Chapter VI

LEGAL AND REGULATORY ASPECTS OF ONSITE SOLAR FACILITIES

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INTRODUCTION

Onsite solar facilities are controlled by laws and regulations often written with entirely different energy systems in mind. That being the case, this study finds surprisingly few barriers to large-scale installation and operation of onsite solar facilities. Existing legal barriers are almost entirely inadvertent.

These barriers can delay the introduction of solar equipment, but in most cases they can probably be removed with routine regulatory action. Resistance to changes in zoning or building codes, for example, generally arises when an interested party will be adversely affected. It is not likely that builders, owners, labor unions, or public officials will perceive onsite solar generation as a threat.

The exceptions to this generally optimistic conclusion are the laws and regulations governing public utilities. Most statutes and regulations governing energy generating equipment assume that energy would be supplied primarily by large regulated utility companies which would enjoy a "natural monopoly" in a given region. If small facilities become economically competitive, however, the only natural monopoly may be systems for transmitting and distributing energy. It is important to notice that most of the regulatory issues raised in connection with small solar energy devices also apply to conventionally powered on site cogenerating equipment.

Application of existing utility regulations to onsite energy systems is frequently ambiguous, sometimes contradictory, and occasionally inadvertently discriminatory. Problems can arise if utilities attempt to own and operate onsite equipment, and if organizations other than utilities attempt to generate solar energy for sale. Regulations governing the rates charged by utilities for backup power and the price at which they will be willing to purchase onsite power generated in excess of onsite needs can have an enormous effect on the cost of solar energy computed by nonutility owners of solar equipment.

Existing rate structures, however, have been designed without attention to the problems of solar equipment and the analytical basis for determining equitable rates is only beginning to be established. Although regulated natural gas prices were designed to benefit gas consumers, the policy tends to reduce the attractiveness of solar energy devices.

How these ambiguities are resolved can have profound effect on the future of the solar energy industry. Regulations can affect the designs chosen and patterns of ownership, and they can serve to retard, stifle, or stimulate the development of the industry. It is clearly an area where doing nothing could translate into a policy of restraining the growth of the solar industry.

SOLAR RIGHTS: PROTECTING ACCESS TO SUNLIGHT

INTRODUCTION

An investment in a solar installation must be considered insecure unless the owner can be assured that the collectors will not be shadowed by new construction or vegetation during the useful life of the equipment. Protecting this access to sunlight can be difficult, since no property owner in the United States has an absolute legal right to sunshine.[1] If procedures to ensure some such protection cannot be developed, concern about "sun rights" could present a major barrier to the use of solar energy, It may not be easy to provide such protection in densely populated areas or in areas graced with large trees, In some cases–particularly older residential neighborhoods — it may be impossible to ensure access to sunlight for all buildings. A considerable amount of protection can be provided, however, with imaginative use of existing laws, zoning ordinances, and covenants; it seems unlikely that additional Federal legislation would be able to contribute usefully to the resolution of these problems.

EXISTING LAWS: ADEQUATE SUN RIGHT PROTECTION?

New Development

Imaginative work is needed to determine how best to use existing laws. Although local governments are able to help protect sunrights, under existing statutes this power usually is not used to help solar equipment owners.

ZONING

The power to zone can literally shape a community from broad outline to minute detail, The zonin$_g$ authority power is broad enough to enable States and municipalities to assure solar access in new subdivisions, shopping malls, industrial parks, and small community developments, Existing zoning regulations may direct the purpose for which land may be used, control building heights and orientation, and govern lot sizes, yard requirements, the appearance of buildings, property, and secondary structures.

If maximum use of solar collectors is desirable, it may prove useful to adopt mandatory minimum or uniform height regulations similar to rules that now limit building heights. ' Since zoning laws generally allow underdevelopment, problems are foreseeable. For example, if a property owner in an area zoned for 16-story development builds only a 4-story building, shading problems could ensue. Perhaps economic incentives will make such cases rare.

RESTRICTIVE COVENANTS

The numerous local building covenants and architectural review boards provide another opportunity for protecting sun rights in a community but may also present problems for solar equipment. These covenants are private legal devices which are typically in the form of reciprocal promises in each deed of a subdivided tract. They can be used to provide detailed guidance about the kinds of architecture and the building materials which will be permitted in the region covered. Since many early solar collectors are likely to be ungainly (if not outright ugly), it is possible that the use of solar devices will receive unfavorable treatment by local organizations reviewing compliance with the building covenants. The problem is likely to become much more difficult if tracking collectors begin to enter the market in significant numbers. The unattractive appearance of the inexpensive solar water heaters in Israel has apparently presented a major problem for manufacturers in that country, and there are isolated

' *Fountainbleau Hotel Corp. v Forty-five Twenty-five, Inc., 114 So.* 2d 357,181 Fla Supp 74 (1959)

* Such a law may guarantee each structure enough sunlight for a hot water heater or other roof collectors, but would obviously not meet the needs of vertical solar collectors (including windows) that are part of a structure's wal ls

instances of local opposition to rooftop solar systems **in the United States. It r-nay be useful to anticipate the problem and develop regulations which would permit solar facilities** in which some care has been taken to minimize pipe-farms on rooftops while permitting enough flexibility **in design to ensure efficient performance of the equipment. Clearly, there will have to be some compromise between performance and aesthetics.**

The advantages of using restrictive covenants as a means of protecting sunrights are threefold: (1) covenants can be used to thwart impending interference of solar access (usually by injunction) before construction begins, thus assuring a continuous supply of sunlight; (2) they cost the Government nothing; and (3) State or local governments could encourage or require their use in new developments.

EXPRESS EASEMENTS

Express easements provide another private legal device to protect access to sunlight in both new and existing developments. An easement confers the right to use (not possess) specified parts of another's property for a special purpose. A property owner, concerned about shading, could bargain with a neighbor for an unimpeded path of sunlight over the neighbor's land. Easements, which may also be leased, are binding on subsequent owners of both parcels **in many States, but in others new legislation may be necessary to assure continuity of access to sunlight. Something of value is traditionally given in exchange for land (although some courts don't require it), and the agree**ment must be in writing to be enforceable.

if a State views easements for light and air as benefiting a person (i. e., "in **gross") rather than a parcel of land, the State may not enforce the agreements against subsequent** owners, although a subsequent **owner probably could, To attain enforcement, a State can enact a short, simple statute stating that such easements must include the vertical and horizontal angles over adjoining property; terms and conditions of the grant; and any** compensation to be paid to any party in**volved. The legislation should also assure the recording of express solar easements along with other land records.**

Colorado has already enacted such legislation, and Florida, Maryland, and Arizona are considering nearly identical bills.

The advantages of express easements are: they cost governments almost nothing; they allow highly motivated individuals to act on their own; they may offer more protection than zoning laws, which can be changed; and they are adaptable to specific needs of different property owners.

Disadvantages are their transfer with the sale of land cannot be forced, their cost is uncertain, enforcement through the courts could be costly, and the would-be owner of a solar structure must bear the entire cost of an easement.

LAND-USE PLANNING

Commonly used techniques that could promote solar utilization in new developments include comprehensive city or county plans, energy impact statements, and flexible zoning techniques.

Many States use comprehensive plans to guide long-range policy in local zoning. Some State courts require that local zoning agree with a comprehensive plan. At least two States have considered including solar energy elements in their comprehensive plans.

Nine States require that environmental impact statements discuss the effects of projects on energy consumption — two require analysis of measures to conserve energy resources,[2] The developers of large tracts of land must usually file impact statements under State laws, and this procedure might be used to assure consideration of solar **energy utilization. Colorado has considered**

[2] Corbin Crews Harwood, *Using Land to Save Energy* (Cambridge, Mass Ballinger Publishing Co , forthcoming)

such a bill.[3] The same Colorado bill would require that subdivision regulations include standards and technical procedures for solar use.

Flexible zoning techniques include planned unit developments (PUDs) and bonus or incentive zoning. Only a few States specifically authorize PUDs, but some communities use this technique without State authorization. This concept relaxes zoning requirements and allows builders to offer layout, building design, and uses as a single package.

To obtain approval of their plans, developers could be required to indicate where shadows would exist and to justify designs that would create shadows. Bonus or incentive zoning offers governmental rewards in exchange for a developer's inclusion of design elements otherwise not directly required by zoning.

Transferable Development Rights

A much-discussed but little-used approach to land-use planning called transferable development rights (TDR) is uniquely suited to protecting solar access.

Under the TDR concept, rights for development conferred on lots by zoning codes are transferable and can be sold independently of the land. Property owners could sell development rights that they could not exercise because of solar restrictions. For example, the owner of a commercial property that adjoins a neighborhood of single family homes might sell the right to build a tall building to the owner of a lot where a tall building would not cast shadows on solar equipment. Under this concept, a municipality can be a buyer-of-last-resort for development rights in cases where it is necessary to protect access to sunlight for solar collectors The main advantage of the TDR concept is that it permits a municipality to police solar access rights and avoid unconstitutional taking of property without compen sat ion.

' (010 H B 1166(197'6)

The Los Angeles Department of City Planning concludes that its code may be adequate to protect solar access in developed as well as new neigborhoods,[4] Transition neighborhoods, where new commercial development is allowed alongside older residential sections, will be one of the most difficult areas in which to protect solar access. If a newly zoned commercial area is south of an older residential neighborhood, the taller buildings may cause shading problems. Los Angeles zoning regulations deal with this by limiting new structures in such areas to six and three stories, "steppin, down" heights gradually to avoid sharp contrasts between old and new development. [5]

Existing Developments

Assuring the protection of sunrights in neighborhoods can be a difficult problem. Many existing buildings in older commercial areas probably could not be adapted to use solar energy unless basically rebuilt, which means the demand for solar access in these areas may be small. Clearly, it would be desirable to consider solar access when an entire area is to be redeveloped, or even when individual permits for remodeling are issued,

Probably the strongest available technique for protecting sunrights in existing developments is the purchase of solar easements. It may be possible (for a price) for a prospective solar owner to purchase an easement that will require his southern neighbor to cut trees to provide access to sunlight.

SHOULD THE FEDERAL GOVERNMENT ENACT NATIONAL SOLAR ACCESS LAWS?

The Federal power to regulate commerce and provide for "the common defense" is

[4] Charles S Rozzellee, Property Owners' *Rights* to *Sunlight,* Los Angeles Department of City Planning, City Plan Case No .26110 (1976), see p 14

[5] I bid , p 12 An administrative problem could arise if the city were flooded with applications for these special zones

apparently broad enough to **allow Congress to adopt policies protecting the use of solar energy if it so desired.** [b] It **is probably not necessary (and may even be unwise), however, for the Federal Government to intervene in protection of individual access to solar** energy

Solar rights laws will have to be adapted to local conditions, no matter where drafted The variables that must be considered **in access laws include topography, latitude, availability of alternative energy sources, long-term regional growth plans, impacts of past and present zoning laws, and even the relationship of streets to sunlight patterns.**

It is possible, however, that State or Federal encouragement will be needed to motivate local governments to incorporate solar access into their statutes. One expert estimated that only 5,000 of 60,000 jurisdictions with power over land use exercised zoning powers in 1974 [7]

While preemption seems unnecessary, an appropriate Federal role might be a national policy set by Congress. For example, the existence of solar access laws could be a factor in choosing locations **for federally owned, funded, or operated structures. Solar access criteria could be added to the Department of Housing and Urban Development's (HUD) Section 701 Community Development program, which provides financing for land-use planning.**[8] **The overall aim of this program is compatible with the encouragement of solar-access planning, since it is designed to encourage "a more rational utilization of land and other natural resources and the better arrangement of residential, commercial, industrial, recreational, and other needed activity centers, "**

STATUS OF STATE LEGISLATION

A variety of legislation has been proposed on the State level. A bill in Massachusetts (Senate No. 269, 1977) uses the building permit system to protect sunrights. Under this proposed law, those wishing to erect active- or passive-type solar energy units would have to reasonably locate and angle their equipment to minimize the possibility of future interference with it, To get a building permit, the equipment also would have to be reasonably sized relative to the structure. The remaining problem of vegetation in adjoining property would have to be solved by express easement. In land zoned for developments for four stories, the municipal plan-

[b] *Wickard vf I/burn,* 31 7 U S 111 (1 942), a person growing wheat on his own land tor home use — a noncom m ercialactiv ity — w astound to have enough effect on interstate commerce to come under the Congress' power

[7] Peter Welt, *The* Future *of the City New Directions in Urban Planning (New* York Wa tson-Guptill Publications, Whitney Library ot Design, 1974), p 149

[8] Criteria specifically referring to solar access could be a dded to H U D's Section 701 Community Development progra m, which provides financing for land-use planning that meets certain criteria Sect lon 701(c) *ot the Housing* Act of 1954 (as amended by the *Housing* and Community Development Act of 1974) says that fund swill on l y be ava il a b l e to ap pl i Ca n t s who have on go ing co m prehensive p l a n n ing p rocesses that inc l ude both a housing element and a l and use ele m e n t The overall a l m of t h is program is compat I-ble with the encouragement of solar-access pl ann ing, sin ce it hopes to enc ou rage "a more rat ional utili za-tion ot land and other natural resources, and the bet-ter arrangement of resi den t ia1, com m er Cia 1, ind u s-tria 1, recreationa 1, and other needed act i \ ity centers "

The regulations accompanying the 701 program (Title 24, part 600 — Comprehensive Planning Assistance) halve been amended to emphasize energy concerns Section 60072 now states that in selecting priorities, each recipient should consider

(,2) Projections of land use needs and land resource d e v e l o p m e n t including energy fac i l i t ies siting needs

(7) The conservation of energy through land use strategies des igned to reduce energy consumption and the development of policies designed to fac i l i tate the rec overy of energy resources i n a manner compatible with environmental I protec tion

" Energy facilities siting needs" could be interpreted to include "talc i l ities" as small as an array of solar collectors on the roof of a single structure, but a more exp l i c it statutory consideration of sol a r energy needs is rea ll y needed

42 u s C 5301 (c) (5)

ning agency and the municipal governing body would have to approve a proposed solar structure. Before a nonsolar structure could receive a building permit under this legislation, the records would have to show that there was no interference with an approved solar collector.

A Minnesota bill suggests a very different legal approach (Minnesota H.R. 2064, 1976). It would simply grant solar easements to any collector owner. Anyone erecting an object shading the system would have to pay the solar homeowner three times the actual cost of implementing an alternative energy system. Although the penalty section is intriguing, this bill has many problems, including vagueness and unfairness based on the first-come, first-served basis of the law.

Colorado legislation would forbid property owners from allowing their trees and shrubs to grow enough to shade solar collectors between 9 a.m. and 3 p.m. [9] But it is an attempt to deal with the serious problem of vegetation, and the specific times listed in the legislation give property owners a clearer view of their rights than a vague protection of "sunlight necessary for the operation of solar equipment. "

The tiny town of Kiowa, Colo., has enacted a law declaring shadows on collectors to be public nuisances. This nuisance approach could present several kinds of problems: no certainty of protection would exist before a collector was installed, tangled complexity of the nuisance law, and costly lawsuits would be required to settle disputes.

Law journal articles suggest applying water laws used in the West — the prior appropriation doctrine — to solar access, and reviving the old English doctrine of ancient lights [10] [11] No State has, to date, followed either of these suggestions, both of which would require extensive litigation, provide no compensation to the injured solar users, and were not drafted specifically for solar applications.

BUILDING CODES AND SOLAR SYSTEMS

INTRODUCTION

Building codes, specifically applicable to hot water and space heating, air-conditioning, and electrical equipment, seldom contain provisions covering onsite solar systems. Code problems do not appear to have been a major barrier thus far, but it is clearly possible that uncertainty on the part of code officials resulting from a lack of information about solar devices and a shortage of standards and certification procedures for solar systems could result in fragmentation of the solar market, delays, additional expenses, and uncertainty to the builder or owner in the permit application and process. There are, as a result, compelling reasons for enacting mechanisms for inspecting solar equipment similar to those in effect for other heating, cooling, and generating equipment installed in residences or commercial buildings.

The Federal Government, in a HUD demonstration program, developed standards

[9] Colorado S B 38 (1976)

[10] Mary D White, "The Allocation of Sunlight Solar Rights and the Prior Appropriation Doctrine, " *University of Colorado Law Review 47 (1976) See* the extensive reviewin the E nvironmental Law Institute's (ELI) *Legal Barriers* to Us/rig *Solar Energy for Heating and Cooling f?ui/dings,* which was contracted for by the Energy Research and Development Administration, and is an early effort in this direction It is available from E L I (1 346 Connecticut Ave , N W , Suite 620, Washington, D C 20036) for $750

[11] Lawrence Kressel, *"Hanson v Salishan Properties, Inc.,* Preservation of View– Limitations as to Height of Improvements and Architectural Control in Uniform Long Term Lease, *"Env. Law5(1974)* 183

that could be used as models for incorporation in building codes. Certification that solar systems meet those standards could be delegated to approved testing agencies, thereby expediting the building permit process for solar users.

DO THE MODEL BUILDING CODES COVER SOLAR SYSTEMS?

The three most widely used model building codes are:

- The Basic Building Code of the Building officials and Code Administrators (BOCA), found mostly in the East and Midwest;
- The Uniform Building Code of the International Conference of Building Officials (ICBO), found mostly in the West; and
- The Standard Building Code of the Southern Building Codes Conference (SBCC), found mostly in the South.

According to a 1970 survey of local building departments, 63 percent of the 919 cities that had building codes of any kind used one of these three model codes. [1]2

The most widely used standards for electrical wiring and equipment are those of the National Electrical Code of the National Fire Protection Association. Although no exact figures are available, it appears that these electrical equipment standards are even more widely used than any of the three major model building codes. The electrical standards are adopted by reference in the BOCA code (Section 1500.3), but not by the other two model codes.

Building codes define terms, set standards for materials and equipment, describe how materials and equipment may and may not be put together, and provide for enforcement through permits and inspections. Standards generally are either specification standards, which identify materials and equipment that may be used in construction, or performance standards, which set standards that materials must meet. Specification standards are easier to administer, but are inflexible. Performance standards are more flexible, but require more trained personnel, time, and money to administer.

Building codes regulate nearly everything that is constructed or built on land, with few exceptions. Before granting permits for construction, remodeling, or repairs, building officials decide whether plans conform to code requirements. If a plan proposes use of materials and methods that are specifically covered by a building code, approval is routine. If a plan calls for innovative materials or techniques, however, a building official has the discretion to require testing of materials and submission of evidence that the resulting structure will not be inferior to a traditionally built structure.

Most building officials display wide latitude in approving or rejecting materials, equipment, and methods not specifically provided for in the codes. If alternative materials or techniques are to be used, building officials must be satisfied that the resulting structure will be at least equal in strength, fire resistance, safety, quality, and effectiveness to structures assembled with materials and techniques specified in the code. I n such case-by-case showings, applicants may be required to pay for testing at facilities chosen by the building officials, using methods approved under the codes or chosen by them.

For most kinds of construction materials and equipment, nationally recognized standards, test methods, and testing agencies are specified in the codes. Two examples are the Underwriters Laboratories, Inc., for electrical equipment, and the American Gas Association, for gas equipment, For solar energy systems such nationally recognized standards, test methods, and listing agencies do not exist.

Under al I three model codes, heating, ventilating, and cooling appliances must be ap-

[1] Charles G Field and Steven R Rivkin, The Elul/ding Code Burden, Lexington, Mass D C Heath and Co , Lexington Books, 1975, p 43

proved by building officials or carry the label of an approved testing agency or laboratory. A "heating appliance" is presently defined in all codes as a device that generates heat from sol id, liquid, or gaseous fuels, or with electricity, Solar sources are not mentioned, nor are they included in the definitions of ventilating or cooling appliances. In addition, there is no agency to certify compliance and attach labels to solar equipment, nor is there a nationally recognized set of standards on which to base compliance. Solar heating systems are therefore at a potential disadvantage as compared to conventional systems, which can be approved for installation with a simple showing of a label.

Other possible impediments to the use of solar facilities include code requirements for maintaining rather high minimum building temperatures in cold weather, and formulas for determining window sizes. Limitations on awning and roof overhangs may interfere with some passive solar designs. Standards for prefabricated assemblies may result in costly tests to demonstrate weather resistance.

More potential problems include limitations on residential building heights that may preclude roof collectors, chimney and plumbing clearances, application of new standards to remodeling of old buildings, and implied prohibitions against using solar collectors as integral parts of a structure's roof or walls,

WHAT SOLAR SYSTEM STANDARDS ARE NEEDED?

The only unique component of solar heating, cooling, and generating systems is the collector. Once heat is collected, or electricity is generated, it is transported, stored, and utilized by the same type of equipment used in conventional systems. Standards for pipes, ducts, valves, storage tanks, controls, wiring, storage batteries, and other components already exist, even though their use in a solar energy system was probably not contemplated when the standards were written. The primary requirement for new standards is for solar collectors, including photovoltaic and focusing devices.

Problems could result from novel usage of equipment and materials presently covered in the codes, involving risks of leakage or explosion from excessive temperatures, high pressures, corrosion, and other component failures. Standards should address these and other risks, including human contact with hot surfaces or broken glass, contamination of drinking water with toxic coolants if plumbing is not properly installed, and damage to collectors from high wind or heavy snowfalls,

These risks would be relatively low in systems designed for low-temperature uses, such as heating buildings or drying grain, but could be higher in some proposed solar electric systems. Building codes must be amended in ways that apply different standards for material and equipment according to the *use* of the solar energy facility.

WHAT POSITION HAVE BUILDING OFFICIALS TAKEN ON SOLAR FACILITIES?

Few builders have reported difficulties in obtaining building permits to construct solar facilities. The major problem with codes may prove to be an overly lax inspection resulting from untrained inspectors rather than codes so strictly written that they interfere with sound solar engineering. Building codes expert Steven Rivkin has said that, "Rather than serving as a retardant, existing building codes have no bearing at all on the development of solar systems.''[13] It is possible that building officials will continue to look with favor on solar energy systems, and not rigidly enforce codes.

As solar energy systems gain in popularity, some kind of additional code require-

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' ' AIA Research Corporation, *Early* Use *of Solar Energy In Buildings,* 2 Vols , Washington, D C , August 1976, 211-32

ments will need to be developed. Without specific coverage in model building codes, however, local interpretations of plans or requirements for costly testing could fragment a potential market, result in higher costs of solar devices built to meet the strictest standards found anywhere, and delay building and construction of solar systems.

All appliances face this problem at some time, and the solution has been nationally recognized standards and testing procedures for the various models of equipment and materials Applying the same procedure to solar equipment would put solar energy systems on the same footing as other heating and electric systems

Most building codes are enforced at the local level, often with guidance from State laws but seldom with intervention at the Federal level. As has been noted, where codes are in effect, the majority of communities adopt and adapt the model building codes. The first step toward assuring acceptance of onsite solar facilities as standard equipment is to draft a model set of standards for inclusion in the major building codes. The second is to designate a testing agency to certify performance of solar energy systems.

The effort to develop national standards could be coordinated by the Federal Government There is precedent for this, including an ERDA contract with the National Conference of States on Building Codes and Standards to develop a model code for energy conservation in buildings.

The Federal Government has already developed standards for commercial and residential solar facilities as part of a solar heating and cooling demonstration program administered by HUD. These standards, or some variation of them, are available for incorporation in building codes.

A final Federal role in amending the codes would be to encourage State adoption of standards for solar equipment Federal legislation mandating, encouraging, or providing incentives for State regulations or standards for solar equipment would function within Congress' power to regulate interstate commerce,

Certification is another matter. Federal efforts to certify solar appliances under its HUD standards met with some criticism, and the Federal Government has traditionally been reluctant to favor one commercial product over another. However, because some approved testing agency must be designated as the solar industry grows, the Federal Government might provide seed money for expanding an existing testing agency or creating a new one.

State Standards

States can write their own solar equipment standards, with variations based on State and local conditions, provided that they do not unreasonably burden interstate commerce, One approach would be to adopt standards similar to those already drafted by the Federal Government under the HUD program, on an interim basis, until private-sector standards have been approved. A recently enacted Minnesota law takes this approach, It requires a State agency to promulgate standards for solar heating and cooling systems based on current interim Federal criteria. 14 The law also requires State administrative agencies to update State standards as new Federal standards are adopted or as new technology dictates.

State Certification

States will want to assess the suitability of solar equipment as to safety, health, structural strength, and adaptability to State or local building codes. The Florida Solar Energy Center in Cape Canaveral already is testing and certifying the thermal performance of collectors sold in that State As an interim measure, State certification can provide local building officials with guidelines until a national testing and certification program

[14] Minn Stat §116 H 127 (1976)

can be put in place. Some States may wish to go beyond furnishing guidelines, and can write laws that require local building officials to approve solar equipment that meets State standards and is certified by State agencies.

ONSITE SOLAR FACILITIES AND PUBLIC UTILITIES

INTRODUCTION

State laws and regulations governing the relationships between public and private utility companies and the owners of onsite generating equipment are complex, and frequently ambiguous, largely because these problems have seldom been addressed by regulatory commissions. In the small number of cases where utilities and industries exchange electrical power or process heat, contracts have generally been written in ways benefiting both parties so that no lawsuits have been brought forcing the courts to rule on ambiguities in the law.

The following discussion examines the statutes and regulations that now govern relationships between public utilities and onsite generators of solar energy, and outlines areas where ambiguities exist. It is an attempt to highlight areas where major regulatory problems may exist.

State regulation through State public utility commissions is the primary issue. Federal power authority has been limited to regulation of wholesale rates of interstate sales of electricity, and siting of hydroelectric facilities, and is of less concern in the following analysis. The onsite solar systems, by the very definition of "onsite," are seldom involved in interstate, wholesale sales, although power sold to a utility grid may reach interstate commerce.

UTILITIES: DO RATES OR SERVICE PRACTICES DISCRIMINATE AGAINST ONSITE SOLAR USERS?

Perhaps the most crucial question in utility regulation is whether utilities may adopt rates or service policies that unfairly discriminate against solar customers requiring utility power as backup.

The answer appears to be that current laws will permit discriminatory rates for solar customers if the utility can prove that the cost of providing service to solar customers exceeds the cost of providing service to other customers. Although it cannot arbitrarily set prices or refuse service in an effort to eliminate competition from solar devices, the burden of proving such discrimination may fall on the solar customer.

Difficulties are likely to occur only when an electric utility is involved since gas utilities would, in general, not be adversely affected by a need to provide backup service to onsite facilities. Calculating a rate for both the purchase and sale of electric energy to a utility is an extremely complex problem. The technical and economic bases for such rates are discussed in detail in chapter V. The present chapter focuses exclusively on the legal and regulatory mechanism for setting rates.

Conventional Rate Structure

The price a consumer pays for electricity seldom directly reflects the cost of producing it. In the absence of widespread time-of-day metering, billings usually are based on formulas that allocate peak costs of energy and total monthly consumption according to the historical demand patterns of different categories of customers.

The most common residential electric rate is the "declining block rate, " under which customers are charged a fixed fee for monthly service, with declining rates for each incremental block of energy consumed

beyond the amount **covered by the fixed** fee. For example, the formula might call for a charge of $3 for the first kilowatt hour (kWh), $004 per kWh for the next 100 kWh, and $0.03 per kWh for the next 200. (Examples of actual rate schedules in several cities are listed in **volume I I.) The declining block rate was introduced when marginal costs for electric utilities were declining and utilities were encouraging customers to use more electricity.**[15] **Another frequent practice, designed to increase sales of electricity, is to reduce rates if a house or commercial building is "al I electric. "**

Utilities justify using these rates in today's market by arguing that all-electric customers are more likely to use electricity during the night for heating and cooling than are other types of residential customers, who use electricity for lighting and other purposes during peak hours. '6 The wisdom of continuing a promotional rate schedule in a period of **declining energy reserves, however,** has been seriously questioned in many quarters. President Carter's proposed National Energy Plan would have flatly **prohibited declining block rates.**

Declining block rates can discourage the use of onsite solar power because a large part of a customer's utility bill is based on the first few kwh delivered, power which would probably not be replaced with solar energy.

Larger utility customers are frequently charged on the basis of their peak demand during some specified period. **Such rates are designed to achieve a more direct relationship between consumption and the net generating capacity that must be installed to meet the customer's requirements, Techniques for determining peak demand vary greatly. Some utilities charge according to the peak demand during the previous 6 months, some take the lesser of monthly peak demands, and some percentage of annual demand, and others charge on the basis of spot measurements of demand made without advance notice.**

The impact of such demand rates on customers with onsite facilities can be very great. In some cases, a demand charge could be so high that a purchase of energy at high rates, when onsite equipment failed or when cloudy weather persisted, could negate any savings attributable to the onsite equipment for an entire year. The justice of such charges is a difficult issue to resolve, Providing power to backup random failures of onsite equipment among a large number of small customers can clearly be managed without a large increase in a utility's generating capacity. Relatively high backup charges might be justified, however, if all of these customers abruptly demanded backup power during a prolonged stretch of adverse weather.

Still another rate structure is designed to provide standby service to customers who do not use electricity under normal circumstances, although these rates would not apply to solar customers under the current definition of "standby power.'" [7] **If the definition were changed to cover onsite facility owners, however, the high minimum monthly charge associated with standby rates would not be advantageous to customers with onsite solar facilities,**

Some utilities have considered applying demand charges to residential customers to cover some of the market losses that would be inevitable with widespread installation of onsite solar generators. One such proposal by the Public Service Co., a Colorado utility, was fiercely opposed by solar customers, [18] [19] **who calculated that under such a**

[15] See Berlin, Cicchetti, and G illen, *Perspective on Power,* chapters 1-3

" Letter insertin monthly bill from Potomac Electric Power Company, January 1977

[17] See, for example, Southern California Edison's rate schedule **#5** (standby rates)

[18] Testimony of James H Ranniger, Manager of *Rates of Regulation* for the Publ ic Service Company of Colorado Colorado Public Utilities Commission Investigation and Suspension Docket No 935, Sept 25-26, 1975

[19] Testimony of Dr Ernst Ha bict, Jr , and Dr William Vickery for the Environmental Defense Fund, Colorado Public Utilities Commission Investigation (Op cit)

rate structure a solar heating system that reduced energy requirements by 70 percent would reduce electricity bills by only 35 percent.[20] The Colorado Utility Commission initially granted the utility's request for the rate change, but reversed the decision following a rehearing and ruled that the issue was sufficiently complex to be addressed in a generic rate hearing. " 22

Lifeline rates have been adopted in a few States. " Under this system, the charge is low for the first units of energy. The goal is to ease the burden on low-income consumers.[24] This rate may incidentally benefit solar users whose needs for supplemental sources of energy are small enough to fall within the "lifeline" amount.

A final type of utility pricing is interruptible rates, This traditionally has been available only to industries willing to accept the risk of service interruptions in return for lower costs, Some studies have pointed out that a solar user willing to accept the risk of going without utility service on infrequent occasions could save the utility substantial amounts in capital requirements, justifying a lower rate. I f the peak occurred only rarely, this alternative might be considerably less expensive than additional units of storage or collector area. 25 The National Energy Plan proposes that utility companies be "required" to offer interruptible rates to all customers. [26]

Selling Energy to a Utility

As of today, few utilities are willing to purchase power from customers, although special arrangements have been made with several large industrial customers.[27] I n some cases, the price the utility pays for surplus power reflects only the cost of the fuel the utility would burn to generate an equivalent amount of energy. I n other cases, the price reflects both fuel costs and the cost of equipment the utility would have to install to generate the power. However, there are so few arrangements for sale of surplus power that clear patterns are difficult to identify.

Southern California Edison Co., for example, recently proposed a rate schedule under which it would buy energy from large industrial customers at "the lowest cost of energy provided by any generating equipment in the Bonneville Power District."[28] This is about 3 mills per kwh, a rate that reflects a minimum energy displacement fee. However, in the same proposal the utility offered to purchase energy from a limited number of residential and small commercial facilities at a rate that is essentially identical to the rate the utility charges residential customers. 29

The Gemini Co., which sells devices to connect onsite wind generators and other equipment to utility distribution lines, iden-

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[20] Gary Mills, "Demand for Electric Rates A New Problem and Challenge for Solar Heating, " *ASH RAE Journal,* January 1977, p 42

[21] In the matter of proposed Increased rates and charges contained in tariff revisions filed by Public Service Company of Colorado, Decision No 87460 (Colo. Pub UtilComm'n, Oct 21, 1975)

[22] Home *Builders Ass'nof Metropolitan Denver v Public Serv Ice Co of Colorado,* Decision No 89573 (Colo Pub UtilComm'n, Oct 26, 1976)

[23] *E g,* Miller-Warren Energy Lifeline Act, 1975, Cal Stats ch 1010 For other examples, *see* Energy Users *Report* (BNA), Dec 16, 1976, p A-25

[24] See "Lifeline Rates – Are They Useful?", *Energy Conservation Project Report, No 4* (January 1976), p 13 (*ECP Report* is a publication of the Environmental Law Institute, Washington, D C) Some authorities question whether the lifeline concept is an effective method to aid lower income groups since these persons often consume relatively high amounts of energy

[25] Feldman and Anderson, *Utility Pricing,* p 120

[26] National Energy Act, Section 513

[27] Thermo E lectron Corporation, *A Study of /rip/ant Power* Generation *in the Chemical Petroleum Refining and Paper and Pulp Industries, June 1976,* U S Dept of Commerce, NTIS PB-255-659

[28] Southern California Edison rate schedule changes proposed in a letter to the Cal ifornia Public Utilities Commission, Feb 2, 1977

[29] Southern California Edison, op cit., Experimental Schedule DC and AC

tifies widely varying patterns of proposed surplus-power prices. Some New England utilities are willing to buy electricity at their own sales price because fuel represents a large fraction of their overall costs. Utilities with low baseload fuel costs have been more reluctant to buy surplus power. [30]

Regulations Covering Discrimination

The rates just described were, except for Colorado, not designed to discriminate against solar equipment, although their impact is not diminished by the lack of an intent to discriminate.

One of the major purposes for public regulation of electric utilities is the prevention of unreasonable discrimination or undue preferences. [31] Nearly every State has a statute prohibiting conduct that favors one class of customer while harming another. Typical statutes proscribe policies that are "unreasonable," "unjust," "undue," or "unlawful.''" Discrimination is a question of fact to be determined on a case-by-case basis by the State utility commission, and it is very difficult to predict precisely how any given discriminatory practice will be analyzed,

As the previous chapter showed, determining fair rates for electric utility power is an extremely difficult process. Uneven solar demands on the utility can result in relatively poor utilization of expensive generating and transmission equipment, but it must be recognized that demands imposed by many nonsolar customers are also very irregular; the only fair measure of the cost of providing backup power to an onsite solar facility is to accurately compute the marginal utility costs incurred in providing such backup.

The parallel question involving a determination of the rate which the utilities can be expected to pay for excess onsite power offered for sale is equally difficult; several very sensitive issues must be resolved. For example, how should the costs of transmission lines be allocated between the price of utility sales and the price charged by onsite generators? Should the utility be expected to purchase energy at rates reflecting the marginal cost of providing the same amount of energy from new utility equipment or simply for the average cost of utility power generated. It will usually not be possible for utilities to pay a rate high enough to meet typical industrial revenue requirements on capital invested in new energy projects. It is possible, however, that special rates could be established which would permit utility purchases at required rates, and it also is possible that, if a utility could sign a contract with a firm guaranteeing purchases over 10 to 20 years, the firm could accept a smaller rate of return on funds invested in the generating equipment. A simple technique for determining the amount which an electric utility can pay for energy purchased was discussed in the previous chapter.

In general, the cases and State utility decisions suggest that utilities have substantial freedom to treat different classes of customers differently.[33] Two *general* principles

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[30] Ben Wolf, Gemini Corporation, private communication, Apr 27, 1977

[31] To economists, "price discrimination" is value neutral and includes any case where the same product is sold at more than one price For purposes of this discussion, "discrimination" is used in its more general sense to refer to any distinction in favor of or against a person The economists' definition pinpoints the issue nicely what is the relevant "product" or service? The way the product is defined will determine a fair price

[32] Priest, *Principles of Public Utility Regulation*, 1 2/36-88

[33] See, e g, Re Pacific Gas & Elec Co , 9 P U R 3d 97 (Cal Publ Util Comm'n 1955); Re promotional Activities by Gas and Electric Companies, 68 P U R 3d 163 (N Y Pub Serv Comm 'n 1967), Re Promotional Practices of Electric and Gas Utilities, 65 P U R 3d 40s (Corm Pub Util Comm'n 1966); Re City Ice & Fuel Co , 260 App Div 537, 23 N Y S 2d 376 (1940) But utility comm issions have not been reluctant to strike down promotional practices they found to be of little value to the utility or the bulk of its customers Re Southwest Gas Corp , 61 P U R 3d 467 (Cal Pub Util Comm'n 1965), Re Carolina Power & Light Co., 52 P U R 3d 469 (N C Util Comm'n 1964); Re Portland General Elec Co , 67 P U R 3d 417 (Ore Pub Util Comm'n 1967)

emerge: (1) preferential treatment is more acceptable if it produces indirect benefits to all customers; and (2) utilities may treat customers differently if there is a reasonable economic basis for doing so, that is, costs to the utility are clearly different. For example, discrimination in favor of solar users that would reduce rates for all customers by reducing the utility's costs would be acceptable.

It seems clear that public utilities may discriminate either against or in favor of onsite solar users if the discrimination either benefits all customers or is based upon a reasonable economic basis. Discrimination could be either as service practices (e. g., specific times at which backup power could be used) or as rate practices (e.g., higher rates for less energy use).

A public utility is subject to State regulation in addition to antidiscrimination laws, by virtue of being a public utility. Fundamental to the concept of a public utility is its dedication of property to serve the public without discrimination. Almost every State has a statutory provision requiring utilities to "furnish adequate and safe service,"[35] "provide such service, instrumentalities, and facilities as shall be safe and adequate and in all respects just and reasonable,"[36] or "furnish reasonably adequate service and f abilities."]

A public utility "may not pick and choose, serving only the portions of the territory covered by their franchises which it is presently profitable for them to serve."[38] As with most issues in public utility regulation, the duty-to-serve requirement is interpreted on a case-by-case basis with "reasonableness" and the "public interest" as the touchstones.

A public utility cannot refuse to provide backup power to onsite facilities unless it can demonstrate a compelling case that backup service would cause substantial harm to the utility's existing customers. Refusal to provide service would violate not only Federal antitrust laws, but also the utility's common law and statutory duty to provide utility service, Of course, the duty to provide *adequate* service has some limits; utilities may be excused from providing service when prevented by acts of God, labor disputes, and shortages of fuel supply. " In some cases, utilities have been excused from providing service where to do so would be unusually expensive, although there is substantial precedent to the contrary."[40]

These laws would not, however, prevent adoption of a policy which would discriminate against new utility customers who did not use solar equipment. Existing statutes appear to permit a regulation which would prevent a utility from providing new *service* to a customer not using solar energy equipment.

Some States have taken measures to restrict gas to certain customers or to eliminate its availability for some uses. For example, New York banned the use of gas in swimming pools and in buildings without adequate insulation. " A few States have banned its use in decorative lighting.

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[34] Priest, *Principles of Public Utility Regulation, 1288*

[35] Or Rev Stat $757020 (1974)

[36] N Y Pub. Ser Law §65(McKinney)

[37] Wis Stat Ann $196,03(1) (West) For a general discussion of a utility's duty to serve, see Note, "Utility's Duty to Serve, " *Columbia Law Review 62 (1962) 312;* and Donald P. Hodel and Ronald G. Wendel, "The Duty and Responsibility of Oregon Public Agencies to Provide Adequate and Sufficient Electrical Utility Service, " *Oregon Law Review 54 (1975). 539*

[38] New *York & Queens Gas Co. v McCall,* 245 U S 345, 351 (191 8).

[39] Priest, *Principles of Public Utility Regulation,* a:237-238.

[40] I bid., pp. 240-242.

4. New *York Pub. Serv. Comm'n, Case 26286 [Apr. 16,1974); and National Swimming Pool Institute v Alfred Kahn, 364* N.Y S 2d 747,9 P U.R 4th 237 (1974). See also "Ban on Heated Pools Leaves Californians Boiling," New *York Times,* Feb. 5,1975

The legal principles involved in rate regulation are similar to those discussed for service discrimination. The same prohibitions on discriminating among customer categories apply, as do the ambiguities as to what constitutes "disc rumination." 42

A rate structure that adversely affects solar energy users, however, may be difficult to challenge under current case law. Several cases have upheld the legality of rate structures that subsidize a particular class of customers (al l-electric customers) despite antidiscrimination laws. In 1965, a court interpreted an antidiscrimination statute as barring only "unjust" discriminations, and concluded that only arbitrary d incriminations are unjust:

> If the difference in rates is based upon a reasonable and fair difference in conditions which equitably and logically justify a different rate, It is not an unjust discrimination [43]

Part of the difficulty results from the fact that the utility can argue that its cost structure justifies a discriminatory rate and the challenger is hard-pressed to rebut the extensive analysis which can be conducted by the utility about its unique cost structure, although in cases requiring a calculation of a fair backup charge for solar energy (and a fair price to pay for excess onsite energy) utilities can be as confused as the interveners.

Until the late 1960's, cost per unit of electricity for at least some types of powerplants declined steadily, Utilities could therefore argue that promotional rate structures would, over time, bring new businesses that would justify additional powerplants. These new plants would then lower the bills of all customers of the utility. More recently, the lack of new sites for low-cost hydroelectric power, changes in regulatory practices, and increased environmental costs have forced the cost of new power to rise steadily.[44]

In these circumstances, promotional rates lose much of their appeal. A New York court recognized the common impact of rising fuel prices in a recent decision overturning a subsidy for all-electric homeowners. 45 The subsidy, which was to run for a year, was intended to lessen the impact of higher electric rates on residential customers who had previously been induced to buy all-electric homes by favorable rates. The court held that the subsidy "constituted undue preference and advantage" in violation of the State antidiscrimination laws.[46]

Several utility commissions have already authorized programs to finance the installation of insulation **to conserve natural gas.[47] Since it can be reasonably claimed that conservation by some consumers contributes to the eventual economic benefit of all, earlier precedent in support of promotional practices should be applicable. Some States**

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42 Colorado Pub UtilComm'nDecision No 87640 (Oct 21, 1975), *Leroy Fantasies, Inc. v Swindler,* 4 4 App Div 2d 266, 354 N Y S 2d 182, 4 P U R 4th 334 (1974), *appeal denied, 34 N Y* 2d 519, 316 N E 2d 884 (1974)

43 88 N J Super 233, 236, 211 A 2d 806, 808, 60 P U R 3d 210, 212

44 From 1956 to 1970, the average cost of electricity in the United Statesdeclined from 261 cents per kWh to 210 cents While average rates declined, the costs of supplying electricity to certain types of loads and to customers during peak hours Increased rapidly Utilitiessubsidize some customers by overcharging others Since 1970, costs have Increased steadily; the average cost per kWhin 1975 was 3 21 cents, despite an equally steady risein consumption during the same period Samuelson, "Reform of Electric Utility Rates, " p 1475 See *a/so* Paul Joskow,''Inflation and Environmental Concern. Structural Change in the Process of Public UtilityPrice Regulation, " *Journal of Law and Economics 17(1 974): 291*

45 *Lefkowitz v. Public Serv. Comm'n,No 593(N. Y. Ct. App., Dec. 28, 1976), aff'g 377 N Y S* 2d *671, 50* App Div. 2d 338 (Sup. Ct. 1975).

46 377 N.Y S 2d at 674

47 E g , Re Pacific Power & Light Co , Case No U-1046-29, Order No 8567, 69 P U R 3d 367 (Idaho Pub UtilComm'n 1967), In the Matter of the Application of MichiganConsol Gas Co for Authorization of a Program for the Conservation of Natural Gas, 1 P U R 4th 229 (Mich Pub UtilComm'n 1973) Related decisions by public utility commissions have allowed the restriction of energy to approved uses and the prohibition of energy use by uses considered wasteful.

have adopted legislation specifically authorizing conservation programs, eliminating any doubt about their validity.[48]

If rate structures that encourage conservation are valid and mandated, subsidies for use of solar energy, which employ a nondepletable, nonpolluting energy source, should also be valid. Use of solar energy is supported by the same public interest and public policy as conservation–decreased use of fossil fuels.

State antidiscrimination statutes are not the only factor to consider in d incriminatory practices by utilities. The Federal antitrust laws may also outlaw rates or services that single out the owners of solar energy systems for special treatment. The longstanding antitrust exemption for State action will not totally immunize public utilities from antitrust liability.[49]

There are several grounds on which utility rate and service discrimination toward solar users could be deemed anticompetitive, and therefore a violation of antitrust laws. A utility may be deemed a monopoly if it charges a very high price or even refuses to provide backup service to solar customers. 50 An antitrust violation might also be found if a utility subsidizes its entrance into the solar heating and cooling market by distributing its losses across all utility customers, giving it an overwhelming advantage. [51]

The conference committee on the National Energy Act has, at this writing, taken steps toward resolving these rate issues, but failed to completely clarify the situation. While most of the President's proposals for dictating rate reform at the Federal level failed to gain conference approval, the conferees did allow the Federal Energy Regulatory Commission (FERC) to prescribe rules requiring electric utilities to offer to sell power to or to buy power from qualifying cogenerators or small power producers and prevent discrimination against such producers. (Small power producers in this case are facilities generating less than 80 megawatts from sol id waste or renewable resources; the definition of a qualifying generator is left to the FERC.) While this provision permits Federal regulation of the relationship between utilities and small solar generating facilities, it leaves the difficult problem of determining just rates up to the FERC.

ARE ONSITE SOLAR SYSTEMS SUBJECT TO REGULATION AS PUBLIC UTILITIES?

If an onsite solar system is found to be a public utility, it must file reports and accounts, 52 serve all customers who demand service within a given area, submit its rate schedules to the utility commission for approval,[53] continue providing service until given permission to discontinue,[54] provide safe and adequate service, 55 comply with

48 Cal Pub Util Code $325007, 2781-88 (West); N J Stat Ann §§ 482-4823 (West)

49 In *Cantor v Detroit Edison Co.*, 96 S Ct 3110 (1 976), the Supreme Court said that a privately owned publ ic utility is not exempt from possible antitrust liability when it furnishes its customers with light bulbs tree ot charge, even though the light bulb promotional practice had been approved (as part of the ut ility's rate structure) by the State public ut ility commission

50 *Refusals to deal area classic violation of section 2 of the Sherman A c?, 15 U. S C.* § 2 (Supp IV 1974) See, e g , *Otter Tail Power Co. v United States,* 410 U S 366 (1972), where a public utility was found to have violated section 2 of the Sherman Act by refusing to sell electricity to a municipally operated distribution system

51 Such conduct could be viewed as temporary price-cutting to put rival solar firms out of business. See *Puerto Rican American Tobacco Co. v American Tobacco Co., 30* F 2d 234 (2d Cir 1929) Or, it might be viewed as an illegal tying arrangement in situations where a solar customer's receipt of favorable treatment is conditioned on his acceptance of the utility service Tying arrangements are another classic antitrust violation See 15 U S C. § 14 (1 970), *International Business Machine Corp. v United States, 298* U S 131 (1936)

52 E g , Fla Stat Ann § 366 06(1) (West)

53 E g , Cal Pub Util Code 454 (West)

54 E g , Wis Stat Ann 19681 (West)

55 E g., Cal Pub Util Code 761 (West)

limitations on the issuance of securities, " and apply for certificates of public **convenience and necessity. State utility regulatory statutes universally require that every public utility obtain a certificate before beginning operation or even construction of its equipment. [57]**

Meeting these requirements would be a prohibitive burden for most potential owners of solar equipment, since the proceedings are frequently long and expensive, Even if a solar owner were willing to undertake the trouble and expense to file as a utility, he would have to recognize that an existing utility will be able to maintain a monopoly in its geographical area unless the courts determine that public convenience and necessity require otherwise

A new utility is therefore rarely permitted in an area already served by an existing utility. Even **where the existing utility** is providing **woefully inadequate and inefficient service, it wi I be permitted to exercise monopoly control over its service area if it promises to correct its shortcomings.**

The initial factor in determination of whether an onsite solar system is a public utility is who owns the system? Ownership can range from the privately owned solar system on a privately owned residence, *to* **cooperatively owned systems for a small community, to a corporate-owned collector field on corporately leased or publicly owned property to utility-owned systems on private residences. Clearly, somewhere in the continuum of owners the onsite solar facility and its owners became subject to regulation as a public utility.**

[56] E g , Fla Stat Ann 366 04 (West)

[57] E g , I III Rev Stat , ch 111 23, 56

[58] See, e g , *Kentuck y Util C o. v Public* Serv Comm n, 252 S W 2d 885 (Ky)

5 f g , F la Stat Ann § 36601, Mich Comp Laws Ann $460-6, Cal Pub Util Code §21 6(a)

[60] wn Stat Ann $19601 (West), Ill Rev Stat ch 111 2 3§ 10, e g , A *llen v California R R Comm 'n,* 179 Cal 68, 175 p 466(1918)

Ownership

Most State statutes define a public utility to include any person, corporation, partnership, association, or other legal entity and their various representatives.[59] A solar facility owned by a landlord, or a private property owner, as well as any partnership or corporate entity would qualify as a public utility, if the other qualifications are met,

Where there is no sale of electric power involved, but rather the owner and user are the same legal entity, State regulations govern. Federal regulations concern only the wholesale rate for interstate electricity sales, Rarely will owner-used energy be subject to Federal regulation as a public utility. This is true whether the owner is a single family, a joint venture composed of the various users, or a corporation which supplies its own corporate needs.

Where the owner is not the sole user, State statutes vary, The general rule is that a company which supplies energy "to the public" will be found to be a public utility, whereas a device which is not producin, energy for public use will escape utility regulat ions, [60] Law in this area is very unclear and the ambiguity may be a barrier to the introduction of solar equipment,

A facility can be judged to be dedicated to "public use" if its owners 1) demonstrate a willingness to serve all who request service;[61] 2) voluntarily submit to State regulation; or 3) attempt to exercise the power of eminent domain.[62]

[61] "The principal determinative charactistic of a public utility is that of service to, or read iness to serve an Indefinite public which has a legal right to demand and receive its services or corn mod ities "Motor *Cargo, Inc. v. Board of Township Trustees,* 52 Ohio Op 257, 258, 117 N E 2d 224, 226 (C P Summit County 19'52) See *generally* A J G Priest, "Some Bases of Public Utility Regulation, " *Mississippi Law Journal* 36 (1965) *18 See, e g, Peoples Gas Light & Coke Co v Ames, 359* I II 132, 134 N E 260 (19 35); *Story v Richardson,* 186 Cal 162, 198 p 1057 (1921)

[62] See Dow Chemical Co , et al , *Energy Industrial Center Study,* p 373 and cases cited therein

Even activities which do not clearly involve a dedication to public use may be declared by the courts to be "so affected with the public interest" that utility commission jurisdiction is justified. In one recent case, the owner of a shopping center was not allowed to sell energy to stores in the shopping center without being regulated as a utility.[63]

Electricity, Steam, or Heat?

Another factor in determining whether an onsite solar use is subject to regulation as a public utility is the form in which energy is supplied to the users —electricity, thermal energy (steam or hot water), or chemical energy. Solar equipment may become available which will produce energy in each of these forms. Again, State statutes vary, For example, some States do not vest jurisdiction over production and sale of steam in their utility commission.[64] State statutes vary greatly, however, and generally thermal energy is not regulated simply because there is no explicit mention of the issue in the statutes,

Still another aspect of this question is whether the sale of energy by an onsite producer subjects the owner of the onsite equipment to regulation. Sale to a presently regulated utility should be interpreted as would sale to any other category of user. Under most State statutes, sale of excess steam or electricity to a specified public utility probably would not meet the test of dedication to public use which is required in determination of public utility status. In a number of cases, industries that generate excess electricity or steam or sell it to public utility companies have been held not to be public utilities.[65] However, in some States the opposite has resulted.

The congressional revision of the National Energy Act takes some action in exempting onsite owners from regulation, but leaves many issues unresolved. The conference agreed to exempt cogenerators and small powerplants producing up to 30 megawatts of electric power from State utility regulations (apparently granting the FERC the authority to overrule States in these issues) and exempts biomass generators smaller than 80 megawatts from the Public Utilities Holding Act. The act would, however, apparently not permit exemptions for subsidiaries of utilities since small generators qualifying for the exemption must be owned by organizations whose primary business is not energy generation,

CAN A UTILITY OWN AN ONSITE SOLAR FACILITY?

The above discussion has assumed that the owner of the onsite solar system was also the owner of the land and building upon which the solar system is located. Is it permissible for utilities or other corporations to own onsite solar facilities on land which the utility does not own, such as the property of the user?

The short answer to this question seems to be yes, although antitrust laws and State policies designed to promote competition would probably prevent utilities from establishing exclusive marketing rights for solar equipment. Utilities probably would be required under existing law to compete with other distributors of solar systems.

The law is clear that utilities at least would not be barred from the solar equipment market. A recent analysis of the question of permitting gas utilities to invest in onsite conservation equipment concluded that Federal antitrust statutes would not be violated if the utility only purchased conservation devices (in this case, insulation material) from independent suppliers and did not actually manufacture or install a major share.[66]

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[63] *Cottonwood Mall Shopping Center, inc. v* Utah *Power & Light Co.,* 440 F 2d 36 (10th Cir 1971).

[64] Mich Comp Laws Ann $460501, Fla Stat Ann. § 36602

[65] *See* **Dow** Chemical Co , et al., op. cit., pp. 374-376, and cases cited therein

[66] William G Rosenberg, "Conservation Investments by Gas Utilities as Gas Supply Option, " *Public Utilities Fortnight/y,* Jan 20, 1977, pp 19-20

Exemption from Federal antitrust statutes is apparently permitted in some cases where an expansion of utility operations is undertaken at the suggestion of a State utility commission and not on a utility's initiative. [67] Precedents exist permitting utilities both to expand their business to include activities under regulatory authority and to own subsidiaries which are not regulated.

There have been cases where, at a utility's request, an unregulated industry was placed u rider regulatory control. The Pacific Telephone Co., in California, for example, owned an unregulated subsidiary for a number of years which installed and operated mobile radio telephones. The company subsequently asked the California Public Utility Commission (PUC) to place this activity under regulatory control. The PUC accepted the application, but a private competitor appealed the decision. The California Supreme Court upheld the PUC approval, in a divided decision. The court found that mobile telephone service was closely related to the utility's regulated business and that the equipment, used for telephone communication, fell under the jurisdiction of the regulatory authority. 68

At the same time, there are cases where utilities have not been able to place subsidiaries of this type under PUC regulation. For example, the New York Service Commission limited the activites of utilities in solid waste disposal ventures,[69] and AT&T was prohibited from expanding its unregulated business as a part of a settlement.'"

It is unclear whether an existing public utility will be permitted to own a solar system which is permanently placed on the roof or other property of a customer. Since such a system is probably a fixture, the utility would be required to leave the solar system in the home or office, even if the property is sold or leased. The most practical approach is for the utility to finance the purchase of the solar equipment and thus perm it its easy disposition as a fixture, but retain the usual metering, repair, and maintenance relationships with the customer.

Nonutility corporations could also own onsite solar equipment. Probably, such a corporation would supply only equipment, and perhaps maintenance, but not energy. Under most State statutes, provision of energy equipment is not subject to utility commission jurisdiction.

The specific arrangement between the solar equipment leasing company or seller and the property owner may alter the question of utility regulation. For example, the inclusion of a service agreement between the lessor and the lessee might increase the likelihood of regulation, as would more widespread adoption of solar devices. Additionally, to the extent that such an agreement requires backup power from public utilities, the contracts and prices for these provisions would be indirectly subject to regulation as part of the normal utility rate regulation.

Congress apparently has taken a dim view of utility ownership and financing, since the committee of conference on the National Energy Act rejected the President's proposal that utilities be permitted to finance the installation of insulation and other expensive residential conservation equipment. While the conference encourages utilities to perform energy audits of residences, it prohibits utilities from installing conservation devices other than furnace-efficiency modification, clock thermostats, and load-management equipment. Loans to cover these devices are limited to $300. (State commissions are per-

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[67] *Cantor* v *Detroit Edison* Co., 96 Sup Ct 3110 (1 976)

[68] *Commercial Communication, Inc* v California *Public Utility Commission,* 50 Cal 2d 512 (1958)

[69] P M Meier and T H McCoy, *Solid Waste* as *an Energy Source* for *the* Northeast, prepared for the Energy Research and Development Administration (Upton, N Y Brook haven National Laboratory, No 50550, 1976], p 96

[70] *United States* v *Western Electric* and AT&T, 13 Rad Reg (P-H) §2143, 1956 Trade Reg Rep (CCH) 571,13-4 (D N J 1956) (consent judgment)

mitted to ask for an exemption from this prohibit i on.)

The field remains quite ambiguous, however, and many possibilities remain open. It may be attractive, for example, for utilities to operate solar equipment as a part of an unregulated subsidiary. Such an arrangement would eliminate concerns, expressed by some potential owners of cogeneration equipment, that equipment on their premises, owned by a regulated utility, would not be able to sell energy on an equitable basis because of special pressure to adjust utility rates.

Municipal Utilities

Since municipal utilities can finance plants with relatively low-interest, tax-free bonds, the capital costs associated with plants owned by municipal can be lower than those of plants owned by privately owned utilities. Lowering capital costs is particularly important in the case of solar energy systems where the bulk of the energy cost results from the cost of capital. In most States, however, municipal utilities are prohibited from expending funds for "private benefit" and this has been interpreted to mean that municipal utilities cannot purchase shares in generating facilities which are partly financed and operated by a private utility.

These prohibitions may also prevent municipal from owning or operating onsite generating systems. In the case of solar devices, however, it would seem that the municipal could make a strong case that installation of a solar device would benefit the public at large even though it was primarily designed to meet the energy needs of a single building. In fact, several municipal utilities have experimented with onsite solar energy equipment in their districts. The legal point may be moot since, as one analyst put it, "Who's going to complain?"

In any event, the laws preventing municipal from owning part shares in generating facilities which will be partly owned and operated by private utilities are being changed in many areas of the country to allow municipal to share the cost of constructing nuclear-generating facilities and other centralized energy equipment, which, like solar energy systems, have high capital costs. Prohibitions aganist such "joint action" programs are often written into State constitutions. The constitution of the State of North Carolina, for example, was recently amended by referendum to permit joint-action financing of new electric utility plants, Such amendments have been controversial in some areas. For example, in 1977, the Governor of Indiana vetoed legislation amending that State's constitution to allow joint action programs.

Cost-Sharing Issues

If a utility were to own or operate onsite generating facilities, contracts between customers and the utility would have to address several important issues. They include:

- Who would pay the property tax on the equipment? (This is particularly important because utility tax rates often are several times higher than those for homeowners.)
- How would costs of insurance be distributed? Would utilities be liable for damage to onsite equipment caused by the homeowner?
- Would a contract for onsite solar equipment be binding on a new owner if title to a building were transferred?
- How far would a utility's maintenance responsibility extend? Would a utility, for example, be responsible for keeping a roof on which a solar collector was mounted in weatherproof condition?
- Should a utility pay a customer for the use of a roof or wall for installing a solar collector? If so, would the fee decrease for the use of walls and roofs that did not permit optimum collection of radiation?
- Could a customer demand that a utility remove onsite equipment? If so, who would pay for removal?

None of these questions pose insoluble problems, but all may require careful negotiation. All of the utilities interviewed by the General Electric Co. said they preferred onsite facilities on large buildings, because questions would be easier to resolve than if large numbers of small buildings were involved. [71]

WHAT RIGHTS WILL UTILITIES HAVE TO AQUIFERS AND OTHER GEOLOGICAL FORMATIONS USED FOR THERMAL STORAGE?

Several techniques for storing large amounts of thermal energy in ground water and in heated underground caverns have been proposed (see chapter XI), and the use of subsurface regions for such purposes may raise a number of difficult legal questions. For example:

- Would a utility need to purchase mineral rights to use subsurface water or rock for thermal storage?
- What aspects of water laws govern which aquifers can be used, the contamination permitted, the heating of aquifers which might be used for potable water, etc. ?
- Would the owner of heated water have protection from someone tapping this hot water supply?
- What environmental laws would apply to large-scale thermal storage?

71 General E lectric Corp , *Conceptual Design and Systems Analysis* of *Photovoltaic* Power Systems, April 1977, ERDA contract E(11-1) 2744, op cit