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SOLAR INVESTMENTS BY A MUNICIPAL UTILITY

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I. INTRODUCTION

Because national economic growth and stability are largely dependent on the availability of economical and reliable sources of energy, and because the general use of solar energy would release nonrenewable fossil fuels for other uses, the legal problems and opportunities arising from the use of solar energy have received considerable attention. Among those are the complex and interesting questions surrounding the involvement of public utilities in the development and use of solar energy.

Utility companies are affected by almost every present or proposed use of solar energy. Solar energy is susceptible of being used in three general patterns: the individual home owner or manufacturer using a single solar collector for his own purposes; a group of individuals sharing a solar collector, such as a co-op or a lessor-lessee arrangement; and, an existing utility, owning a solar collector and shipping the electricity or heat to its customers. Each of these arrangements necessarily raises utility questions. The individual user, in most cases, must rely on a utility for backup power because solar collectors depend on the weather for optimum performance, and adequate storage facilities are in many cases prohibitively expensive. The group or lessor-lessee arrangement may be subject to public utility regulation as a public utility.[1] Use of solar energy as a power source by a public utility to produce electricty or heat for its customers involves many of the same questions as the operation of a power plant dependent on another energy source.

1. *See* Cottonwood Mall Shopping Center, Inc. v. Utah Power & Light Co., 440 F.2d 36 (10th Cir. 1971). Some argue that on-site energy systems should be treated as utilities only for purposes of limited review and inspection. *See* Harris, for the FEDERAL ENERGY ADMINISTRATION, PERMISSIVE REGULATIONS OF ON-SITE ("TOTAL") ENERGY SYSTEMS, (Rand Corp. 1974).

II. THE RELUCTANCE OF UTILITIES TO PROMOTE SOLAR ENERGY DEVELOPMENT

Utility companies often have an ambivalent attitude toward the development of solar energy, which seems to strike them as a disturbing problem rather than as an area ripe for development. A series of interviews conducted for the Florida Energy Committee revealed the following:

> [T] he utility stance is to avoid, and even possibly discourage, solar energy development, out of apprehension that the only result can be a reduction in utility revenues. Solar energy is viewed essentially as a threat which the utilities have not yet determined how to turn into a benefit.[2]

The cause of this uneasiness with solar energy has been analyzed as a natural reaction to the "possibility of partial extinction."

> The essence of a retail energy utility is the transportation of an energy resource from a central source to the point of use. Electrical energy is most efficiently generated in large facilities serving thousands of users. Natural gas is found in a relatively few scattered gas fields, and transported through pipes to the homes and businesses that use it.
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> If solar energy were to capture a large proportion of the market from gas and electricity, it could make some of the existing distribution capacity obsolete.[3]

III. METHODS OF UTILITY PARTICIPATION IN SOLAR ENERGY DEVELOPMENT

A. MAKING PURCHASE LOANS TO CUSTOMERS AND LEASING SOLAR DEVICES.

On the other hand, the fact that utilities are primarily organs of distribution, coupled with the fact that some utilities are leaders in the development of solar equipment, suggests that utilities may

2. BOOZ, ALLEN & HAMILTON, INC., SOLAR ENERGY UTILIZATION IN FLORIDA A55 (1975).

3. Noll, Public Utilities and Solar Energy Development (1976) (Graduate School of Business, Stanford University). For a discussion of a utility's similar reaction to diesel co-generation, *see* Alexander, *The Little Engine That Scares Con Ed*, FORTUNE at 80 (Dec. 31, 1978).

be the logical agencies to promote and manage solar systems. The strong incentive of corporate survival guarantees that utilities, once into the solar field, would strive to make the technology work, and in many cases, they are.[4] For instance, the Tennessee Valley Authority (TVA) has initiated a program in Memphis in which it is installing 1000 solar hot water systems on customers' roofs. Ownership is in the customer, who is loaned the $2000 initial cost of installation by the TVA at a 3.37 percent interest rate for twenty years. The program is intended to result in 100,000 solar water heaters and a loan program of $200,000,000. Each heater saves the TVA one kilowatt of generating capacity, which would otherwise come from new power plants at a cost of $700 per kilowatt.[5] Rental to the customers of solar equipment which is owned by the utility, in the pattern of the telephone company, has been suggested by the Rhode Island Division of Public Utilities. In this program, the utility would install, own, and maintain the system, while the landowner leasing the system would make payments which would cover installation, financing, maintenance, and profit to the utility.[6]

Because utilities have access to the advance loan capital for solar systems that is not readily available to low-and-middle-income citizens, and because utilities are less sensitive to the high front-end costs and long pay-back periods of solar systems, utilities are ideally situated to help broaden the use of solar energy in residential as well as industrial applications.

For every watt of power produced from solar energy, that much less oil, gas, or coal, all nonrenewable resources, need be used. As the cost of exploration and production in nonrenewable fossil fuels increases,[7] the savings made possible by the use of solar energy benefit everyone who uses fossil energy.

B. SOLAR INVESTMENTS

Another form that utility participation in solar energy use might take, apart from leasing solar devices, making loans to

4. In 1977, the Electric Power Research Institute identified over 400 renewable energy projects being sponsored by 150 electric utilities at a cost of $15-20 million. ELECTRIC POWER RESEARCH INSTITUTE, ELECTRIC UTILITY SOLAR ENERGY ACTIVITIES — 1977 SURVEY (Feb. 1978).

5. The Denver Post, Nov. 29, 1978, at 21 B.

6. RHODE ISLAND DIVISION OF PUBLIC UTILITIES, SOLAR ENERGY PROBLEMS & OPPORTUNITIES.

7. There is little question that conventional fossil fuels are being depleted. The only issue is when they will run out. *The Big Five of World Energy,* UNESCO COURIER at 6 (Jan. 1974), reported the following pessimistic and optomistic projections:

	Long	Short
Coal	2500 A.D.	2083 A.D.
Oil	2100 A.D.	1992 A.D.
Natural Gas	2015 A.D.	1994 A.D.

customers for solar purchases, and funding solar research, is suggested by a 1976 Federal Energy Administration proposal for conservation investments by gas utilities.[8] That proposal noted that considerable amounts of gas could be saved if certain conservation measures (insulation, automatic thermostat, and furnace modification devices) were installed in consumers' residences. Because the gas made available from utility investment in conservation measures would be freed for use by all new and existing customers of the utility, the costs of the investments would be borne by all the customers, just as the costs of a conventional new powerplant would be included in the rates charged by the utility.

Such an approach could be taken by a utility to the use of solar energy. If the utility were to purchase and install solar units on some of its residential customers' homes, retaining ownership of the devices while spreading the costs throughout its system, benefits would be created for the utility, the customers on whose property the devices were placed, and all the other customers of the utility, because of the overall savings in energy costs.

C. SOLAR WATER HEATING

The most likely candidate for a solar device would be a residential water heater; even at current power costs, solar heating of residential water seems to be competitive with electric heating.

> A typical, conventional electric water heater for a house costs about $150 and lasts for about 10 years. The cost of electric water heating may be about $15 per month for a typical family of four. A solar water heating system costing about $720 could save two-thirds of the electricity cost and last for 15 years, the savings amounting to about $120 per year. Ignoring discount rate and maintenance for simplicity, the solar energy system has a 6-year payback period ($720 cost divided by $120 savings). Since the solar water heater will pay for itself well before it wears out, it would seem to be a reasonably economic investment.[9]

Taking either projection, it is clear that pessimists and optimists agree that fossil fuel will one day be gone.

8. Rosenberg for the FEDERAL ENERGY ADMINISTRATION, CONSERVATION INVESTMENTS BY GAS UTILITIES BE CONSIDERED A GAS SUPPLY OPTION (PRELIMINARY ANALYSIS) (Dec. 17, 1976).

9. Hirshberg, *Public Policy for Solar Heating and Cooling*, BULL. OF THE ATOMIC SCIENTISTS 37, 38 (Oct., 1976).

Heating of household water seems to be the one use of solar energy that all the experts agree is a commercially successful direct application.[10] A recent ERDA study indicates that solar water heating systems are economically competitive against electrical resistance systems in 12 out of the 13 cities studied.[11] Depending on the construction costs used, solar water heating may be competitive with gas heating now,[12] in terms both of positive savings within five years and of payback within fifteen years. The chief drawback of solar water heating, as with most uses of solar energy as a substitute for fossil fuels, is the high front-end cost. Even with a free source of energy and low maintenance, the high initial cost of the solar collector may keep solar energy use beyond the reach of most homeowners. Legislative recognition of this problem has resulted in a plethora of state laws designed to ease the burden on the individual consumer,[13] as well as federal attention, centering on research and development studies.[14]

1. *Cost Spreading*

The customer who has already equipped his home with a solar water heater, like the homeowner who insulates, is already benefitting all other customers of the utility. In Pennsylvania, the solar-heated home saves the *utility* over $400.00 per year in fuel costs; this is independent and in addition to the customer's gas and electric bill savings. "Under the present method of recovering average fuel costs in excess of the cost imbedded in the rate base through a fuel adjustment charge, levied on all customers at a uniform rate per unit of energy consumed, the marginal cost saving is distributed to all utility customers."[15] It appears that cost-spreading is at work in reverse: the solar user benefits everyone else in the utility without sharing the financial burden of his solar unit. Of course, the monetary savings that the solar users produce for the utilities are only in the area of energy used, not normally in the cost-to-serve costs, which must include many other items than the fuel to produce energy alone.

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10. F. DANIELS, DIRECT USE OF THE SUN'S ENERGY 75 (1964).

11. ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION, AN ECONOMIC ANALYSIS OF SOLAR WATER & SPACE HEATING 16 (DSE-2333-1) (Nov. 1976).

12. *Id.* at 17.

13. *See* ROBBINS, NEW LAWS TO ENCOURAGE SOLAR ENERGY USE FOR INDIVIDUAL BUILDINGS (NSF Grant No. APR 74-21034) (June 1976).

14. *See, e.g.*, Solar Heating and Cooling Act of 1974, 42 U. S. C. §§ 8241 (1974).

15. LORSCH, IMPLICATIONS OF RESIDENTIAL SOLAR SPACE CONDITIONING ON ELECTRIC UTILITIES 8-13 (NSF Grant No. NSF-Cio33 (AER-75-18270))(Dec. 1976).

If a utility were to invest in solar power, owning and installing solar collectors on the customer's side of the meter, it could conserve power for all customers. The cost of the solar devices and their installation and maintenance would be regarded by the utility as a capital expenditure and entered into the rate base upon which rates are computed for charge to all customers. The overall savings in energy consumption would result in a decrease in rates which would offset any increase in rates to finance the solar program. An important effect of the use of solar devices to provide part of the energy ordinarily supplied by the utility would be to slow the accelerating costs of energy supplies to the utility. Because the utility would be using less energy to supply power to its customers, it could delay the construction of new power plants and possibly avoid them altogether. Because the long-term cost of the solar equipment would be considerably less than the energy that the utility would otherwise have had to supply, all users of power from the utility would benefit from the solar program, even if they chose to refuse or had already installed solar devices.

A subsidiary corporate structure could be set up to effectuate the solar program: a wholly-owned subsidiary of the utility would supervise and finance installation of the solar devices, contracting with independent contractors in the solar field. In this way, various types of solar collectors could be tested in the utility's geographic location, and the utility would discover which collectors were most feasible for its area. The use of independent contractors from outside the utility, possibly even those suggested by customers, would help avoid undesirable anti-trust problems. The utility would not, naturally, be in the business of selling solar equipment, just encouraging and benefitting from its use. The subsidiary would receive an equity investment from the utility and have all its expenses covered by the utility, including interest and return on equity. Periodic rate adjustments, with expedited hearings, passed on to all the utility's customers, would cover the purchase and installation charges. Because of its access to loan capital, and with payment assured by the utility, the subsidiary could arrange for financing for initial purchase of the solar devices.

IV. A MUNICIPAL UTILITY MODEL

This proposal raises problems at several levels: federal antitrust questions, state constitutional questions, and local utility organic documents and rules. These three areas all offer different

types of obstacles. One way to examine these problems is from the viewpoint of a municipality which operates its own utility, Colorado Springs, Colorado; examination may serve as an example for other utilities.[16]

Colorado has a high level of interest in solar energy, as is evidenced by its having the largest number of solar-heated homes in the country and many solar equipment manufacturers, as well as the Federal Solar Energy Research Institute.[17] Several state laws indicate legislative familiarity with the concept of solar energy use.[18] In addition, consumer interest in the organization and performance of the utilities in the state is high; the governor has recently appointed a special expert witness to represent consumers at rate increase hearings, and asked for a "fundamental reanalysis" of the rate-setting process. These two factors, public awareness of the potential of solar energy, and concern about the present effectiveness of public utilities as energy supply systems, are prerequisites before a utility could adopt a program of installing solar devices and charging all of its customers.

Colorado Springs enjoys the advantage of owning its own gas and electric utility, which is a city department; the city council also

16. Article XXV of the Constitution of Colorado exempts municipally-owned utilities from the regulation of the Public Utilities Commission; later cases have clarified this article to mean that the Commission has no jurisdiction over a utility owned by a home-rule city and operated within the municipal limits. City & County of Denver v. Public Utilities Comm'n, 181 Colo. 38, 507 P.2d 871 (1973). The statute setting up the Public Utilities Commission reiterates this exemption. COLO. REV. STAT. § 40-1-103 (1973). For those utilities that fall under the jurisdiction of the Public Utilities Commission, a close study of the Commission's regulations would be in order before implementing conservation investments, with close attention to those areas of rate-setting and property valuation for rate bases. Because the Commission's mandate lies in the state constitution rather than in delegated powers of the legislature alone, the regulations are entitled to great deference in the courts, although they are restricted to a "zone of reasonableness." Mountain States Tel. & Tel. Co. v. Public Util. Comm'n, 345 F. Supp. 80 (D. Colo. 1972). The Commission's authority to regulate the end-use of energy, as well as the rates charged for it, may be of significance in assisting the utilities to conserve energy by encouraging use of solar power. Two opinions indicate the development of the Commission's reasoning. In 1974, a utility sought the authority to condition electric service upon proof of compliance with minimum insulation standards; the Commission denied the request (against the recommendations of its staff), explaining that, "It is not our function nor do we have the authority to regulate consumers. The Commission sets utility rates throughout the State of Colorado and each individual can then make individual economic decisions based upon these rate schedules." Investigation and Suspension of Proposed Tariff of Mountain View Electric Assoc., Inc., PUC Docket No. 831, Recommended Decision of Comm'r Howard S. Fjelland (1974). The state supreme court, in an unrelated case, decided that same year that the Commission, as a constitutional body, may exercise all powers reasonably related to the provision of utility service, in the absence of legislative direction otherwise. Public Util. Comm'n v. Miller, ___Colo. ___, 525 P.2d 443 (1974). In 1975, the Commission apparently changed its mind, and ordered an end to the burning of gas in some luminaires and advertising flares, estimated to consume enough gas to heat 300 homes. Colorado Public Util. Comm'n, Decision No. 87640 (Oct. 21, 1975). If the Commission feels strongly enough about its powers to prohibit certain uses for conservation reasons, it may be receptive to a plan that permits and encourages the use of solar energy, on a voluntary basis, in order to conserve other fuels, for the benefit of all of a utility's customers.

17. HILLHOUSE, SOLAR ENERGY AND LAND USE IN COLORADO: LEGAL, INSTITUTIONAL, AND POLICY PERSPECITVES (Nov. 1977).

18. *See, e. g.*, COLO. REV. STAT. §§ 38-32.5-101 to 102 (Supp. 1977), "Solar Easements;" and, 31-32-101, including solar systems in public utility franchises which municipalities may grant.

serves as the city utility board. The Phoenix Project, a privately-funded solar demonstration home purchased by the city, is one indication of the interest the city takes in solar energy. The political responsiveness evidenced by the municipally-owned utility arrangment is important for a program that will depend for its success on public acceptance.

V. ANTITRUST PROBLEMS

On the federal level, the first obstacle encountered is the antitrust laws.

The purpose of the federal antitrust laws is to prevent monopolization and restraint of trade by agreements between competitors (horizontal price-fixing) and by restraints imposed by sellers upon buyers (vertical restrictions). The supplying of power has traditionally been considered a "natural monopoly," in which, because of the high capital costs and practical difficulties of duplicating services, competition seldom exists within a single geographically limited market; consequently, utilities are regulated by the state in lieu of natural competition. The most likely antitrust charge that this program would be open to is that it constitutes an illegal "tying" agreement, in which the seller of a product conditions the sale upon the buyer's purchasing another product as well. Such an arrangement is thought to foreclose competition from the market for the second product.[19] A monopoly in the "tying" market, for power, might lead to monopoly in the "tied" market, for solar units. Because the utility would "give" the units away, no customer would have an incentive to buy units from others. Survival in the solar market might depend on getting the utility's order. On the other hand, this argument can be made against any large purchaser, and tends to restrict or depress the solar market. A utility customer who wanted to own a collector could buy or build one for himself, and also benefit from the lower overall utility rates for his back-up power.

There may be two arguments that the federal antitrust laws will not foreclose a utility from making solar investments. The utility is not *selling* anything new, since it retains ownership of the solar collector. In addition, the "state action exemption" of *Parker*

19. *See* GELLHORN, W., ANTITRUST LAW AND ECONOMICS, 277-89 (1976).

v. Brown,[20] recently interpreted in *Cantor v. Detroit Edison,*[21] may apply to remove the question from the antitrust area. In *Cantor,* a utility supplied its customers with light bulbs, with the purpose of increasing the consumption of electricity,[22] and included the cost of the bulbs in its rate base. The state Public Service Commission had long approved the practice, an approval that the Supreme Court held did not insulate it from the scrutiny of the antitrust laws:

> There is nothing unjust in a conclusion that (the utility's) participation in the decision is sufficiently significant to require that its conduct implementing the decision, like comparable conduct by unregulated businesses, conform to federal law. Accordingly, even though there may be cases in which the State's particpation in a decision is so dominant that it would be unfair to hold a private party responsible for his conduct implementing it, this record discloses no such unfairness.[23]

The utility that wishes to place solar conservation investments in the customer's home will have to try to meet this test. If the state assumes a dominant role in the decision to implement the proposal, as of course it would in the case of a municipal utility, in which the city exercises the delegated state police power, then the test of *Cantor* might be met. In addition, federal support for conservation investments may enable them to fit into another exception that the *Cantor* opinion suggests. In a footnote, the plurality opinion quoted an earlier case as follows:

> The Court has never held, and does not hold today, that the antitrust laws are inapplicable to anticompetitive conduct simply because a federal agency has jurisdiction over the activities of one or more of the defendants. An implied repeal of the antitrust laws may be found only if there exists a "plain repugnancy between the antitrust and regulatory provisions."[24]

Having independent contractors furnish the collectors should prevent fears of the kind of "tying" arrangment that was attacked

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20. 317 U. S. 341 (1943).

21. 428 U. S. 579 (1976). SEE ALSO City of Lafayette, La. v. Louisiana Power & Light Co., ___U. S. ___, 98 S.Ct. 1123 (1978).

22. *Cantor* v. DETROIT EDISON 428 U. S. 583, 584 (1976).

23. *Id.* at 594-595.

24. *Id.,* n. 36, *citing* Gordon v. New York Stock Exchange, 422 U. S. 659 (1975) (Stewart, J., concurring).

in *Cantor.* Also, no customer would be required to accept a solar heater as a precondition to utility service. In addition, retention of ownership of the solar collector in the utility itself shows that there is no sale going on; it is as if the customer were allowing the utility to construct a power plant, drill for gas, on land that he owns, in order to benefit himself and all other customers of the utility.

The problem of certification of solar units may arise, since there are as yet no governmental or trade regulations governing solar collector construction beyond local building and plumbing codes. For utilities to favor certain reliable firms might lead to antitrust actions. This should be easy to avoid by allowing competitive bidding against minimum standards of efficiency set by the utility, with a mix of types of solar collectors being permitted. The use of various methods of solar collection would offer a useful testing-ground for the solar firms. The utility will neither be competing with the contracting firms nor preventing any of them (above a minimum of competency) for entering the market.[25]

VI. STATE ACTIVITIES

Colorado's recent vigorous activities in the antitrust area,[26] combined with the new sections of the Clayton Act that permit state suits for injuries to consumers under the doctrine of *parens patriae*,[27] should indicate caution to any utility that may wish to overstep its traditional role. Because the Colorado state antitrust laws roughly parallel the federal laws, utilities would be wise to conform their activities in this area to those patterns that are found acceptable on the federal level.

Even without owning its own utility, a city can encourage both homeowners and the utility serving them to utilize solar energy for water heating. Under the police power to protect the health, safety, morals, or welfare of the citizenry[28] delegated to the cities by the state,[29] the city may be able to use its zoning power to require

25. The Public Utility Holding Company Act of 1935, 15 U.S.C. 79 (1935), which would likely apply to the subsidiary corporation, should be foreclosed from application in our case by Section 79 (i), which withholds jurisdiction if the acquisition has been expressly authorized by a state commission. Either Public Utility Commission approval or municipal approval should satisfy this requirement.

26. Burke & Walters, *Antitrust Enforcement in Colorado: New Directions, New Concerns,* 6 COLO. LAW. 1 (1977).

27. Antitrust Improvements Act of 1976, Pub. L. No. 94-435, 90 Stat. 1394 (codified at 15 U.S.C. §§ 15c-15H, 18a, and 66 (1979 supp.)).

28. *See* Berman v. Parker, 348 U. S. 26 (1954); East N. Y. Sav. Bank v. Hahn, 326 U. S. 230 (1945); Nebbia v. New York, 291 U. S. 502 (1934); License Cases, 46 U. S. (5 How.) 504, 583 (1847).

29. City of Golden v. Ford, 141 Colo. 427, 348 P.2d 951 (1960).

developers to "stub" all new homes (provide with suitable fittings and plumbing) for the later voluntary installation of solar energy equipment by conditioning approval of the subdivision map upon compliance. The state of Florida, which has a tradition of solar water heating, has taken this step.[30] Municipal adoption of this requirement could be justified by analogy to requirements that subdividers may be forced to construct roads to city standards, install sewer and water systems, curbs and gutters, and to dedicate land for parks and schools.[31] As a first step, a city can require layout plans of subdivisions in which each home has reasonable access to the sun, even if it decides not to go as far as implementing solar overlay zoning.[32]

VII. MUNICIPAL ACTIVITY

Colorado Springs already requires, by ordinance, many concessions from developers: four percent of the land in the subdivision or four percent of its value for parks; preservation of natural and cultural features; easements along streams; paved alleys; water and sewer lines and fire hydrants; trees planted along both sides of all streets; and, undergrounding of telephone and electric lines.[33] Since subdivision maps must be approved in advance by the city, street layout maps that permit solar access, with most homes oriented on an east-west axis would be an easy step to take.

Beyond subdivision regulations, the city could take some positive steps to encourage conservation investments and solar use without a full-scale commitment to utility involvement. Santa Clara, California, has found a market that the city is supplying — solar swimming pool heating. While there may be fewer private swimming pools in Colorado Springs, the approach seems suitable to other projects. The Science Advisor of Santa Clara describes the plan as follows:

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30. FLA. STAT. § 553.065, requires that all single-family residences constructed in the state be designed with plumbing which will facilitate future installation of solar water heaters.

31. Roads: Ayres v. City Council of Los Angeles, 34 Cal.2d 31, 207 P.2d 1 (1949); Ridgefield Land Co. v. City of Detroit, 241 Mich. 468, 217 N. W. 58 (1928); Brous v. Smith, 304 N. Y. 164, 106 N. E.2d 503 (1952). Sewer and water: City of Buena Park v. Boyar, 186 Cal. App. 2d 61, 8 Cal. Rptr. 674 (1960); Longridge Estates v. City of Los Angeles, 183 Cal. App. 2d 533, 6 Cal. Rptr. 900 (1960). Curbs: Petterson v. Naperville, 9 Ill. 2d 233, 137 N. E. 2d 371 (1956). Parks: Associated Home Builders v. City of Walnut Creek, 4 Cal. 3d 633, 484 P.2d 606, 94 Cal. Rptr. 630 (1971); Aunt Hack Ridge Estates, Inc. v. Planning Comm'n, 27 Conn. Supp. 74, 230 A.2d 45 (1967); Billings Properties, Inc. v. Yellowstone Co., 144 Mont. 25, 394 P.2d 182 (1964). Schools: Jordan v. Village of Menomonee Falls, 28 Wisc.2d 608, 137 N.W.2d 442 (1966).

32. ROBBINS, ZONING, PROCEEDINGS OF THE WORKSHOP ON SOLAR ENERGY AND THE LAW 15 (Am. Bar Foundation 1975).

33. Colorado Springs, Colo., Ordinance 13-21 and 22, pp. 590.13 to 590.16.1 (1970).

> The Santa Clara City Council has allocated $36,000 from its utility reserves to establish the nation's first "solar utility." Swimming pool owners in the city can contract with the city for a solar heating system for their swimming pools in the same way that they sign up for other utility services. For a $200 initial fee, the city designs, installs, maintains and guarantees the system, and the homeowner pays a monthly fee to the city for six months of the year, which is typically less than the monthly charge he or she has been paying for gas heating. The monthly rate is typically on the order of $30 for a home size pool and the systems are suitable for heating the pool six to eight months of the year in Santa Clara's climate. The rates are set so as to amortize the cost of the equipment, make the solar utility self-supporting and repay the initial capitalization from utility reserves at 7½ percent interest. Public response has been overwhelmingly positive and approximately 40 systems will be installed by the end of the summer (1976).[34]

The Santa Clara "toe in the water" approach is one way to prove that a solar utility can be self-supporting, whether used to heat swimming pools or home hot water.

In Colorado, the General Assembly appears to have given its blessing to municipal use or control of solar devices in the recently revised municipal title of the statutes; the first part of the article on utilities explicitly includes "solar systems" as within the power of cities to purchase or erect.[35] The enabling statutes providing for acquisition and authorization of "power works and distribution systems" also require an election before such systems are acquired or franchised. It is not certain that this statute would apply to the sort of modification to a customer's home required by a utility-financed solar water heating plan. These structures are not new

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34. Letter from J. N. Davis, Science Advisor, City of Santa Clara, Cal. (July 1976).

35. Colorado municipalities have the powers, including the following:

> 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.
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> . . .
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> 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.

COLO. REV. STAT. § 31-15-707 (a) (1), (e) (1973).

ventures, but are additions to an already existing power system. In either event, putting the program before the voters, after a clear explanation of its benefits for both utility and customers, would probably be wise. The proposal would depend on public acceptance for its success — if no one were willing to allow the utility to install a solar collector on his home, then no savings could result — and the greater measure of public participation that an election brings could draw more participants than might otherwise be interested in the program. If revenue bonds or anticipation warrants are used to finance the project, the bonds do not constitute an "indebtedness" of the city (and must so state on their face), and thus are free from the requirment of an election.[36]

VIII. FINANCING

Conservative financing could be used, with financing of the subsidiary not restricted by the provisions of the parent utility's bond indenture.[37] The Colorado statutes defining the general financial powers of municipalities permit the governing bodies of the municipalities to contract indebtedness on behalf of the municipality for "any public purpose."[38] No debt is created, however, unless the question of incurring it is put to the voters at an election[39] and it passes by majority vote. After the election and determination of passage of the bond vote by the governing body, and recording of that determination, an irrepealable ordinance shall be passed providing for the issue of the bonds.[40] The ordinance shall settle the form of the bonds. Interest on the bonds is to be paid out of general revenues, reimbursed by property taxes.[41] The advantage of issuing bonds, of course, is that the interest paid to the bondholder on these bonds is tax-exempt.[42] Since ownership of the solar heater would remain in the municipal utility, which is tax-exempt, the bonds would remain tax-exempt for the bondholder even if classified by the IRS as "industrial development bonds."

Bonds are required by the practical demands of the program: if the solar heater is attached to the customer's home, it would

36. *Id.* § 30-20-309 (1973).
37. *See* Rosenburg, *supra* note 8.
38. COLO. REV. STAT. § 31-15-302 (l) (d) (I) (Supp. 1975).
39. *Id.* § 31-15-302 (l) (d) (I) (Supp. 1975).
40. *Id.* § 31-21-104 (l) (Supp. 1975).
41. *Id.* § 31-21-106 (Supp. 1975).
42. I. R. C. § 103 (a).

become a fixture, part of the real estate. While a security interest could be perfected in the solar device by the utility under the Colorado UCC, it would be lost to the utility as a source of financing through mortgaging.[43] It would probably support, instead, the customer's mortgage by adding to the value of his property. Typically, mortgage bond indentures require use of bond proceeds to acquire only bondable property subject to the utility's mortgage, but the utility will probably not have a mortgagable interest in the devices under Colorado law. In any case, for the utility or its mortgage holder to take away the devices might cost more in labor than the value of the used devices would support. The solar heater might be worth less than the costs of the plumbing which would be an integral part of the structure. These limitations on mortgage financing suggest that the utility should turn to some form of bonds for the capital to finance the project.

There are three basic categories of long-term municipal bonds: general obligation bonds, revenue bonds, and improvement or assessment bonds.[44] General obligation bonds, one of the most flexible bond forms, must be backed by both the taxing power and by full faith and credit. This form of bonding is not available to municipalities in Colorado.[45] The third type, assessment financing, must support improvements that benefit both the public at large and the individual properties assessed, a condition that a solar program should meet. The funds for assessment bonds, however, come from assessments levied upon individually-benefitted properties;[46] since the virtue of the solar program is that it recognizes the wide extent of benefit that at first glance seems to benefit only those customers whose properties are improved, the use of assessments to fund those improvements would impose the costs on the wrong parties. If solar investments benefit all the customers of the utility, it would be a mistake to lay the burden of financing them on just those customers whose properties are the sites for the investments.

What remains are revenue bonds. In Colorado, this form of bonding is specifically approved for municipalities, under the name of "anticipation warrants." All "governmental agencies,"

43. COLO. REV. STAT. § 4-9-313 (1973).

44. WHITE, SANTA CLARA, CALIFORNIA, COMMUNITY CENTER, COMMERCIAL SOLAR DEMONSTRATION, LEGAL ALTERNATIVES, IMPLICATIONS, AND FINANCING OF SOLAR HEATING AND COOLING BY A MUNICIPAL CORPORATION 32 (Energy Research and Development Administration Contract No. AT(04-3 1083) (Sept. 1976).

45. COLO. REV. STAT. § 30-20-306, 309 (1973).

46. Ochs v. Town of Hot Sulphur Springs, 158 Colo. 456, 407 P.2d 677 (1965).

meaning all cities and counties, are authorized in this manner to fund "public projects," for "public purposes," which include but are not limited to water and sewer facilities. "Public project" means:

> lands, buildings, structures, works, machinery, equipment, or facilities suitable for and intended for use as public property for public purposes or suitable for and intended for use in the promotion of the public health, public welfare, or the conservation of natural resources, including the planning of such lands, buildings, structures, works, machinery, equipment, or facilities, and shall also include existing lands, buildings, structures, works, and facilities, as well as improvements or additions to any such lands, buildings, structures, works, or facilities.[47]

The generality of this language would certainly seem to include conservation investments, especially in the case of a city like Colorado Springs, which has already set up its own public utility. The language of this section has been interpreted by the courts, and is intended to extend the powers of a municipality beyond those things specifically enumerated to other things necessary to accomplish the purposes of municipal government.[48] The warrants themselves must be issued pursuant to resolution or ordinance setting forth the proposed project, the rate of interest, and the amount of warrants to be issued.[49] Payment of the principal and interest of these warrants may come out of a special sinking fund established by the municipal legislative body,[50] but the general income of the municipality may not be pledged for this payment, which must come out of the revenues of the project only.[51] Since the advantage of solar investments is that they naturally tend to increase the revenues of the utility as well as lowering the rates to consumers, by greatly decreasing the cost of fuel, this type of funding is especially appropriate for these investments. The wisdom of limiting municipal bonds to the revenue bond form is apparent after the nation-wide publicity

47. COLO. REV. STAT. § 30-20-301 (1) to (3) (1973).
48. Garel v. Board of County Comm'rs., 167 Colo. 351, 477 P.2d (1968).
49. COLO. REV. STAT. § 30-20-303 (1973).
50. *Id.* § 30-20-306 (1973).
51. *Id.* § 30-20-309 (1973).

given in the last several years to the financial difficulties of New York City, which pledged itself to repay far more than even the exercise of its taxing powers has been able to bear. In Colorado, another statutory provision allows for the acceptance of "donations or gifts" from any source "to be used in the best interests of such project."[52] This provision may permit Colorado municipalities which have begun to participate in such a program to benefit from federal largess aimed at stimulating conservation and solar use.

The question remains of how best to characterize the "revenue" that conservation investments create for the utility. Since on the face of it a customer who uses solar energy is paying less, not more money to the utility, the definition of "revenue" may need to be reworked to include the greatly reduced fuel costs that the entire utility enjoys as a result of the investments. To insure public acceptance, the utility will want to avoid use or connection charges to those customers who permit the solar devices to be attached to their homes. If the entire program is viewed in the same light as the construction of a new energy-producing plant, in this case broken up into a multitude of power plants in the attics of consumers, then the added revenue can more easily be recognized. Whenever a utility adds a new plant that saves it fuel costs while it continues to collect substantially the same payments from its customers, it enjoys additional revenues, which can be used to pay for the plant. Because the conservation investments are easier to visualize as revenue-producing if they are compared directly with a new power plant, it will be wise for the utility to operate the program through a subsidiary corporation or department, to which the fuel savings can be credited, and which can be seen to pay for itself.

The Colorado Springs Charter derives its authority from the Colorado Constitution, Article XX, Section 6, which permits cities with a population greater than two thousand to adopt charters, which become the organic law of those cities; the section also ratifies the Charter of Colorado Springs, which was adopted before the section was added to the Constitution. The city charter contains several sections that bear directly on the question of solar investments by utilities.

52. *Id.* § 30-20-307 (1973).

The city has the general power to:

> construct, condemn and purchase, acquire, lease, add to, maintain, conduct and operate, waterworks, light plants, power plants, transportation systems, heating plants, and any other public utilities or works or ways local in use and extent, in whole or in part, and everything required therefor, for the use of said city and the inhabitants thereof. . . and shall have the power to issue bonds upon the vote of the taxpaying electors, at any special or general election, in any amount necessary to carry out any of said powers or purposes.[53]

The general limitation on city indebtedness was increased in 1951 to ten percent of the assessed valuation of the taxable property within the city.[54] An exception is provided, however, for revenue bonds "issued for the acquisition, construction, extension or improvement of water, electric, gas, sewer, or other public utilities or other income producing projects from which the city will derive a revenue."[55] The state statutory limitation on the form of bonds available to the city is reiterated as follows:

> No bonds or other evidences of indebtedness, payable in whole or in part from the proceeds of ad valorem property taxes, or to which the full faith and credit of the City are pledged, shall be issued, except in pursuance of an Ordinance authorizing the same, and unless the question of the issuance of the bonds shall at any special or general election be submitted to the vote of such qualified electors of the City as shall in the 365 days next preceding the date of the Election have paid a property tax in the City, and approved by a majority of those voting on the question; provided, however, that the Council, pursuant to Ordinance and without an election, may:
>
> . . .
>
> (2) Borrow money or issue bonds for the purpose of acquiring, constructing, extending or improving water, electric, gas, sewer or other public utilities or income producing projects; provided, further, that said borrowing shall be repaid and said bonds shall be made

53. Colorado Springs, Colorado, City Charter, Art. I, § 2 (d).
54. *Id.* Art. VII, § 47.
55. *Id.*

> payable solely out of the net revenue derived from the operation of the utility, utilities or other income producing projects, or any or all thereof.[56]

The power to regulate rates is retained by the city council in terms broad enough to encompass conservation investments in the rate base.

> All power to regulate the rates, fares and charges for service by public utility corporations is hereby reserved to the people, to be exercised by them by ordinance of the council or in the manner herein provided for initiating or referring an ordinance. Any right of regulation shall further include the right to require uniform, convenient and adequate service to the public and reasonable extensions of such service and of such public utility works.[57]

Finally, the Department of Public Utilities is established, including the Division of Water Works, Electric Light and Power, Gas, and "any other public utility acquired by the city."[58] Provision is made for administering each of these divisions as an entity and for keeping their accounts separately. This scheme of separate accounts would facilitate the establishment of either a separate division of solar investment or an interior department within the gas or electric divisions, and would make clear that these investments paid their own way.

The charter requires that the net earnings of the Department of Public Utilities be used to pay for the operation of its divisions, and that any surplus goes to the general revenues of the city.[59] This provision has enjoyed some success, noted in the press. In 1975, the Department paid $2.8 million into the city's general revenue fund, estimated to be about $1.5 million more than a privately-owned utility would have paid.[60]

The ordinances of the City of Colorado Springs do not appear to include any provision that would bar the use of conservation investments as part of the service offered by the Department of Public Utilities. The rates for various types of service —

56. *Id.*
57. *Id.* Art. XII, § 65.
58. *Id.* Art. XII, § 79 (a).
59. *Id.*
60. *Colorado Springs Has a Better Idea,* ROCKY MTN. J. (Apr. 6, 1977).

residential, commercial — are set directly by ordinance, without any declaration or limitation on what particular items may or may not be included in the rate base.[61] The Department is to "include in its administration all properties, rights, and obligations of the City that shall be employed in or related to the said Department and shall, as far as is practicable, be administered as an entity."[62] The independence of the department is a practical requirement of the demands of revenue bonds: if an enterprise is obliged to pay for itself, then its books will most easily be kept separately from other enterprises.

IX. CONCLUSION

There does not, generally, seem to be any insuperable bar to the city's using solar investments as a part of its utility service. The state General Assembly has given as explicit approval as could be asked in its endorsement of "solar works" for operation by cities. The city itself could eliminate all doubts by passing an ordinance directed specifically at solar investments, or by one generally including solar collectors among the definitions of "income producing projects" in the city charter. It is hoped that Colorado Springs could serve as an example for other utilities for which the development of solar energy would be feasible. The aim of the program is to bring to the customer's attention the fact that conservation of energy by anyone benefits everyone else served by the same utility; and to put this fact to practical application in spreading the costs, as well as the benefits, of solar use.

61. Colorado Springs, Colo., Ordinances, Ch. IX, Art. 3, § 9-9.
62. *Id.* Art. I, § 9-1.