. 61, 69, 428 P. 2d 922, 926-27 (1967).

207. *See* Pennsylvania Coal Co. v. Mahon, 260 U.S. 393 (1922).

208. *See id.* at 415.

209. CAL. PUB. UTIL. CODE §§ 2801-16 (West Supp. 1978).

210. *Id.* at § 2802.

. . . is being transmitted in part through facilities owned by a public utility."[211] Another section of the statute allows such utilities to use existing public utility transmission facilities where it is necessary to transmit the electricity from the generating source to the point of end use.[212] The statute provides an incentive for solar utilities in that it allows such utilities to use existing utility facilities without sanction of PUC regulations. Such strategies should be considered in other states seeking to promote solar power.

B. *Competition by Municipally-Owned Solar Utilities*

Municipally-owned utilities, to the extent of their operations within municipal boundaries, are not subject to the jurisdiction of the PUC in Colorado. And under article XX of the Colorado constitution, home rule cities are empowered to manage local and municipal matters, including the construction, acquisition, and operation of municipal utilities.[213] Since statutory and home rule cities are not subject to PUC jurisdiction, utilities owned by municipalities have broad potential for experimenting with, developing, and operating solar facilities. In partial recognition of this potential the Colorado legislature in 1975 granted municipalities the power to acquire or erect solar systems.[214] The statute provides that the governing body of each municipality has the power to acquire electric light and power works, including "solar systems and all appurtenances necessary to the operation of such works." The somewhat ambiguous language would seem to include solar systems designed to generate electricity.

The statute further provides that the municipality has the right to purchase or condemn the facilities of an existing franchise at their fair market value. Under this statute, and a Colorado Supreme Court case interpreting it,[215] existing franchises within a municipality would not present a barrier to a municipality desiring to establish a solar municipal utility. A municipality could therefore condemn for purchase the electric works of any electric utility operating within municipal limits and

211. *Id.*

212. *Id.* at § 2812.5

213. COLO. CONST. art. XX §§ 1, 6.

214. COLO. REV. STAT. § 31-15-707 (1973). *See also* text accompanying note 131 *supra.*

215. Public Service Co. v. City of Loveland, 79 Colo. 216, 245 P. 493 (1926).

subsequently construct a solar generating facility to establish a solar municipal utility.[216] To the extent of solar electric service provided within municipal boundaries, the municipally-owned solar utility would not be subject to PUC jurisdiction and hence the certification procedures.

The Colorado Supreme Court has confirmed that a municipality seeking to provide a public service is not barred by the existence of a certified privately-owned utility company providing a similar service. In *United States Disposal Systems (USDS), Inc. v. City of Northglenn,*[217] the city passed an ordinance authorizing it to provide trash removal services. USDS argued that since it held a certificate granted by the PUC, the ordinance constituted an invalid exercise of the police power and a taking of private property without compensation. The court concluded that the ordinance had a fair relation to the protection of the public health, and held that the municipality's actions constituted a reasonable exercise of the police power.[218] More importantly, the court stated that under the Colorado constitution the PUC (1) cannot interfere with municipalities in the exercise of their police power and (2) has no jurisdiction over municipally-owned utilities.[219] The acquisition by a municipality of electric power works for the purpose of establishing a solar electric utility would probably be construed as a valid exercise of the police power, and the existence of a PUC certificate granted to an existing utility would therefore constitute no legal barrier to this action.

In the absence of statutory and judicial law such as that found in Colorado, common law and constitutional provisions would govern the extent to which a municipality seeking to compete with an existing utility could ignore a previously issued franchise. A municipality that wishes to compete with an existing utility would be subject to scrutiny under the contract

216. A municipality could not purchase generating plants constructed for private use, or use outside the municipality. *See* Pikes Peak Power Co. v. City of Colorado Springs, 105 F. 1 (8th Cir. 1900). Moreover, where a franchise has been granted to a private company to provide electric service within a municipality, the electric power works cannot be condemned or purchased within twenty years after the granting of the franchise without the consent of the owner of the franchise. COLO. REV. STAT. § 31-15-707(a)(IV).

217. 567 P.2d 365 (Colo. 1977).

218. *Id.* at 367.

219. *Id.* at 368.

clause and fourteenth amendment of the Constitution.[220] The contract clause guarantees that no state shall impair the obligations of contract[221] and the fourteenth amendment protects against takings by a state of private property without due process of law.[222]

Inasmuch as a municipal franchise to an existing utility is recognized as a binding contract,[223] it is possible to argue that the municipality has contracted to give the utility the exclusive right to provide service. Impairment of such an agreement would be actionable under the contract clause.[224] However, it has been held that the grant of a franchise carries with it no implied contract which would foreclose competition by the municipality.[225] In addition, the Supreme Court has stated that the contract clause is not only:

> qualified by the measure of control which the State retains over remedial processes, but the State also continues to possess authority to safeguard the vital interests of its people. It does not matter that legislation appropriate to that end "has the result of modifying or abrogating contracts already in effect." [citation omitted] . . . Not only are existing laws read into contracts in order to fix obligations as between the parties, but the reservation of essential attributes of sovereign power is also read into contracts as a postulate of the legal order . . . .[226]

Therefore, a franchise granted to a utility by a municipality must be construed in accordance with the municipality's authority to exercise its police power. Since the establishing of a municipally-owned solar utility would promote the health, safety, and welfare of the public, such an action would be considered a valid exercise of the police power.

An existing utility would have a stronger defense against competition from a municipally-owned solar utility where the

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220. WILSON, JONES, MORTON, & LYNCH, THE SUN: A MUNICIPAL UTILITY ENERGY SOURCE 3 (1976) (prepared for the city of Santa Clara, California with the support of the Energy Research and Development Administration, Contract No. E(04-3)-1083) [hereinafter cited as MUNICIPAL ENERGY SOURCE].

221. U.S. CONST. art. I § 10, cl. 1.

222. U.S. CONST. amend. XIV § 1.

223. Larson v. South Dakota, 278 U.S. 429, 432 (1929).

224. Walla Walla City v. Walla Walla Water Co., 172 U.S. 1 (1898).

225. Madera Waterworks v. City of Madera, 228 U.S. 454, 456 (1913); Skaneateles Waterworks Co. v. Village of Skaneateles, 184 U.S. 354, 363 (1902).

226. City of El Paso v. Simmons, 379 U.S. 497, 508, *rehearing denied*, 380 U.S. 926 (1965), (citing and quoting from Home Building & Loan Ass'n v. Blaisdell, 290 U.S. 398, 434-35 (1934)).

express terms of the franchise provide that the company is to provide service free of competition from any other entities, including the municipality. Where a private utility holds a franchise that explicitly precludes the municipality from operating a similar facility, the former will find protection under the contract clause.[227] If solar electric service were considered to be a "new" utility service, though, an exclusive franchise for a given type of service would not protect the holder from solar utility competition.[228] And if the power of a municipality to operate a utility is granted by the state constitution,[229] the municipality will be allowed to compete even if the terms of the franchise to the private utility expressly prohibit solar competition by the municipality. Such a result is due to the fact that a franchise granted pursuant to state statute cannot abrogate the power constitutionally vested in a municipality.[230] The Contract Clause will thus pose only a minor limitation on a municipal solar utility seeking to compete with a franchised, existing electrical utility.

If a private utility cannot use the contract clause to defeat municipal competition, it will claim that such municipal involvement in the franchised area amounts to a "taking" of private property under the fourteenth amendment.[231] Such an argument is likely to be unsuccessful. In *New Orleans Gas-Light Co. v. Louisiana Light Co.*, it was held that when a private utility has been granted a franchise which precludes competition, the authorization by the municipality of a similar venture does not constitute a taking when such authorization is an exercise of the police power.[232] To the argument that the municipality's competition would deprive the private utility of its property without due process, the Court in another case replied that: "the decisions of this Court leave no doubt that a state [or a municipality by delegated authority] may, in the public interest, constitutionally engage in a business commonly carried on by a private enterprise, . . . [citations omit-

227. New Orleans Gas-Light Co. v. Louisiana Light Co., 115 U.S. 650 (1885).

228. *See* Larson v. South Dakota, 278 U.S. 429 (1929).

229. *See* COLO. CONST. art. XX, §§ 1, 6.

230. *See* MUNICIPAL ENERGY SOURCE, *supra* note 220 at 4.

231. The rights granted in a municipal franchise have been held to constitute property rights entitled to protection by the fourteenth amendment. City of Los Angeles v. Los Angeles Gas & Elec. Corp., 251 U.S. 32, 39 (1919).

232. 115 U.S. 650, 671-72 (1885).

ted] and compete with private interests engaged in a like activity."[233] It seems, then, that regardless of whether the private utility asserts contract clause or takings claims, the question of whether a solar municipal utility may compete with a franchised utility will be determined according to whether the municipality is acting within the scope of the police power.[234]

The final possible limitation on municipal solar utility competition with existing private utilities is the array of federal antitrust laws. Municipalities are not likely to be subject to the antitrust laws after the Supreme Court announced in *Parker v. Brown* that the Sherman Act's coverage does not extend "to restrain state action or official action directed by a state."[235] The *Parker* state action exemption as applied to a municipally-owned utility was more recently considered in *City of Lafayette v. Louisiana Power & Light Co.*, where the Supreme Court held that actions of municipalities are exempt by the *Parker* doctrine when such actions are "engaged in as an act of government by the State as sovereign, or, by its subdivisions, pursuant to state policy . . . ."[236] The constitutional or statutory authority that a municipality in Colorado exerts to acquire or operate a municipal solar utility should easily qualify the action for the state action exemption from the antitrust laws.

C. *Competition by Federally-Owned Solar Utilities*

To what extent may solar utilities owned by the federal government compete with private, electric utilities? Existing federal power agencies such as the Bonneville Power Administration and the Tennessee Valley Authority are basically generating and marketing agencies permitted to enter into contracts for the wholesale distribution of electric energy.[237] With the exception of the Rural Electrification Administration, the federal power authorities do not generally market electric energy directly to individual consumers on a retail basis.[238]

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233. Puget Sound Power & Light Co. v. Seattle, 291 U.S. 619, 624 (1934).

234. *See* Grand Trunk Western Ry. Co. v. City of South Bend, 227 U.S. 544 (1913).

235. 317 U.S. 341, 351 (1943).

236. 98 S.Ct. 1123, 1137 (1978).

237. *See* E. BERLIN, C. CICCHETTI, & W. GILLEN, PERSPECTIVE ON POWER 157-63 (1974) (Appendix C). Appendix C of the publication provides an excellent summary of federal power agencies.

238. Under the Rural Electrification Program, the REA finances qualified cooperative associations for the purpose of providing generation, transmission, and distribution of electric power to rural residents not receiving central station service. *See id.*

If Congress or federal agencies were to establish solar electric utilities for the purpose of competing with existing utilities for business at the retail level, it is highly likely that these entities would be subject to PUC jurisdiction in Colorado. The applicable statute provides that every cooperative electric association and "every other supplier of electricity" are subject to the jurisdiction, control, and regulation of the PUC and to the provisions of the Public Utilities Law.[239] The Colorado Supreme Court has held that this statute makes no exceptions, and that every cooperative electric association, as well as every other supplier of electricity, is a public utility and therefore subject to PUC jurisdiction.[240] Thus, the certification procedures applicable to privately-owned solar facilities discussed above would equally be applicable to federally-owned solar utilities.

The tenth amendment is another potential limitation on the ability of federally-owned solar utilities to compete with existing utilities on a retail basis. Under the tenth amendment "[t]he powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people."[241] In *Fry v. United States*, the Supreme Court recognized that under this amendment Congress may not exercise power in a manner that impairs a state's integrity or its ability to function effectively.[242] In *National League of Cities v. Usery*, another tenth amendment case, the Supreme Court recognized that the states have attributes of sovereignty which may not be impaired by Congress.[243] The Court in *Usery* held that Congress may not exercise the commerce power so as to limit state decisions regarding the conduct of integral governmental functions.[244] After *Fry* and *Usery* it could be argued that a congressionally authorized solar utility so interferes with the states' regulation of public utilities, an integral governmental function traditionally of a

239. COLO. REV. STAT. § 40-1-103(2).

240. Western Colo. Power Co. v. Pub. Util. Comm'n, 159 Colo. 262, 280, 411 P.2d 785, 794-95, *appeal dismissed* and *cert. denied*, 385 U.S. 22, *rehearing denied*, 385 U.S. 984 (1966).

241. U.S. CONST., amend. X.

242. 421 U.S. 542, 547 n.7 (1975).

243. 426 U.S. 833, 842, 845 (1976).

244. *Id.* at 855.

local nature, that a tenth amendment violation has occurred.[245]

D. *Regulated Competition as an Alternative to the Regulated Monopoly Structure*

Competition among regulated solar and nonsolar utilities is an alternative to the regulated monopoly energy supply market structure. The regulated competition model is currently in effect in Colorado for transportation utilities as a result of a 1967 amendment to the applicable Colorado certification statute.[246] This law might serve as an example for states that wish to allow the consumer to choose between solar and fossil fuel-generated power. Because of this amendment a certificate of public convenience and necessity to operate a motor vehicle for hire for the transportation of property no longer constitutes an exclusive grant or monopoly. Instead, the PUC is authorized to grant more than one certificate for the transportation of property when it finds that public convenience and necessity require the competing service.

In *Miller Bros., Inc. v. Pub. Util. Comm'n,* the Colorado Supreme Court held that the 1967 amendment eliminated the requirement that existing service must be shown to be inadequate before a competing carrier may be certified.[247] After *Miller Bros.* the new controlling factor is the "public interest." The Court validated the statute despite the lack of definition of "regulated competition," and despite the fact that no standards were included under which the PUC might issue additional certificates.[248] This and other cases establish guidelines that may be used by the PUC in determining whether to issue a certificate to a common carrier wishing to compete with a

245. *But see* Jackson v. Metropolitan Edison Co., 419 U.S. 345 (1974), where state regulation by the PUC of a privately-owned utility was not considered to be an attribute of state sovereignty.

246. *See* COLO. REV. STAT. § 40-10-105 (1973) which provides in part that:

> The granting of any certificate of public convenience and necessity to operate a motor vehicle for hire for the transportation of property shall not be deemed to be an exclusive grant or monopoly, and the doctrine of regulated competition shall prevail. The Commission has authority to grant more than one certificate of public convenience and necessity to operate motor vehicles for the transportation of property over the same route or a part thereof or within the same territory or a part thereof if the commission finds that the present or future public convenience and necessity requires or will require such operation.

247. 185 Colo. 414, 431-32, 525 P.2d 443, 451-52 (1974).

248. *Id.* at 430-31, 525 P.2d at 451.

certified carrier. These guidelines include determinations of whether (1) there is a public need for the service,[249] (2) the economic feasibility of existing certified carriers would be lost,[250] (3) there is a need for competition in providing the service,[251] (4) the new carrier is willing and able to provide the service,[252] (5) the competitor's service is unique in any way[253] and (6) the competitor's service is better in any way than existing service.[254]

Guidelines similar to these could be applied in the event that existing electric public utilities are required to operate with solar utilities under a regulated competition model. An extension of the regulated competition model could promote the development of solar energy both by existing utilities and by privately-owned companies desiring to establish solar electric utilities. And under this model a solar utility could compete with an existing utility in providing electric service, but the PUC could still, through continuing vigilance, assure that wasteful duplication of facilities and excessive rates do not occur.

IV. CONCLUSION

As solar technologies become more workable and marketable, the likelihood of utility involvement in the development of solar power increases. Such involvement is suspect for many reasons, the most important of which is the regulated monopoly status of most public utilities. Should such existing public utilities play a large role in the marketing of SHAC devices, and should the utility's certificate of convenience and public necessity foreclose competition by solar utilities, existing utilities will be able to determine the rate, the quality, and the success of the commercialization of solar technologies. It is important for law and policy makers to consider the implications of this degree of utility control over the new but growing solar market. Alternatives to utility involvement in the solar energy field should be explored, and strategies that limit or at

249. Wells Fargo Armored Service Corp. v. Pub. Util. Comm'n, 545 P.2d 707, 709 (1976).

250. *Id.*

251. *Id.* at 709-10.

252. *Id.* at 710.

253. *See* Miller Bros., Inc. v. Pub. Util. Comm'n, 185 Colo. 414, 435, 525 P.2d 443, 453 (1974).

254. *Id.*

least regulate utility decisions regarding solar technologies should be understood. Utilities may be one means of accelerating the speed with which solar energy is accepted by the public. Nevertheless, the consequences of and alternatives to using utilities in this manner should be fully examined before utilities assume such a critical role in the solar commercialization effort.