

LEGAL AND INSTITUTIONAL MECHANISMS  
TO MANAGE LOCAL ENERGY CONSUMPTION  
IN SOMERVILLE, MASSACHUSETTS

by

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BARBARA MARIE BRENNAN

Submitted to the Department of Urban Studies and Planning  
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requirements for the degree of  
Master of City Planning

ABSTRACT

This thesis presents the legal and regulatory tools available to communities to manage local energy resources. It was written as part of a community energy planning effort in Somerville, Massachusetts. Although the thesis pays particular attention to the needs of Somerville, it is designed to be used as a model for cities and towns in Massachusetts. Somerville's community energy plan was initiated by the Somerville Citizens Energy Advisory Committee, in cooperation with the Boston Neighborhood Network.

A locality can play an important role in local energy management, since it is better able to assess community energy needs and administer local programs than the state and federal government. Nevertheless, communities must also depend on help from other levels of government in areas where the locality has little or no control. This thesis discusses the role each level of government should most appropriately play.

A variety of legal and regulatory tools are discussed with recommendations that Somerville enact:

1. Zoning changes -- to eliminate obstacles to solar energy systems
2. A Solar Access Permit System -- to provide solar access to registered collectors and to balance development interests
3. A Somerville Energy Constitution -- to establish energy conservation and renewable resources as a public purpose.

Thesis Supervisor: Philip Herr

Title: Legal and Institutional Mechanisms to Manage Local  
Energy Consumption in Somerville, Massachusetts

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## SECTION I INTRODUCTION

### LOCAL AUTHORITY TO MANAGE ENERGY USE

Somerville has the power to confront the energy crisis. As a municipality with solidly-established local authority, the city, in many ways, is in a better position to evaluate and manage its own energy use than the state or federal government. This study will address those legal and institutional powers the city of Somerville can exercise to manage local energy resources more efficiently. It is part of a broad-based community-initiated effort to develop a comprehensive energy plan for the city.

The city can play an important role in the energy planning process. For example, traditional land use tools such as zoning can be tailored to ensure that energy conservation and renewable resources are encouraged. Furthermore, the city can provide organizational support and educational outreach to the community. It can promote energy conservation and renewable resources as a public purpose in the community. The purpose of this report is to explore the range of alternatives available to a local authority to manage community energy resources.

### SOMERVILLE'S COMPREHENSIVE ENERGY PLAN

A comprehensive energy plan is being prepared by the Boston Neighborhood Network together with the Somerville Citizen's Energy Advisory Committee (CEAC), a grass-roots citizen's energy group which provided the interest and inspiration for the entire process. CEAC is made up of people who live and work in Somerville and who believe

that the community can do much more to not only manage its own energy use but to promote local conservation and renewable resources. With this in mind, CEAC asked the Boston Neighborhood Network (BNN), a nonprofit group providing technical assistance to communities in the Boston area, to help put together a community energy plan for Somerville.

CEAC worked closely with the BNN to develop a plan which would involve citizens, business persons, bankers, real estate brokers, architects, developers and the City in the planning process. The intent is to develop energy policies which reflect the thinking of an informed community and to prepare a comprehensive energy strategy which will address the needs and concerns of all the people who live and work in the City.

Behind this community-based planning process is the belief that Somerville citizens can:

- make a significant difference in reducing local energy use
- cooperate with the City government to ensure that policies are enforceable and reflective of the thinking of an informed community
- develop a comprehensive plan which will address all sectors of the community and reach all categories of energy users.

As a way of reaching out and building an informed energy community in Somerville, the following steps have already been accomplished:

1. Somerville Energy Data Base -- a comprehensive picture of Somerville's energy consumption broken down by sector. It shows what kind of energy is used, who uses it, how much is used, where it comes from and how it is used (see Appendix D for selected excerpts).

2. Community Energy Forum -- a weekly evening lecture series held at Lincoln Park School on all aspects of community energy planning ranging from data collection to financing energy conservation programs.

3. CEAC Meetings -- a bi-monthly open organization meeting, and weekly energy subcommittee planning sessions.

4. Somerville Energy Workshop -- the second phase of the planning process -- now that consumption data has been collected -- involves people who live and work in Somerville in making decisions on how to establish the community's energy priorities. The first in a series of community energy workshops was held in Somerville to define citizens' energy priorities and to translate them into an action plan for the city and its residents.

Somerville's plan to achieve maximum conservation and use of renewable energy resources is an ambitious undertaking. The plan is long-term and involves a strategy for both incentive and mandatory measures to achieve the goal; it involves cooperation among all sectors of the community. The workshop was designed for community decision-making on energy priorities. Members of CEAC, the City's energy coordinator, BNN consulting team, citizens, and business persons attended the energy planning session. The workshop split up into groups representing the municipal, commercial/industrial, residential and transportation sectors to discuss and give priorities to their energy concerns. As a result, several main themes emerged from the session:

- energy can be saved and used more efficiently in each sector through better energy management actions
- the city can play a crucial role in promoting energy conservation and solar energy in Somerville
- public education is a highly important component in a comprehensive plan
- public and private sector financing needs to be developed.

The workshop was only the first step in developing an energy plan for the City. The process is ongoing and will evolve over time. The role of the municipal government in this process is extremely important.

## THE ROLE OF THE CITY

Comprehensive energy planning, of course, involves action by all sectors in the community. Each sector, however, has a role which it is most suited to play: that of city government is an important one. Somerville has already taken a strong interest in encouraging local energy conservation.

The Somerville Office of Planning and Development, under the Brune administration, has hired an energy coordinator for the City. As a result, the City set up an energy conservation program for low- and moderate-income home owners, free home weatherization audits for income-eligible residents, and a community educational outreach program which includes weatherization workshops and an energy fair. In short, Somerville has established a strong foundation upon which to build a more comprehensive energy plan.

As part of this plan, the City can most appropriately:

- change zoning laws to encourage the use of solar energy systems
- provide solar access protection for registered solar energy systems
- pass laws which require that all municipal department heads meet a minimum energy budget or which establish energy conservation and renewable resources as an appropriate public purpose in the community
- stimulate action by the private sector by encouraging local banks to make energy conservation loans or by providing technical assistance to help small energy-related companies get started in the City
- seek state and federal funding by establishing a well-organized energy management strategy which will put the City in a more competitive position to be awarded program money. In addition, the City could promote energy conservation through linkage with other non-energy programs such as economic development or housing



-- provide education and information to the community.

### Working With the State and Federal Government

The City must be in a position to take advantage of program opportunities on the state and federal level. Although the future of energy programs is uncertain, there has been a considerable interest in the Commonwealth to help communities finance energy conservation and renewable resource alternatives. For example, a comprehensive energy financing bill has been introduced in this legislative session which would provide energy-efficient home-improvement loans for low and moderate income persons, a pension fund reinvestment program and a corporate tax deduction for employers who make energy conservation home-improvement loans to their employees.<sup>1</sup> The state would float bonds to finance this program.

The present comprehensive energy financing bill in the legislature designates community development corporations (CDC's) or local housing authorities as the intermediaries through which money is channeled. The city could act as a liaison between the state and local CDC or other funding authority.

In addition, Lt. Governor O'Neill's office is providing assistance to help communities establish alternative institutional structures to finance and administer programs.

A local energy action strategy could be tied into other existing state or federal programs such as the state's Commercial Area Revitalization District Program (CARD) or the federal Community Development Block Grant Program (CDBG). In any comprehensive energy

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<sup>1</sup> An Act to Provide Low and Moderate Income Persons with Financing Assistance For Weatherization And Other Related Home Improvements. H.R. 5271, 1981 Committee on Taxation (Mr. Barrett).

planning strategy, the relationship between the City and other levels of government is important.

These are only a few examples of the types of programs which may be available for local energy planning. With a well-defined energy management strategy, Somerville will have a competitive edge over other less-organized communities and be in a better position to be eligible for these programs.

## SECTION II LOCAL LEGAL AND INSTITUTIONAL MECHANISMS TO MANAGE ENERGY RESOURCES

Communities all over the country are looking at ways to save energy. Fitchburg, Massachusetts, St. Paul, Minnesota, Seattle, Washington, to name a few, have received national acclaim for their local energy management strategies.<sup>2</sup> Still the history of local comprehensive energy planning is brief.

Although local management tools may be similar, a comprehensive energy plan must be tailored to match the individual needs of the community. Each plan is unique. Somerville can directly set up City-sponsored energy programs, or it can help other community-based energy actions. The City can mandate or encourage energy conservation and renewable resources within the community. This section will address different legal and institutional alternatives which are most appropriate for Somerville.

The options presented are designed to help Somerville's policy makers and citizens make informed choices about how to implement a comprehensive energy plan. Existing legal mechanisms, as well as new innovative tools, will be discussed in the context of implementation and enforcement.

Not all of the alternatives can be implemented immediately; some of the ideas may not be realistic in the near term but rather as future alternatives that may become feasible if variables such as Proposition 2 1/2 or municipal bond ratings change. Other ideas can be implemented over time -- in incremental stages. This section looks

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<sup>2</sup> "Communities and Energy," The Energy Consumer, U.S. Department of Energy, Office of Consumer Affairs, February/March 1980.

at possible alternatives most appropriate to Somerville's comprehensive energy planning effort.

Existing structures, such as the City's zoning ordinance, building permit system, local housing and sanitary code, and local bonding authority, can be revised to encourage energy conservation and use of renewable resources, such as solar energy. Other new ideas include a Somerville Energy Constitution which articulates the community's energy policy in a resolution of public purpose, and different institutional structures which administer and finance local energy programs.

The following alternatives will be discussed:

- A. Residential Energy Conservation Options
- B. Protecting Solar Access -- Public vs. Private
- C. Institutional Structures to Finance and Administer Energy Programs
- D. Local Bonding Authority
- E. New Development Conservation and Renewables Options
- F. Public Purpose

A. RESIDENTIAL ENERGY CONSERVATION OPTIONS

Conservation is the necessary first step in paving the way toward a local comprehensive energy plan. The purpose of this section is to address the existing legal structures which the City could use to influence energy conservation. Energy-efficient house disclosure statements for homeowners and landlords and property tax abatements will be discussed.

Somerville's greatest strength lies in its ability to administer energy programs and provide community outreach on energy conservation. The City has already built a strong foundation in the residential and municipal sector by:

- establishing a weatherization improvement program which

provides energy audits to low and moderate income homeowners and rebates for improvements made

- organizing an innovative oil distribution program called Share the Wealth. Under this program, residual oil from tanks in houses which have converted to gas is collected and distributed to income-eligible persons
- pursuing state and federal funding to weatherize municipal buildings.

Other programs to provide community outreach and financing alternatives are being considered by the Office of Planning and Development.

In addition to what the City has done, the Somerville comprehensive plan will present an array of program ideas for the city to consider. The following discussion focuses on the City's regulatory authority.

### 1. Energy Efficient Disclosure Laws

Communities such as Seattle, Washington, Portland, Oregon, and Minneapolis, Minnesota have implemented residential energy-efficient disclosure laws. These laws essentially require that the energy efficiency of a home or apartment must be disclosed prior to sale or lease. Energy-efficient disclosure laws can range from requiring that an energy audit be provided to a prospective homebuyer or renter to mandating that specific conservation measures be implemented as a prerequisite to selling or leasing. They are designed to require that homeowners and landlords assess the energy use of their property.

Energy disclosure laws can be more or less restrictive, depending on how far a community wants to go to promote energy conservation in residential buildings. Local disclosure laws are supported by the theory that the housing market will reward homes which are more energy efficient and penalize those that aren't.

Furthermore, an energy disclosure statement at the time of sale

is useful because:

- a homeowner who makes the necessary improvements can reflect those improvements in the cost of the house
- homebuyers can defray the extra energy conservation costs over the length of the mortgage.

In each of the communities which have enacted local energy disclosure statements, the state passed enabling legislation.<sup>3</sup> The state is in a better position to influence the actions of bankers and real estate brokers who play an important role in enforcing local energy-efficient disclosure laws. For example, Somerville has no authority to require that a local bank or broker participate in implementing these laws. Somerville can, of course, encourage bankers and brokers to participate in promoting energy-efficient house disclosure statements. This does not affect homes sold by a broker or mortgaged by a banker outside of the community. For more broad-based enforcement power, the Commonwealth would need to enact energy disclosure laws statewide.<sup>3</sup>

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<sup>3</sup>In Massachusetts a statewide energy disclosure law (H.R. 1965) was introduced which would require an energy disclosure statement at the time of sale or lease. The law included:

- for owner-occupied units a statement of energy costs and quantity consumed by month for a 12-month period
- for landlords, a statement of these costs for which a tenant is liable.

The energy disclosure law has already been disapproved in the legislature and is unlikely to be revived in the near future. The Massachusetts Association of Realtors lobbied against statewide energy disclosure statements. The Association contends that a statewide law would add to the already time-consuming process of transferring property; be punitive to certain homeowners; and be unnecessary since the market place will influence people's decisions and behavior about energy conservation. The Association supports a strictly voluntary approach.

### Somerville's Role

The City can play two roles in promoting energy efficient disclosure statements in the community. It could mandate energy disclosure for both landlords and tenants at the time of sale or lease of property by making the local health and safety code more stringent. Rather than regulate energy disclosures, the City could work with community groups, brokers and bankers to promote greater energy efficiency in the community. The following is a discussion of both alternatives.

#### a. The Regulatory Route

Unlike the state's building code, a local government is allowed to develop more stringent local health and safety code regulations.<sup>4</sup> The state's Health Department already requires that residential housing meet certain weatherstripping requirements as part of the minimum standards of fitness for human habitation.<sup>5</sup> These already-existing energy laws in the Health Department could be strengthened to require an energy audit be conducted as a prerequisite to a certificate of occupancy each time a home or rental unit changes hands.

The City of Newton passed an ordinance which requires that each time a dwelling unit, apartment, tenement or room in a lodging house is vacated a change of occupancy permit must be issued by the Health Department.<sup>6</sup> Somerville could use this tool to require that homeowners and landlords conduct an energy audit before being issued a

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<sup>4</sup> Department of Public Health State Sanitary Code, Chapter 11: Minimum Standards of Fitness for Human Habitation, 105 CMR 400.015 Effect of Code on Local Regulations.

<sup>5</sup> Ibid., 400.501 Weathertight Elements.

<sup>6</sup> City of Newton ordinance #429, February 1, 1971.

certificate of occupancy.<sup>7</sup>

An energy audit requirement could be tied into the state's Residential Conservation Audit Service (RCS) program, to the City's weatherization audit program or to some other equivalent home energy audit. A single audit might only be required every 5 years but updated each time an energy improvement is made.

Enforcement of local energy disclosure statements could be difficult unless there was a strong community constituency in favor of the regulation. The following groups would be affected by energy disclosure statements:

- the local board of health
- real estate brokers
- tenants, homeowners, landlords and homebuyers.

The Board of Health would be responsible for issuing a certificate of occupancy after an energy audit was performed. Such a regulation could be administratively complex and expensive to enforce, since the health department would need to know each time an apartment or home changed occupancy. Moreover, the department is already understaffed. Actual notification of the change would become the responsibility of the other two groups. For example, brokers might be charged with the responsibility under the Massachusetts Consumer Protection Act, Ch. 93A. A real estate broker can be held liable for failure to disclose relevant information to the homebuyer and it is likely that, under this law, a broker would be required to disclose a local certificate of occupancy requirement.

<sup>7</sup> Department of Public Health, State Sanitary Code, Chapter II: Minimum Standards of Fitness For Human Habitation, 105 CMR 410.001. Purpose: "The purposes of this chapter are to protect the health, safety and well being of the occupants of housing and of the general public." A locality can strengthen the local health code as long as the new regulations are consistent with the purposes of the state's code. Energy conservation has already been established as a public purpose in the Commonwealth of Massachusetts and is considered a valid reason to protect the health and safety of the general public.



For local energy disclosure statements to work, homeowners, landlords, tenants or homebuyers must ensure that energy disclosure laws are enforced. The responsibility, in essence, depends on the interest and commitment from the community. A constituency of tenants, homeowners or real estate brokers could make enforcement and administration of these laws possible but without this support, local energy disclosure laws would be token at best.

b. The Supportive Role

The City can play an active role in developing a local constituency to support energy efficiency disclosure statements. First, the City could enforce and publicize the energy laws in the state's health code.<sup>8</sup> Tenants could be encouraged to notify the health department when violations occur. To have this regulation work, the health inspectors would need to make its enforcement a priority.

Real estate brokers could be encouraged to work with the City to promote local energy conservation practices. They might be reluctant to support mandatory energy efficient house disclosure laws because:

- it will present an additional regulatory burden for the brokers
- homes in Somerville are generally poorly insulated and therefore disclosure laws would not be a selling point for these homes
- people will start demanding audits on their own, without local requirements.<sup>9</sup>

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<sup>8</sup> Dept. of Public Health, 105 CMR 400.501.

<sup>9</sup> Conversation with Rob Authier, Massachusetts Association of Realtors.

Massachusetts real estate brokers, however, are interested in using a home's energy efficiency as a selling point. The Massachusetts Association of Realtors has sponsored a series of workshops designed to teach realtors about energy conservation.<sup>10</sup>

The chart on the following page illustrates where implementation of energy efficient disclosure laws would be most appropriate. The authority can apply to both owned and rental residential property.

c. Mandatory vs. Incentive Policies

The City of Somerville is confronted with developing strategies which will reduce local energy consumption. It can use either persuasive or regulatory power to do so -- the success of which depends on the degree of support for the policy in the community. The preceding discussion addressed Somerville's authority to mandate residential energy efficient statements.

Somerville has the regulatory power to enact local energy disclosure laws through a more stringent local health code which would require an energy audit as a prerequisite to selling or renting a unit. The success of a regulatory approach would depend on public sentiment, municipal staffing, enforcement ability, and actual energy saved as a result of the regulation. Administrative costs versus energy saved is also an important issue to consider.

For Somerville, the first step before changing the local health

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<sup>10</sup> The Massachusetts Association of Realtors is sponsoring a series of Residential Energy Efficiency Workshops for realtors. Workshops were held last year in six different regions of the state; they were funded by the Department of Energy and conducted by Energy Works. Based on last year's success, the Massachusetts Association of Realtors is continuing the workshops on its own through the local Board of Realtors.

IMPLEMENTATION OF ENERGY-EFFICIENT DISCLOSURE LAWS  
LOCAL VS. STATE

	LOCAL	STATE
BANKERS	Voluntary: persuade local banks to require an energy audit as a prerequisite to mortgage financing. Mostly symbolic since mortgages can be obtained from banks outside the community	Mandatory: require banks statewide to request an energy audit as a prerequisite to making a home mortgage loan. All banks would participate
REAL ESTATE BROKERS	Voluntary: persuade brokers to encourage homeowners to provide an energy audit to prospective homebuyers. Brokers could use the energy efficiency of a house as a selling point; special energy-efficient home listing a possibility. Banks and brokers could be encouraged to cooperate	Mandatory: require brokers to disclose energy efficiency of home to prospective buyers. Under Mass. Consumer Protection Act Ch. 93A, broker's duty is to provide information material to the buyer's decision to purchase
HOMEOWNERS/ LANDLORDS	Mandatory: require that a certificate of occupancy be issued each time a house or apartment is vacated. In order to obtain the certificate, the homeowner/landlord would need to show an energy audit (RCS or other similar audit)	Mandatory: require that before a title can be transferred, an energy disclosure statement must be made at the time of sale or rental. Require landlord's disclose portion of rent which goes to energy costs of tenant
HOMEBUYERS	Mandatory: certificate of occupancy would not be issued to the homebuyer unless an energy audit were performed	Mandatory: state can protect homebuyers and tenants through statewide energy disclosure laws
TENANTS	Voluntary: persuade tenants to request energy audits from landlords	"

code, would be to enforce existing standards for weatherization.<sup>11</sup> Once existing laws are enforced, more stringent measures, if appropriate, can be implemented.

It is unfair to mandate implementing energy conservation measures unless financial resources are available to back up the regulation. Rather than promote energy conservation and renewable resources in a positive way, there is the danger that regulations can be either punitive or simply unenforceable. In this respect, enforcement, timing, financing and public sentiment are essential elements in determining the merits of a regulatory approach. The City is in a good position to work with the other sectors of the community, in a voluntary way, toward developing a local energy management plan.

## 2. Property Tax Abatement

The only taxes which cities and towns in Massachusetts are authorized to collect are property taxes. With Proposition 2 1/2, this power to tax is restricted. Nevertheless, a locality has the authority to tax classes of property differently as long as the total tax collected does not exceed 2 1/2% of the full and fair market value. In this way, Somerville could give a property tax break to homeowners who have implemented energy-conserving measures or solar energy systems. Because of the uncertainty and budget cuts caused by Proposition 2 1/2, a conservation or solar energy property tax abatement would be untimely.

The state has enacted a law which exempts "any solar or wind powered system or device which is being utilized as a primary or

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<sup>11</sup> Dept. of Public Health, 105 CMR 400.501.

auxiliary power system for the purpose of heating or otherwise supplying the energy needs of property taxable under this chapter." <sup>12</sup> Approved systems are exempt from the property tax for a period of 20 years from installation. Property with solar- or wind-powered systems will not be assessed for the value of the system.

It is unclear whether the impact of enacting a local property tax abatement for solar systems would be of any significance. Before considering this approach, the overall effects of the state law should be analyzed to determine if the use of renewable energy systems has increased in the state as a result of the property tax exemption.

#### B. PROTECTING SOLAR ACCESS -- PUBLIC VS. PRIVATE

Ways in which Somerville might use its regulatory power to encourage residential energy conservation were identified in the preceding discussion. This section will look at what role the City can play in both encouraging and protecting solar access. Each of the following tools will be presented:

1. Zoning
  - a. Eliminating obstacles to solar system
  - b. Solar access permit system
  - c. Solar envelope zoning
2. Private Easements
3. Restrictive Covenants

#### 1. Zoning

Somerville can provide solar access protection through its zoning powers. Zoning is generally considered to be an appropriate mechanism to provide local solar access protection. <sup>13</sup>

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<sup>12</sup> Mass. Gen. Laws, Ch. 59 § 5 (45).

<sup>13</sup> Northeast Solar Energy Center, Proceedings of a Workshop on Solar Access Legislation, July 1979. (U.S. Department of Energy Contract #EM-78-C-01-4274.)

Other communities have taken the lead in amending their zoning ordinances to encourage or in some instances require energy conservation and renewable resource measures. For example, several communities in Addison County, Vermont, have each redrafted their zoning codes to provide solar access protection.<sup>14</sup> In Minneapolis, Minnesota, the city zoning code was amended to establish a solar access permit system.<sup>15</sup> Central Naugatuck Valley Regional Planning Commission (in Connecticut) has developed specific solar access suggestions for each of the communities within its jurisdiction.<sup>16</sup> In short, there is a growing concern among communities to develop local solar access protection.

The strategies discussed will require an amendment to the City's zoning ordinance. To do this, Somerville must establish energy conservation and solar access protection as a public purpose. The authority to amend the zoning ordinance for solar access is implicit in Chapter 808 passed in 1975 as an amendment to the Commonwealth's Zoning Enabling Act. "Careful construction of Chapter 808 in relation to the Home Rule Amendment (Chapter 40A) also makes possible many potential zoning innovations not specifically cited in the new Chapter 40A; these areas include solar access, growth management, aesthetics and water zoning."<sup>17</sup>

Furthermore, specific language of the 1975 amendment to the Zoning Enabling Act provides that:

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<sup>14</sup> Addison County Regional Planning and Development Commission, Solar Commercialization in Addison County, Vermont: Results of a Model Program. 1979-1980.

<sup>15</sup> Solar Access Protection Ordinance, City of Minneapolis, Minnesota, September 12, 1980.

<sup>16</sup> Central Naugatuck Valley Regional Planning Agency, Meeting the Energy Crisis: New Considerations For Planning and Zoning in the 80's, Central Naugatuck Valley, Connecticut, February 1980.

<sup>17</sup> Philip Herr, "Innovative Zoning Possibilities", A Guide to Massachusetts New Zoning Act Chapter 808, The Acts of 1975.

This Act is designed to provide standardized procedures for the administration and promulgation of municipal zoning laws. This section is designed to suggest objectives for which zoning might be established which include, but are not limited to, the following...to conserve the value of land and buildings, including the conservation of natural resources and the prevention of blight and pollution of the environment..."<sup>18</sup>

### Solar Access

Solar access protection is being implemented on both the state and local level for new construction and for existing structures. Protection can be provided through local zoning or code enforcement procedures. It can also be negotiated through private agreements with a minimum amount of city involvement. Rapidly-growing areas look to new subdivision regulations to promote better solar utilization. Somerville, like most northeastern cities, needs to concentrate on its existing housing and on ways to provide solar access protection to these homes.

Solar access protection is a realistic alternative for Somerville to consider. The City has a uniform highly-dense pattern of development. Buildings are low rise, mostly 3- to 4-story detached structures with flat rooftops; they are located close to one another. With few exceptions, the City adheres to its pattern of low rise development.

Consequently, Somerville's rooftop access potential is good, particularly for solar domestic hot water. Since Somerville is nearly all developed, there is almost no land for new development. In this way,

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<sup>18</sup> Chapter 808 of the Amendments to the Massachusetts Zoning Enabling Act of 1975.

solar access protection will not interfere with future growth. Somerville's urban form makes city-wide solar access protection a strong possibility.

For this and other reasons, the citizens who attended CEAC's energy planning workshop agreed that promotion of the use of solar energy should be a priority action in the community energy plan. As an established and well-known land-use tool, zoning is a valuable way to promote solar energy in the community.

### Solar Zoning Changes

Changes in Somerville's zoning could take the form of:

1. eliminating obstacles to installation of solar energy systems
2. providing solar access protection to solar energy systems through establishing a solar energy permit system.

A revised solar access zoning ordinance for Somerville has been developed which includes these changes (see Appendix A). The following will be a discussion of the major provisions in the revised code.

#### a. Eliminating obstacles to solar energy systems

Somerville's zoning ordinance could be revised to include language which specifically permits the installation of active and passive solar energy systems. The new language clarifies that solar energy is to be encouraged and that solar energy systems are a permitted use in Somerville. The following are the parts of the zoning ordinance which should be reviewed to facilitate the use of solar energy systems:



Public Purpose: The City's intent to encourage solar energy should be expressly stated as a purpose of the zoning code.

Height: Language should be included which exempts solar energy systems from height restrictions. This is particularly important in cases where the roof slope or orientation is not optimal and collectors must be elevated above the roof on mountings. Under present language, solar roof-mounted collectors could be prohibited.

Yard Projections: Yard projections include, rear, front and side yard setbacks. Zoning should ensure that yard projections are flexible enough to allow certain solar energy systems. Language regulating yard projections could influence three types of solar systems: solar shade control devices, such as overhangs which are used in actively or passively heated structures and which shade solar collector area to prevent overheating (generally, 4' is considered sufficient for an overhang)<sup>19</sup>; ground reflectors which are designed to increase the efficiency of the solar system and ground active or passive collectors; and solar greenhouses used for heating, cooling or agriculture.<sup>20</sup>

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<sup>19</sup> Martin Jaffe and Duncan Erley, Protecting Solar Access to Residential Development: A Guidebook for Planning Officials (Chicago: American Planning Association, under contract with the U.S. Department of Housing and Urban Development HH-2573, 1979).

<sup>20</sup> Although most buildings in Somerville have little available yard space, it is important that zoning does not restrict the use of such systems as solar greenhouses, or solar overhangs which could project into yard setback regulations.

Permitted Use: Solar energy systems should be considered a permitted use.

Planting Screen Specifications: Provisions in the zoning ordinance which govern vegetation obstructing traffic visibility should, when possible, also ensure that solar access is protected.

Language changes to the City's zoning code can promote the use of solar energy throughout the community by ensuring that solar energy systems will be a permitted use. The administration and enforcement of these changes will be minor while the benefits will be broad-reaching.

Nevertheless, these solar system installations must be given protection from problems caused by shading. The City can play a role in providing this protection.

b. Solar access protection through establishing a solar permit system

Zoning changes can be made to encourage the use of solar energy in Somerville. Once a solar energy system is installed, however, the system owner should be concerned that future development or vegetation does not obstruct access to the sun. The solar system owner wants to be sure the system will consistently provide a reliable source of energy while the adjacent property owners do not want their development rights unfairly restricted to protect the use of someone else's single solar energy system. Solar access protection becomes a balance between saving energy and restricting development. The City can play an important role in striking that balance.

As the preceding discussion illustrated, solar access protection,

particularly rooftop protection, has good potential in Somerville. Solar access protection can be broken down into public and private sector actions:

Public

Solar access permit system  
Solar envelope zoning

Private

Solar easements  
Restrictive covenants

Each action will be discussed in terms of the City's role in promoting solar access. More emphasis is placed on the solar access permit system approach, as it seems to be the most appropriate action for Somerville to take.

*Solar access protection permit system*

A Solar Access Protection Ordinance for the city of Somerville can be found in Appendix B. The ordinance provides solar access protection to a solar collector owner who applies and is approved for a solar access permit. The permit system is designed to reduce the burdens of administration and enforcement by:

1. building the solar access permit into the building permit system (the building permit and solar access permit are two separate applications). In this way, the administrative burden establishing a separate procedure is eliminated
2. placing the burden of proof on the solar collector applicant to show that the solar system will not unfairly restrict surrounding development
3. involving the Office of Planning and Development because of its expertise in energy and development in an advisory role to the building inspector.

## The Process

The solar permits process is designed to anticipate and handle potential conflicts which could arise over solar access. A full description of the actual permit process is found in Appendix B. This section demonstrates how the process will respond in three situations.

### 1. Best Case

The applicant applies for a building permit and a solar access permit. All abutting property owners, as indicated on the application, are notified of the pending solar access permit application. No one objects; the Office of Planning and Development makes a favorable recommendation to the Building Inspector and the solar access permit is issued.

### 2. Opposition

This time an abutting property owner objects to the solar access permit application on the grounds that the permit will prevent plans to build an addition to his/her top floor. The objector has been considering the addition as a future home improvement in five or six years. There are no written plans or designs. The Office of Planning and Development reviews the comments and recommends to the Building Inspector that the permit be approved. The OPD maintains that the objector could still build an addition, perhaps a smaller one, but one which would not interfere with the applicant's solar access rights. The solar permit is issued and the objector files an appeal to the Zoning Board of Appeals.

At this point, the solar permit applicant must:

1. show that he/she has done everything possible to locate the collector in a place which would minimize restriction on surrounding development
2. show how much sunlight will be obstructed and an estimated

amount of energy lost as a result of the adjacent development.

The Zoning Board of Appeals makes its decision based on the arguments of the objector and on the evidence submitted by the collector owner. It may issue the solar permit with an exception for the plans of the objector, who must develop within a specified number of years or lose the right to an exception.

3. Future Conflict

An application is made for a building permit, and the Building Inspector discovers that a solar access permit was issued on an adjacent property five years ago. The cross-check occurs when the Building Inspector checks permit applicant's address against the solar access permit file.

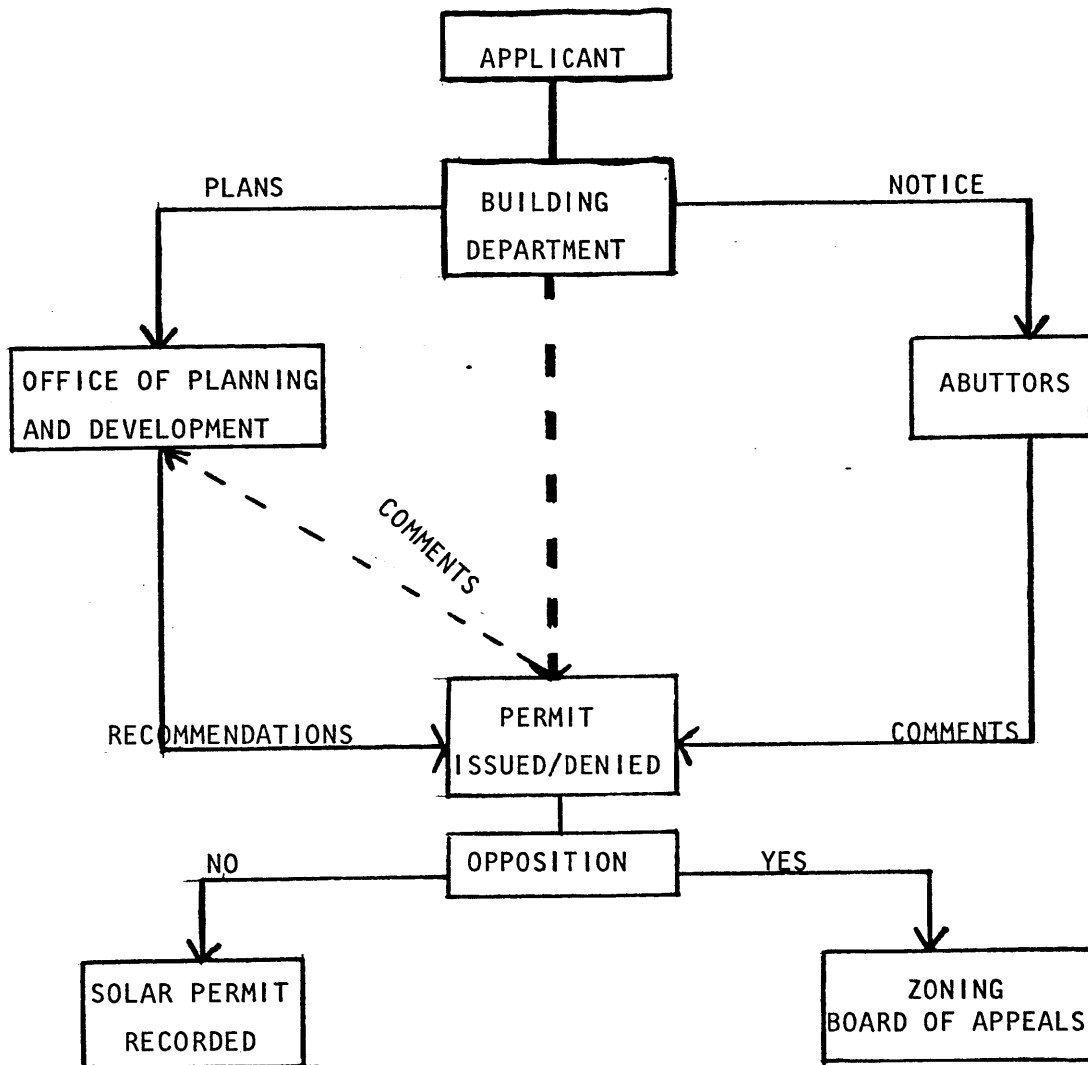
The solar permit holder is notified by the building inspector and must show that the proposed development will or will not shade the registered collector during the hours of either guaranteed or partial protection. (See Appendix B for definitions of guaranteed and partial protection.) A recommendation is made by the Office of Planning and Development to the building inspector. Based on the building inspector's decision, an appeal can be made to the Zoning Board of Appeals.

	Application	Permit	Notice	Recordation/ Enforcement	Hearing	Recommendation	Burden of Proof
Building Department		●	●	●			
Office of Planning and Development						●	
Zoning Board of Appeals					●		
Applicant	●						●

Built into the process is an appeals procedure to the Zoning Board of Appeals.

The following diagram shows how the permit process works:

SOLAR ACCESS PROTECTION PERMIT SYSTEM



## Major Issues

### 1. Burden of Proof

The burden of proof rests on the solar permit applicant to show that:

- a. the collector has been sited in such a way as to minimize development restrictions on abutting property
- b. in the event that an abutt r decides to build an addition to his/her structure, the solar access permit holder will have to prove that the development will significantly impact the efficiency of his/her collector.

Because all the benefits of the solar access permit accrue to the solar collector owner, it is not unreasonable to place the burden of proof there.

### 2. Enforcement

The solar access permit file should be checked before the Building Department issues a building permit. If the applicant is an abuttor to a solar access permit holder, it is up to the solar collector owner to prove that the building addition will not obstruct his/her solar access. The Office of Planning and Development has considerable responsibility in formulating recommendations for the building inspector.

### 3. Vegetation

Protecting solar access involves shadows from both structures and vegetation. Buildings are less complex than vegetation to control. In the solar access permit procedure for Somerville, existing trees are not covered by the ordinance. To protect future vegetation from blocking solar access, the solar collector owner may record all vegetation on the surrounding property on the site analysis. Abuttors would have the opportunity to review the site plan for its accuracy.

Enforcement of vegetation would be by complaint.

The vegetation provision is not designed to discourage vegetation, but rather to encourage type and location of vegetation which will not interfere with the solar system collector surface. The City could provide information regarding the most appropriate types of trees so as to not block sunlight.

c. Solar envelope zoning

Another way to protect solar access is through the concept of a solar envelope. A solar envelope defines buildable area according to changing daily and seasonal positions of the sun. Shading is kept within the boundaries of the lot during a specified period during the day (i.e. 9 a.m. to 3 p.m.).

Somerville's conventional zoning defines buildable area in terms of height, setback and floor area ratio, which forms a simple rectangular box shape which fits over the buildable area of the lot. Vegetation is outside of the envelope (see Diagram 1). Unlike conventional zoning, the solar envelope concept forms a low tent shape over the buildable area of the lot (see Diagram 2).

The solar envelope can be tailored to the size, slope and orientation of the actual environment and development conditions in different areas of the City. Solar overlay zones, which uniformly apply to areas of the City, can vary from zone to zone. This provides flexibility for development to occur based on specific site considerations. In addition, solar envelope zoning allows greater development to take place on north-sloping sites where solar interference is less of a problem.

Generally, solar envelope zoning is more appropriate for new development than existing structures. In Somerville, however, areas of the City which are potential development areas might be appropriate



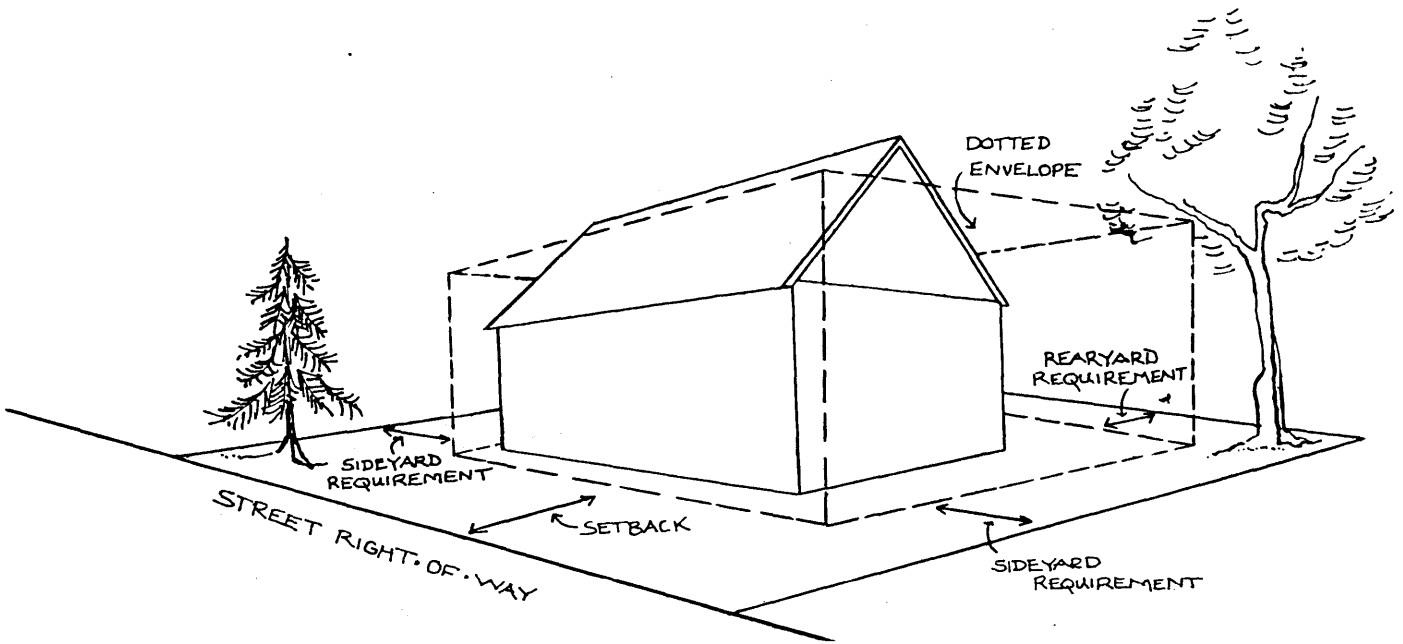


Diagram 1. Conventional Zoning

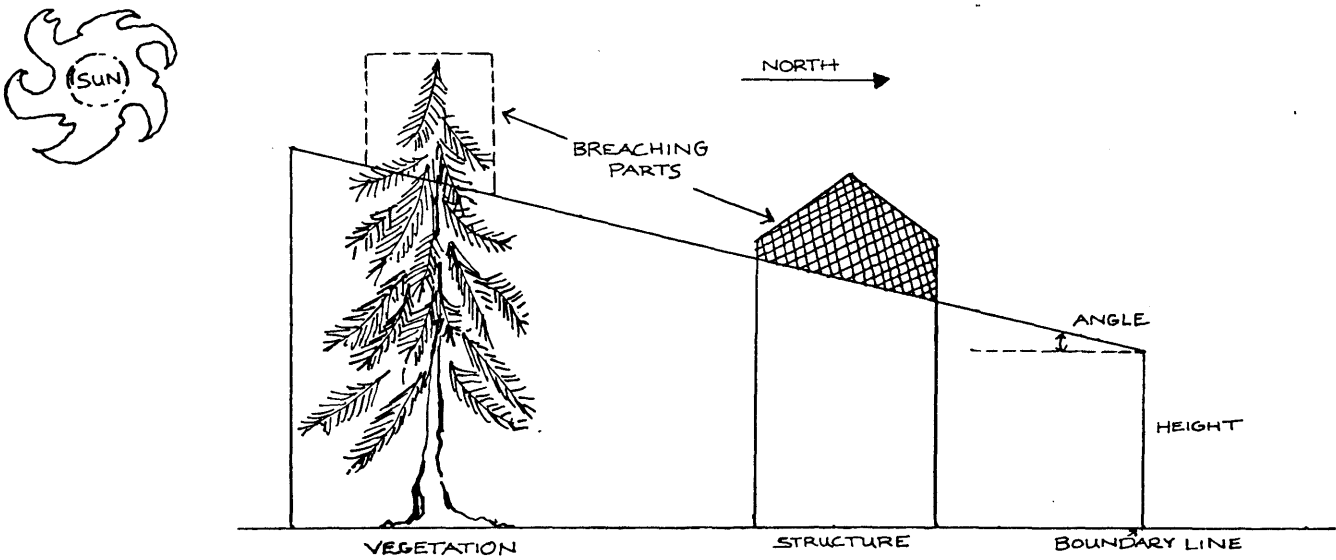


Diagram 2. Solar Envelope Zoning

Taken from Gail Boyer Hayes, Solar Access Law Protecting Access to Solar Energy Systems

for a solar overlay zone. For example, Davis Square, with the extension of the Red Line subway, will be undergoing increased development. The neighbors, wanting to keep the present image of Davis Square intact, voted to impose a 6-story height limitation in the district. This limitation could be further defined by solar overlay zone.

The envelope zoning approach is unnecessary in Somerville; its building form is such that solar access could be protected through conventional zoning and special permit system, as described before.

## 2. Solar Easements

The right to solar access protection can be obtained through zoning or private easement. "Easements are interests in real property that can be transferred like the property itself."<sup>21</sup> To be legally binding, easements must be in writing and include the limitations of the agreement and termination terms. Granting of a solar easement specifically requires a description of the space to be protected. In addition, an easement must be recorded to be transferred from one owner to the next.

Solar space can be defined in terms of:

1. vertical and horizontal angles of the sun
2. three-dimensional space
3. time and place in which obstruction is prohibited

The description of the air space is important as it informs the neighbor of the height over which he or she agrees not to build. (see Diagram 3).

"Easements for solar access protection may be drafted under existing property law in all states."<sup>21</sup> In fact, many states have

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<sup>21</sup> Duncan Erley and Martin Jaffe, Site Planning for Solar Access: A Guidebook for Residential Developers and Site Planners (Chicago: American Planning Association under contract with U.S. Dept. of Housing and Urban Development #H-2573), p. 120.

enacted laws which set forth technical requirements for solar access easements.<sup>22</sup>

A municipality in Massachusetts has no legal authority to regulate solar easements. It could, however, promote their use within the community. For example, in Colorado Springs, Colorado, the city passed an ordinance which acknowledges that all property will not be entitled to install solar collectors, but that reasonable care should be taken to protect the opportunity whenever possible. The ordinance does not carry the force of law but simply encourages the use of solar energy in the community.

Somerville could protect its citizens with a standard solar easement agreement. The model could include defining the airspace to be protected and its value; in this way, the city could help reduce legal fees. It could also pass an ordinance to create public awareness and encourage the establishment of solar easements.

Solar easements are a good way to protect solar access because they are:

- legally binding
- permanent
- shaped to fit individual site and system requirements
- involve no public expenditures or bureaucratic processes

One of the biggest problems with negotiating an easement is determining the value of the air space. "Solar easements will be used more effectively in single family residential areas where present and future value of air space is minimal."<sup>23</sup>

The city could help determine the value of air space by assessing property with and without solar easements to give the parties an idea of the value of the benefits given up.

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<sup>22</sup> Gail Boyer Hayes, Solar Access Law Protecting Access to Sunlight for Solar Energy Systems (Washington, D.C.: Environmental Law Institute for the U.S. Dept. of Housing and Urban Dev., H-8213G, May 1979), p. 112.

<sup>23</sup> Sandy F. Kramer, Solar Law (Colorado Springs: Shepard's Inc., 1978).

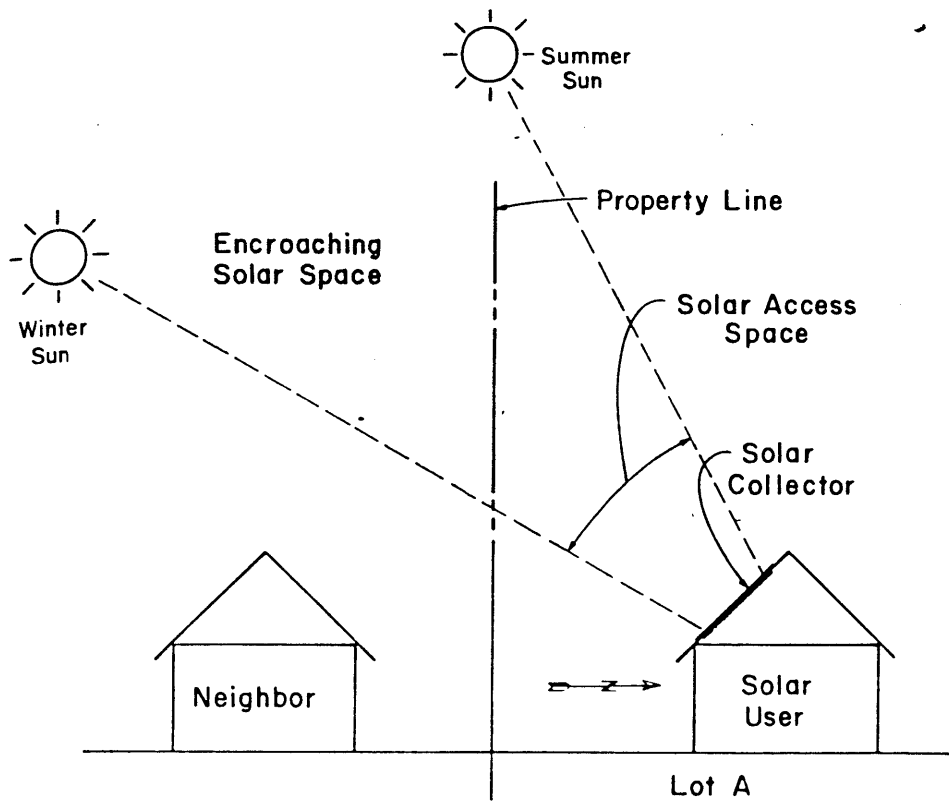


Diagram 3. Solar Access

Taken from "Describing the Solar Space in a Solar Easement,"  
Solar Law Reporter, July/August 1980, p. 301.

### 3. Restrictive Covenants

"A restrictive covenant is a contract between two or more persons which involves mutual promises of reciprocal benefits and burdens among consenting landowners." A covenant is considered restrictive if it requires parties to restrict development opportunities."<sup>24</sup> A restrictive covenant differs from a solar easement in it provides mutual benefits or burdens. For the most part, restrictive covenants are used in new residential development where the developer will incorporate the restrictions into the deed of each lot sold in the subdivision. Restrictive covenants, like zoning, can inhibit the development of solar energy. They can also be used in new subdivisions to protect solar access.

The use of restrictive covenants as a tool to protect solar access is not appropriate in Somerville since nearly all of the City's construction is in retrofitting existing structures.

### C. ORGANIZATIONAL MODELS

The City can play an important role in either administering energy programs or providing assistance to other organizations involved in energy conservation or renewable resource efforts. This section will outline the organizational models which can become vehicles for implementing local energy programs. Somerville has already-existing organizations upon which it can build a comprehensive energy plan. It may, however, be necessary to establish new structures which are better suited to coordinate or administer energy-related activities.

Individual solutions depend on local perceptions, social and

<sup>24</sup> Site Planning for Solar Access, *Ibid.*, p. 117.

political conditions. The organizational models presented must be viewed under these conditions -- without people and ideas, these structures have no life. The following models will be discussed:

1. Public agency model
2. Non-profit organization model
3. Quasi-public corporation model
4. Cooperative model
5. Private for profit organization model

Several of the models to be discussed exist in Somerville and are presently involved in the energy area. Local organizational resources should be inventoried to establish a network of community energy organizations. Organizations could be involved in sponsoring demonstrations, projects, administering or financing programs, or producing energy.

The value of an organizational model depends on how it fits into an ongoing energy plan. Furthermore, a model's value depends on how it will be used. Different models are more suitable to specific outcomes.

#### 1. Public Agency Model

An appropriate public agency to administer or finance energy programs already exists in Somerville. The energy coordinator with the Office of Planning and Development fills that role. Somerville's energy program goes well beyond energy management in municipal buildings -- it reaches out to all energy users in the City. The

energy coordinator, in addition, looks for new programs, ideas, and ways to finance them. Clearly, the energy coordinator can not be responsible for all facets of the City's energy plan and must rely on other community groups to share the work. As a representative from the City, the energy coordinator is in a unique position to provide:

- resource and referral information -- the energy coordinator is knowledgeable about energy issues in the community, and can serve as a referral network for other energy programs
- energy assistance -- the energy coordinator can promote the concept of energy programs and fit programs to the appropriate resources. For example the energy coordinator might investigate a local energy cooperative by targeting community groups and providing technical assistance to get them organized, help a new energy-related business get going, or help an existing business expand
- liaison -- an important role for the energy coordinator is as a liaison between municipal agencies and the community.

Table 1 is an analysis of the advantages and disadvantages of using a local public agency such as the Office of Planning and Development.

## 2. Non-Profit Organization Model

Churches, social service organizations and community development corporations are examples of local non-profit organizations which can play an active part in the energy planning process. Each organization serves a specific audience in the community and therefore has a unique function to perform. Hands-on demonstration programs, energy education, outreach, technical assistance, to name a few, are all ways

Table 1

PUBLIC AGENCY MODEL

Somerville's Office of Planning and Development

ADVANTAGES	DISADVANTAGES
<p>has existing position of local energy coordinator to build upon</p> <p>is in a good position to influence municipal policy</p> <p>can use city authority to implement programs</p> <p>able to reach all sectors of community and provide information and technical assistance</p> <p>has staff experts in housing and economic development</p> <p>can communicate with other city and community programs</p>	<p>vulnerable to federal, state and local funding cutbacks</p> <p>unable to tap private capital markets</p> <p>subject to political pressures</p> <p>vulnerable to change in administration (Somerville's mayoral elections every 2 years)</p> <p>increases administrative and enforcement workload of City</p>



in which Somerville's non-profit organizations can become involved. Non-profit organizations, in addition, can apply for foundation grants. This section deals with the Community Development Corporation (CDC) model -- a type of non-profit organization established to increase local employment opportunities and improve community conditions. In Somerville, Somerville's United Neighborhoods Community Development Corporation (SUN-CDC) is involved in the areas of housing rehabilitation, small-business development and energy.

For example, SUN-CDC has helped a small weatherization workers cooperative called SUNRISE Efficiency Association to set up a weatherization program for low-income homeowners and tenants. SUN-CDC does the audits and SUNRISE Efficiency Association does the installation and conservation work. Plans are being developed to start a Somerville building materials cooperative -- which would carry a wide variety of energy conservation materials in addition to standard non-energy building materials. In the future, SUN-CDC would like to start a fuel-buying co-op and small energy business such as a solar collector manufacturer, van pooling program and a recycling program. Clearly, SUN-CDC is playing a major role in promoting local energy action.

CDC's are often considered as intermediaries to locally-administered state and federal programs. The state is considering a comprehensive energy financing package which would give a local organization such as a CDC authority to provide low-interest energy conservation financing from a state bond issue. Other legislative proposals have also specifically designated CDC's as appropriate local structures.

To Somerville's advantage, SUN-CDC is not only established but knowledgeable on energy issues. Table 2 outlines the advantages and disadvantages of using a CDC to finance and administer energy programs.

Table 2

NON-PROFIT ORGANIZATION MODEL

Somerville United Neighborhoods  
Community Development Corporation

ADVANTAGES

DISADVANTAGES

<p>facilitates acquisition of federal and state monies through existing channels</p> <p>has access to Community Development Finance Corporation (CDFC) venture capital</p> <p>can secure private sources of venture capital</p> <p>has currently-existing network of community inputs to ensure public accountability</p> <p>requires no new administrative structure</p> <p>has an interest in and has already sponsored energy programs: weatherization program for low-income people already in progress</p> <p>imposes no liability for the City</p>	<p>vulnerable to uncertain federal and state funding</p> <p>credibility in the eyes of the private money market -- may make it difficult to find investors interested in CDC's</p> <p>would compete with other CDC projects for money and management attention</p>
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### 3. Quasi-Public Corporation Model

A quasi-public corporation is established by the City, yet it can act as an independent organization with policy-making authority. It is managed by a Board of Directors, all of whom are appointed by the mayor. Unlike a CDC, a quasi-public corporation does not restrict itself to economic development. It could take a more active oversight role to the community planning effort.

A quasi-public body can have representatives from different sectors of the community such as bankers, real estate brokers, businesses and consumers. As an independent agency, a quasi-public corporation is often run more like a private business rather than a government agency, which lends more credibility to the quasi-public corporation in the eyes of the business community. For example, Baltimore, Maryland set up a highly-successful quasi-public corporation to manage the redevelopment of its inner harbor -- a large-scale, urban renewal effort. The Charles Center-Inner Harbor Corporation was credited with the success of Baltimore's harbor showplace.

Establishing a quasi-public corporation in Somerville is premature at this time; the possibility, however, should not be ruled out for future consideration. At this time, Somerville would be wiser to build on existing structures. Table 3 shows the advantages and disadvantages of setting up a quasi-public structure.

### 4. Cooperative Model

Energy cooperatives are becoming popular in Massachusetts and throughout the country. These are primarily consumer co-ops whose members join together to purchase energy supplies and energy-saving materials in quantity, and to volunteer time and skills to help each other cut energy bills. This buying arrangement eliminates the middleman's

Table 3

QUASI-PUBLIC CORPORATION MODEL

ADVANTAGES	DISADVANTAGES
<p>has access to municipal funds</p> <p>possibility exists for bond issuance</p> <p>can focus on city-wide programs</p> <p>ensures public accountability through oversight by City</p> <p>offers potential for consolidation of existing energy programs</p> <p>can undertake municipal projects</p> <p>can speak to both public and private sector interests</p> <p>less politically vulnerable</p> <p>Board of Directors can be representative group from Somerville community</p>	<p>may inhibit use of private venture capital</p> <p>entails extensive legal work to establish</p> <p>does not ensure direct community participation</p> <p>imposes liability for the City</p>

profit and provides energy or energy-conserving materials to members at cost. Producer co-ops service persons who provide rather than consume goods and services and are less common types of energy co-ops.

Somerville has its own workers cooperative -- SUNRISE Efficiency Association, which offers weatherization services. The Boston Building Materials Co-op provides conservation materials, including insulation installation equipment and storm windows at reduced cost to its members. The nine hilltowns in western Hampshire County have established a fuel wood co-op which has successfully reduced the costs of firewood for its members. The South Middlesex Opportunity Council in Framingham has started an energy/food co-op for low-income persons in the area with further plans to extend services provided by the co-op. Co-op structures might be established to provide:

- bulk fuel purchasing
- boiler maintenance and repair
- energy auditing
- weatherization and conservation services
- energy legal aid
- energy economic development, including solar collector manufacturers
- leasing and installation of alternative energy systems
- energy education and planning
- energy design and research
- energy advocacy
- energy storage
- energy production <sup>25</sup>

The potential for Somerville to save energy and money through a cooperative structure is great, and an energy co-op could be an integral part of Somerville's energy plan.

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<sup>25</sup> Conference on Alternative State and Local Policies, Cooperatives and Energy (Washington, D.C.: The Energy Project and the Coop Bank Projects).

Unlike food co-ops where members purchase on a regular basis, some energy co-ops tend to provide one-shot services such as insulation and storm windows. Because of this, energy co-ops often find it difficult to sustain an ongoing interest among its members. This issue has been resolved by either combining energy products with some other goods such as general building materials, or organizing around a goal. A co-op is then set up until that goal is accomplished. For example, the goal might be to insulate a percentage of homes in the City and a local co-op could be organized to purchase materials and provide service for a short time. CEAC and the City could play an important organizing role. In addition, the National Consumer Cooperative Bank was established by Congress to promote the development of new and existing co-ops. It does this through:

- direct loans
- self-help (low-interest) loans
- technical assistance

The co-op bank is interested in expanding opportunities in the energy areas.<sup>26</sup>

Table 4 shows the advantages and disadvantages of energy cooperatives.

##### 5. Private or For-Profit Organization Model

In this present period of scarce public resources, communities are turning to the private sector to provide local services and financing for energy conservation on renewable resources. The demand exists and the technology is reliable, which makes the energy field a good business opportunity. The City can play a useful role in helping small energy-related businesses get started in Somerville by offering technical assistance or financial packaging of loan applications, marketing

<sup>26</sup> Ibid.

Table 4

ENERGY COOPERATIVE MODEL

ADVANTAGES	DISADVANTAGES
<p>members share in decision-making and profits</p> <p>provides lower-cost goods and services to members by eliminating middle-man profit</p> <p>eligible for assistance through National Co-op Bank</p> <p>offers basic service to members, i.e. how to use all insulation</p> <p>flexible enough to be organized spontaneously around an issue</p>	<p>organized energy co-ops may be difficult to sustain</p> <p>co-op investment considered high risk by private investors</p> <p>often hard to match price of large hardware stores</p> <p>heavy financial start-up burdens</p>

and locational decisions. For example, the Office of Planning and Development, under the direction of the City's energy coordinator, is looking at ways to set up several neighborhood-based energy stores which would provide comprehensive energy services such as:

- conservation financing
- audits
- demonstration projects
- technical assistance
- revolving low-interest energy conservation funds<sup>27</sup>

An energy business would serve to complement both the economic development and energy conservation goals of the community. Moreover, a good business operation is in a better position to go after venture capital markets; it provides a stream of revenue; and adds to the tax base of the City. Table 5 shows the advantages and disadvantages of organizations for profit.

### Conclusion

The preceding discussion was designed to be a sampling of the possible organizational models which Somerville could consider to administer and finance local energy programs. In selecting an organizational structure for the City, it is important to:

- build on existing structures and programs
- determine what you want the structure to do: finance, educate, coordinate

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<sup>27</sup> City of Somerville Office of Planning and Development, Innovative Grant Application for Community Energy Conservation, submitted to U.S. Dept. of Housing and Urban Development, June 18, 1980.



Table 5

FOR-PROFIT ORGANIZATION MODEL

ADVANTAGES	DISADVANTAGES
provide comprehensive energy conservation services -- "one-stop shopping"  not dependent on government subsidies  better able to attract venture capital markets  adds to tax base of city	no public oversight

- target the groups you want to serve: homeowners, businesses, municipal
- match structures with program priorities

The success of comprehensive energy planning depends on integrating various sectors of the community into a cooperative planning effort. In this respect, organizational models must be flexible and creative enough to fit into the comprehensive picture.

#### D. LOCAL FINANCING

The preceding section provided an overview of the organizational models which could be appropriate to either finance or administer local energy programs. Innovative financing strategies are being explored by communities all over the country to help citizens implement energy conservation measures or renewable resource technologies. Certain financing strategies are better suited to certain organizational structures; the selection process is based on the individual needs of the community. This section will address ways in which the City can help finance local energy programs. Specifically, it talks about the authority of cities and towns in Massachusetts to use bonding proceeds to make low-interest energy conservation loans.

Presently, the City's Office of Planning and Development is using federal and state money to administer and fund its energy programs. This money is in short supply but high demand. The City is now beginning to look to the private market to make available energy conservation or renewable resource loans.

In the present context of federal budget cuts and Proposition 2 1/2, Somerville is financially strapped, as are most cities and towns in Massachusetts. Budget cuts are being made and municipal employees are being laid off. Many communities in Massachusetts,

including Somerville, have lost their bond ratings. In this context, talking about using municipal bond proceeds to provide energy conservation loans seems fruitless. It may, however, be an alternative to consider in the future.

In an opinion to the Governor,<sup>28</sup> the justices of the Supreme Court in Massachusetts found that state bond proceeds must be devoted to a public purpose with direct public benefits and where private advantages would be reasonably incidental to carry out the public purpose. The Community Development Finance Corporation (CDFC) was established for a valid public purpose, for which public funds could be expended. In this way, state bond proceeds can be used by CDC's to finance projects which ensure a public purpose for the use of the funds. Thus, CDC's could administer state bond proceeds for energy conservation loans.

It is possible that municipalities in Massachusetts could also use the proceeds of a municipal bond for low-interest conservation loans if the money were channeled through a local CDC. This option should only be considered in the long term.

It is currently more realistic for the state to exercise its bonding authority to help finance conservation and renewable improvements. On a local level, transaction costs of issuing bonds are high, making small bonds for energy purposes infeasible.

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<sup>28</sup> Opinion of the Justices to the Governor, Supreme Judicial Court of Massachusetts, October 1977.

E. NEW DEVELOPMENT CONSERVATION AND RENEWABLES OPTIONS

Almost every aspect of land development has an effect on energy use, from minute architectural detail to broad considerations of urban density. The effects of land use are long-term. Housing and commercial buildings constructed today will last at least through this century and into the next. The energy efficiency of these structures, their orientation and site design will dictate energy consumption patterns far into the future. Many communities are using such land-use tools as planned unit development procedures or new subdivision regulations to encourage or mandate energy conservation and renewable resources.<sup>29</sup> Other tools include development packages or Chapter 121 A tax agreements. This section will address the tools available to communities to influence energy conservation in new development.

Somerville may not be in a position to take advantage of all of these tools for two reasons:

1. there is little available land for development in the City, hence, land-use tools which regulate large-scale development are unnecessary
2. the City can not change the state building code and require additional energy conservation standards.

There are, however, opportunities for Somerville to have more influence on the quality and design of future city development. For example, the City could encourage more energy-efficient development when it puts together developers' packages such as the plan for adaptive

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<sup>29</sup> American Planning Association Planning Advisory Service, Energy-Conserving Development Regulations: Current Practice, Report #352, August 1980.

reuse of several closed Somerville schools. Letting developers know that his or her plan will be given more favorable consideration if energy conservation and/or renewable resources are addressed is a logical first step. An expressed concern about greater energy efficiency in buildings does not have to have the effect of restricting development.

Other communities have worked out a range of alternatives which balance the question of development and conservation. Each community has a unique set of circumstances which require a tailor-made solution. Approaches range from voluntary to mandatory. For example, Dade County, Florida, has a site plan review process which encourages energy-efficient design methods for energy conservation. Lincoln, Nebraska developed a bonus point system which awards energy bonuses to developers who include energy conservation and renewable resource measures. The City gives energy bonuses for energy-efficient site selection, site planning, street layouts and landscaping. Mandatory requirements to install domestic solar hot water systems in all new developments are working successfully in San Diego County.<sup>30</sup>

#### 1. Planned Unit Development Process

For localities that are undergoing significant redevelopment, the Planned Unit Development Process (PUD) is a good way to encourage or mandate energy conservation and renewable resource features. PUD's are a zoning technique designed as an overall plan for a project, making the development process more creative, flexible and efficient. A local government can use site plan reviews, density bonuses, special permits and/or overlay zones to bargain for certain amenities

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<sup>30</sup>

Ibid.

incorporated in a PUD. In this way, both the city and the developer are able to negotiate the specific terms of the PUD package. For example, criteria for a PUD process review might be drafted to:

- encourage energy conservation and renewable resources by including them as criteria in the PDA process review
- provide a system of bonus points for specific energy-efficient measures
- mandate certain energy-efficient standards for all site plan review

Somerville does not have a PUD procedure. It has not been necessary because of the size and type of development in the City. A PUD, however, is an interesting tool for other developing communities.

## 2. Chapter 121A Tax Agreements

Chapter 121A of the Massachusetts General Laws is a local law which is designed to stimulate development in the state of projects which will have "a beneficial impact on the community."<sup>31</sup> The 121A mechanism exempts certain developments from the real property tax. Instead, the City and the developer negotiate what the terms of the agreement will be. The developer pays the agreed amount as an excise tax to the state Department of Revenue which, in turn, returns the money to the municipality on a cherry sheet distribution.

The state has outlined specific guidelines and procedural

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<sup>31</sup> Massachusetts Executive Office of Communities and Development, Chapter 121A, A Handbook for Local Officials, November 1979.

requirements which an eligible 121A tax entity must follow. Communities are allowed to develop policy guidelines which define what specific local concerns are. A community could use this opportunity to encourage energy conservation and renewable resources in any 121A tax agreement. With Proposition 2 1/2, the Office of Communities and Development expects that 121A's will become more popular because they are exempt from local property tax restrictions. Although Somerville has not negotiated a 121A, it could be an alternative, to consider in the future.

### 3. Development Packages

Development packages are another way in which the City can encourage energy conservation and renewable resources. The City could let developers know that, for example, a plan which includes domestic hot water heaters will be reviewed more favorably than one which relies on more conventional energy systems. A development package could also require specific energy-efficient measures for review.

For Somerville, the developer's package would be most appropriate, given the City's limited development potential. Because the City is interested in encouraging more growth in the community, a mandatory requirement might be too restrictive at this time. An approach which encourages more energy-efficient development could be more easily accomplished.

### F. ENERGY AS A PUBLIC PURPOSE

Local governments must establish energy conservation and renewable resources as a public purpose. Without doing so, authority to manage local energy use could be challenged; courts generally will support a

local government's decision if it is expressed in a public policy statement (see Appendix C on Legal Implications of Solar Access).

Both energy conservation and renewable resource strategies are considered valid reasons for promoting public purpose:

- conventional energy is in short supply
- conservation is essential to reducing dependence on foreign oil
- citizens face the possibility of a severe energy shortage

The State of Massachusetts established energy conservation and renewable energy resources as a valid public purpose when the Office of Energy Resources was established.

"It is the purpose and policy of this chapter...to protect the people of the Commonwealth in their right to the conservation, development, and utilization of natural resources, to promote the health, safety, welfare and convenience of the commonwealth and its citizens by reducing the dependence of the commonwealth and its citizens on the use of hydrocarbon fuels; to promote the development of alternative energy and energy conservation; ....it is therefore expressly declared that the provisions of this chapter and the powers herein conferred, constitute needed programs in the public interest and serve a necessary and valid purpose for which public money may be expended or invested."<sup>32</sup>

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<sup>32</sup> Massachusetts General Laws, Chapter 25A § 1 (B), (C)



A local policy statement is the first step toward enacting an ordinance to influence local energy consumption. There are several ways in which a community could establish local energy resource management as a public purpose:

1. Comprehensive Plan

Encouraging energy conservation and renewable resources in the community is a goal which can be included in the public purpose section of a local comprehensive plan. Since Somerville does not have a local comprehensive plan, this is the least appropriate mechanism to use. There are other ways, however, in which Somerville might be able to do this. For example, a bill has been introduced in the state called the Balanced Growth and Development Act. The legislation is designed to "reduce regulatory delays, simplify the construction of much needed housing, promote the protection of environmentally sensitive areas and reduce both the private and public costs of development."<sup>33</sup>

The bill does so by encouraging cities and towns to adopt local plans which address local housing, economic development and environmental needs; the process is voluntary and the plan is short-term (three to five years). Cities and towns which develop local growth management plans will be given priority in the distribution of the state's discretionary funds. Although the legislation has not yet been approved, it does indicate the kind of opportunities that might be available to Somerville to establish energy conservation and renewable resources as a public purpose.

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<sup>33</sup> Special Commission on the Effects of Present Growth Patterns on the Quality of Life in the Commonwealth, Massachusetts Growth and Development Act, filed March 29, 1981.

## 2. Zoning Ordinance

Energy conservation and renewable resources can be included as a public purpose in the City's zoning ordinance. This is a useful way for Somerville to establish energy conservation and solar energy systems as a valid purpose of zoning. The zoning ordinance only affects local land use policies; it does not establish energy as a public purpose in general.

## 3. Citywide Resolution

The City can pass a policy statement which voices energy conservation and renewable resources as a community priority. A resolution which would establish a City Energy Constitution to spell out what are the City's energy priorities could be passed. The constitution could be amended to reflect community concerns as they change. CEAC has already initiated an energy planning process involving members of the Somerville community to define energy priorities in each sector group. These priorities could become the basis for Somerville's Energy Constitution. General statements of public policy might include:

- recognizing the need to manage local energy resources
- establishing energy conservation and renewable energy as a valid public purpose
- promoting comprehensive planning efforts in the community
- committing the City to work with other businesses, organizations and citizens who are involved in energy
- seeking available federal and state programs to bring money for local energy management in the community

- providing technical assistance or information dissemination or educational outreach in the energy area
- encouraging programs to help low and moderate income owners and tenants
- seeking energy efficient and energy related businesses in the community
- helping businesses save energy

The Somerville Energy Constitution would not have any enforcement power but would serve to define local public policy toward energy. More specific programs could be added as amendments to the constitution.

## SECTION III IMPLEMENTATION

Somerville's energy planning effort is a dynamic process -- designed to be fluid and responsive to the needs and priorities of the people who live and work there; it is comprehensive as it includes all sectors of the community -- yet its separate parts will be implemented gradually. This section will address the implementation of the legal alternatives already presented. Not all of the options are immediately feasible; some are more suitable for future consideration. The future implementation of each option depends upon the political, social and economic climate of Somerville.

### I. THE IMPLEMENTORS

#### Local Organizations

Somerville is a city of neighborhoods with a variety of community organizations. Each organization targets a different sector of the community and, in this regard, can play an important role in implementing Somerville's energy management plan. Although energy may not be the primary focus of the organization, it is an issue which can be related to other broader community concerns, such as housing, adult education or senior citizens. Somerville Citizens Energy Advisory Committee (CEAC), in particular, can serve to develop a network of community-based organizations which participate in the energy planning process. CEAC members can provide the informational and organizational support necessary to initiate energy action among local organizations.

### Office of Planning and Development

A strong base to support community energy programs exists in the City's Office of Planning and Development. Under the Brune administration, a City energy coordinator was hired. As a result of the City's efforts in the energy area, Somerville has been highly successful in getting federal and state money for municipal and residential energy conservation programs. The OPD continues to seek new ways to tackle the energy problem in Somerville.

In this respect, the OPD is the most appropriate department in the City to implement energy conservation and renewable resource programs; it has the experience and the interest in creating solutions to the energy problem. Furthermore, the OPD has staff experts in housing and economic development -- issues which are closely related to energy. Other City departments, however, can not be overlooked in their role in implementing energy programs.

### Other Resources

Somerville has other resources which can be tapped to promote energy conservation and solar energy. Tufts University, for one, is located in Somerville. Faculty and students from Tufts have worked with CEAC and the Boston Neighborhood Network to help prepare Somerville's comprehensive energy plan; university resources can continue to be used in the future. Local businesses could become involved in promoting energy conservation; banks could set aside money for low-interest loans; real estate brokers could promote the state's Residential Conservation Service (RCS) program. As part of the comprehensive energy planning effort, the City can draw upon its many local resources.

## 2. THE CONTEXT

The City of Somerville is faced with constraints which make implementation of certain energy actions difficult.

### Somerville's Tight Municipal Budget

As a result of Proposition 2 1/2, in 1981 alone Somerville will face a decrease in property tax revenue of \$5,967,723.<sup>34</sup> City departments are cutting staff and expenses in an effort to make ends meet. Uncertainty over the federal government budget cuts also contributes to the City's belt-tightening measures. Moreover, Somerville has a small commercial and industrial tax base with little available land for future development.

In an era of tight financial constraints, administrative and enforcement costs of new energy programs may be prohibitive. The City and the community must also look to other sources of support. On the state level, legislation is being considered which would provide comprehensive financing for energy conservation loans. Private venture capital markets must also be explored. Funding for energy-related programs is competitive but available.

### Political Constraints

Somerville has a history of political uncertainty. The mayor

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<sup>34</sup> "2 1/2 to Cost Cities, Towns \$557 M," The Boston Globe, 7 March 1981, sec. 1, p. 13.

serves a two-year term and with each new administration comes a new list of priorities. Consistency in city planning becomes difficult. The present Brune administration has made energy conservation a priority and has allocated staff and resources toward that goal. A new administration may hold a different view of energy management, and local energy policies could change.

In spite of local and political constraints, Somerville has its own resources which can be used to implement energy program actions. Clearly, the Somerville community can play an active role in managing local energy use by administering programs, seeking funding, or lobbying for energy conservation and solar energy programs. Future alternative actions have been presented and can be implemented when the time is right. Table 6 shows the groups involved in implementing Somerville's community energy plan.

Table 6

The Implementors -- City

- Office of Planning and Development
- Building Department
- Health Department
- Board of Aldermen
- Other City departments

The Implementors -- Community

- CEAC
- Homeowners
- Bankers, real estate brokers
- Local businesses
- Neighborhood groups
- Tenants
- Non-profit organizations

## SECTION IV CONCLUSION

As little as five years ago, local comprehensive energy planning would not have been taken seriously. No longer do we live in a society with abundant reserves of conventional energy resources, and although the energy crisis has not yet dictated the shape of our society, its effects have been to limit its range of possibilities. For these reasons, communities all over the country are seeking ways to relieve the economic and social disruptions which are caused by skyrocketing energy costs.

The problems associated with scarce and expensive conventional energy resources are pervasive, yet local solutions reflect differences in climate, politics, population, housing stock, to name a few. Because each community has its own energy needs, it must design its own energy solution.

The preceding sections presented an array of possible legal and regulatory tools for Somerville to consider in this role. Not all of the tools discussed are appropriate for Somerville to implement, yet they demonstrate the range of alternatives that communities in Massachusetts have in managing local energy use. Most importantly, communities must determine what tools will serve local needs best. In Somerville, the City can play two important functions.

### REGULATORY ROLE

A variety of legal and regulatory tools to manage local energy use have been presented. Of all the tools considered, Somerville should consider first:



1. Zoning Code Changes -- to encourage greater use of solar energy by changing language in the zoning ordinance which presents obstacles to solar energy installations. This change could be implemented immediately.

2. Solar Access Permit Procedure Ordinance -- to protect solar access to registered systems. The ordinance could be enacted in the near future.

3. Somerville Energy Constitution -- to establish energy conservation and renewable energy as a public purpose in Somerville. This could be implemented immediately

#### EDUCATIONAL AND ADVISORY CAPACITY

The City can play an important role in promoting energy conservation and renewable energy in the community. Specific ideas for programs are numerous and will not be elaborated here. Instead, general ways in which the City can be most effective include:

1. Community Outreach -- to continue the efforts of the energy coordinator in trying to encourage community involvement in the energy planning process.

2. Technical Assistance -- to help establish energy-related businesses in the community, such as a "one-stop" energy conservation store. The City is also in a good position to work with the business, banking and real estate community to promote energy interests.

3. Demonstration Programs -- to encourage the use of solar domestic hot water heating on selected residences in the City.

4. Federal and State Funding -- to establish an energy management strategy which will put Somerville in a competitive position to seek federal and state funding sources.

5. Comprehensive Oversight -- to act as a liaison between municipal agencies and the residential, commercial/industrial, financial and transportation sectors of the community.

In general, the City can take a leadership role in managing local energy resources, since it is in the best position to determine local needs, administer programs and act as a liaison among different sectors in the community. The City is unique in that it represents the entire community.

Comprehensive energy planning efforts need the support of the federal and state government. As the preceding discussion illustrated, there are certain areas which should be addressed at another level of government. For example, pricing and supply of conventional energy is clearly a federal issue. Research and development of alternative fuel sources has also been the responsibility of the federal government.

The state can play a more direct part in helping localities manage their own energy resources. Its authority is more broad-based -- reaching all cities and towns in the Commonwealth. Already the state has enacted tax incentives to encourage renewable energy systems. In addition, the state is in a much stronger position to exercise its bonding authority to provide low-interest conservation loans. This is a logical next step to complement the Residential Conservation Program (RCS) which provides energy audits to public utility customers.

Energy efficient disclosure laws are also more appropriately addressed on the state level as it has the power to influence the important participants in making the laws work -- namely the banking and real estate communities. The state could also help establish a pension fund reinvestment program or provide a corporate tax deduction for employees who make energy conservation loans to employees. Communities also turn to the state for assistance in developing and administering programs. In this way, the state can play an important technical assistance role.

Somerville can influence its energy future -- with the help of other levels of government. Each level should play the role for which it is best suited. In this way, with the cooperation of the federal and state governments and the citizens of Somerville, the City is in a good position to enact a local energy management plan.

APPENDIX A  
PROPOSED CHANGES TO SOMERVILLE'S ZONING CODE  
TO REMOVE OBSTACLES TO SOLAR ENERGY SYSTEMS

ARTICLE 1

Sec. 1.2 Purpose

The purposes of the ordinance are to promote the health, safety, and welfare of the inhabitants of Somerville; to lessen congestion in the streets; to conserve health; to secure safety from fire, panic, and other dangers; to provide adequate light and air; to prevent the overcrowding of land; to avoid undue concentration of population; to conserve natural resources, and to encourage the use of renewable energy; to facilitate the adequate provision of transportation, water, sewerage, schools, parks, and other public requirements; to conserve the value of land throughout the City and to preserve and increase the amenities of the municipality.

Sec. 2.2 Definitions

2.2.56 Solar Energy System: A solar energy device whose primary purpose is to provide for the collection, storage, and distribution of solar energy for space heating or cooling, for water heating or for industrial, commercial or agricultural processes and which is used on the premises. Such systems include, but are not limited to, active and passive solar collectors, solar greenhouses, solar overhangs and solar window box collectors.

Sec. 3.4.3 Consideration Relative to Approval (Special Exceptions)  
(added to sections (a) through (h))

(i) protection of solar access for existing solar energy systems which provide a significant amount of the specified energy needs of a building.<sup>1</sup>

Sec. 3.4.5 Floor Area Ratio on Large Lots

added...In reviewing such applications the Board of Appeals shall take into consideration, in addition to the conditions referred to as items (a) through (i) in the first paragraph of Section 3.4.3....

Sec. 3.4.9 Site Plan Review

f. The proposed development takes advantage of solar orientation and where feasible employs passive solar energy techniques. Plans will be reviewed for solar orientation, use of landscaping to minimize heating and cooling needs and use of energy conservation and renewable resources in design.

ARTICLE 6

Sec. 6.3 Floor Area Ratio

For any building or group of buildings on a lot, the ratio of the gross floor area to the lot shall not exceed the maximum specified below. For the purpose of this calculation, gross

<sup>1</sup> See Appendix B, Proposed Solar Access Protection Ordinances.

floor area shall not include basements, unenclosed porches, attics, or any floor space in accessory buildings or in the main building intended and designed for the parking of motor vehicles in order to meet the parking requirements of these regulations or solar energy systems which provide a significant portion of the structure's heating and/or cooling needs.

#### Sec. 6.6.2 Exceptions to Height Limitations

The provisions of this Ordinance governing the height of buildings shall not apply to church spires, belfries, cupolas, domes, monuments, observation towers, flag poles, masts, aerials, skylights or ventilators, solar energy systems or other structures normally built above the roof and not devoted to human occupancy. Such features and structures may be erected to their required height and in excess of the height limits otherwise provided for the district in which the structure is built as long as these structures have minimum interference with solar access protection provided by a special solar permit.

#### Sec. 6.7.1 Front Yard Requirements

Solar energy systems attached to the principal structure or independent from it can encroach up to 5 feet or one-third of the required front yard depth.

Sec. 6.8 Side Yards

6.8.7 Projections into Side Yards: Bays, balconies, chimneys, flues and fire escapes, apparatus needed for the operation of active and passive solar energy systems including but not limited to, solar greenhouses, overhangs, moveable insulating walls and roofs, detached solar collectors, reflectors and piping, steps down from the first story, and cornices, belt courses, leaders, sills, pilasters, lintels and ornamental features may project into a required side yard not more than one-quarter of the width of the latter, nor more than three feet in any case.

Sec. 6.9 Rear Yards

6.9.4 Projections into Rear Yards: ...except that solar energy systems would be allowed to encroach up to 5 feet of a rear lot line.

ARTICLE 8

Sec. 8.3 Planting Screen Specifications

All planting screens

All planting screens required by this Ordinance shall consist of plants at least thirty (30) inches high when planted, maintained, and pruned in a healthy condition from a minimum height of five (5) feet to a maximum reasonable height that will provide maximum opacity and provide adequate solar access protection without significantly reducing the efficiency of any existing solar energy system.

Sec. 8.4 Required Tree Planting

....Trees should be planted so as not to shade significantly an existing solar collector protected by a special solar permit. They should not be pruned: except for sound horticultural reasons and following sound horticultural practices or by a horticulturalist or where solar access of a solar energy system is significantly blocked or where law dictates.



APPENDIX B  
PROPOSED SOLAR ACCESS PROTECTION ORDINANCE

PURPOSE:

The Board of Aldermen of the City of Somerville finds that:

- the public health, safety and welfare of the Citizens of the City are dependent on affordable energy sources
- solar heating and cooling of buildings, solar heated hot water and solar generated electricity can provide a significant contribution to Somerville's energy supplies
- solar access is not protected under existing rules and regulations
- the city is concerned about balancing solar access protection offered against the rights of neighboring property owners
- the city notices that it is the policy of the Commonwealth of Massachusetts to expedite solar energy use.<sup>1</sup>

DEFINITIONS:

Existing Structures or Vegetation: Structures and vegetation which are in existence at the time application is made for a solar access permit are exempt from the restrictions of this ordinance.

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<sup>1</sup> Mass Gen. Laws ch 25A 1(B), ch 625 6 (d), 64H S6 (dd), and 59 S5 (45).

Grounds for Objection: An abuttor may object to a solar access permit on the following grounds:

1. he/she could not develop to heights enjoyed by neighbors
2. unfair restriction in use of property
3. decrease in real property values<sup>2</sup>

Hours of Protection: A solar energy system is protected from an obstructed path of the sun to the collector surface for:

- Hot Water Heating: 9:00 am to 3:00 pm all year round, local sun time<sup>3</sup>
- Space Heating: 9:00 am to 3:00 pm from October 1 to April 30, local sun time
- Space Cooling: 9:00 am to 3:00 pm from May 1 to September 30, local sun time.

Levels of Protection: Any blockage which occurs between the hours of 11:00 am and 1:00 pm on June 21 and January 21 is prohibited. Any blockage between the hours of 9:00 am to 11:00 am and between 1:00 pm and 3:00 pm on December 21 and June 21 would be prohibited if the efficiency of the solar collector were blocked by a significant amount. The sun chart found at the end of the ordinance shows the two levels of protection granted. The burden of proof falls on the solar collector owner to determine if a structure will affect the efficiency of his/her collector. This could be accomplished by:

<sup>2</sup> the intention is not to protect speculators.

<sup>3</sup> "At any given location within the United States or Canada, sun time is found by starting with local standard time (if daylight savings time is in effect subtract an hour from your local time). Since it takes the sun 4 minutes to move 1° longitude, a correction needs to be made between the standard time longitude line and your local longitude." Edward Mazria, The Passive Solar Energy Book (Emmaus, Pa: Rodal Press, 1979). Somerville is east of the standard time longitude line (75°) by 3°. For each degree of longitude east of the standard time longitude, 4 minutes is added to local time. This adjusted time is suntime: in Somerville, suntime would be 8:48 to 2:48 local standard time.

- plotting the skyline;<sup>4</sup>
- doing angle calculations.<sup>5</sup>

Permitted Collector: A solar collector for which a solar access permit has been issued.

Solar Access Permit: Creates the protection for solar access awarded by the Board of Zoning Appeals after a special permit procedure.

Solar Access Permit Recording Process: All solar access permits are recorded by the building inspector, and filed according to street address. In addition, cards will be recorded on abutters affected by the protection, according to street address. Before a building permit is issued, the solar access permit file must be checked. If the property is restricted by the solar access permit, the solar access permit holder will bear the burden of determining if his/her protection will be infringed by neighbor's development.

Solar Access Protection: A solar energy system which has been granted a special solar access permit is protected from an obstructed path of sunlight to collector surface during the specified hours and amount of protection given in this ordinance. The solar collector has no right to solar energy which is blocked by existing structures or vegetation.

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<sup>4</sup> See The Passive Solar Book (Ibid.) for plotting skyline procedures.  
<sup>5</sup> If rooftop protection is desired, skyscapes should begin at the building eaves. If southwall access is chosen, then the skyspace begins at the bottom of the southwall. "As a rule of thumb, 120° altitude can be used as a cut off point for solar skyspace. Roughly 80° of the sun's energy is received when the sun is at or above 120° altitude." Site Planning for Solar Access, p. 31.

Solar Energy Performance: For protection under this ordinance, a solar energy system must provide a significant amount of the structure's heating and cooling needs.<sup>6</sup>

Solar Energy System: A passive or active solar energy device whose primary purpose is to provide for the collection, storage and distribution of solar energy for space heating and cooling, hot water heating, industrial, commercial or agricultural processes or for electrical generation. Such systems include, but are not limited to, active and passive solar collectors, solar greenhouses, solar overhangs, solar window box collectors and structural design features whose primary purpose is to provide for the collection, storage or distribution of solar energy for heating or cooling purposes.

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<sup>6</sup> The intention of this ordinance is not to protect solar toys. A significant percentage amount from 5% to 20% might be difficult and costly to calculate. Defining the performance in BTU's is an easier way to calculate whether the solar energy system is making a significant contribution. For example, the collector must be capable of 25,000 BTU on a clear winter solstice day. 25,000 BTU per day is approximately the amount of heat needed to supply the daily hot water needs of 2 adults, assuming that each adult uses 20 gallons of 140° water per day. The American Society of Heating, Refrigerating and Air Conditioning Engineers states that the hot water requirement of an adult person is between 15 and 20 gallons per day (A.S.H.R.A.E. Handbook of Fundamentals, p. 607, 1972).

PERMIT PROCEDURE:

How to Apply:

An applicant must be a property owner, lessee or agent who has installed or intends to install a solar energy system.

Applicant files a request for a solar access permit with the Building Department.

Applicant must, at a minimum, provide the building department with the following information:

1. Applicant's name and address, owner's name and address, block and lot number where collector is to be located.
2. Drawing showing the type of system to be installed, including:
  - size and location of the collector
  - size and location of storage
  - its orientation with respect to due south
  - slope from the horizontal
3. A site plan of property and abutting southerly properties within 200 feet of the system. The site plan should include the location and height of all surrounding structures or vegetation (if applicant wants to be protected from future vegetation).
4. Names and addresses of neighbors on the abutting southerly properties.

5. Statements that:

- the applicant has done everything reasonable in designing and locating the collector to minimize the impact the collector will have on future development of nearby land
- to the best of the applicant's knowledge, nothing exists which will block access now or in the future
- the size of the system is consistent with present and anticipated energy needs of the structure
- the applicant has reasonably evaluated the potential for solar collection on the system

6. Information on the expected life of the system and the amount of energy it is expected to provide.

Notification:

The building inspector will notify the Office of Planning and Development of a request for a special solar access permit and the abutting neighbor/s identified in the permit application that the solar access permit is pending and that future development of property could interfere with solar access protection. In addition, abutting property owners will be encouraged to take pictures of any existing structures or vegetation. Abutting property owners will have 30 days to respond.

Responses will be filed with the building inspector. The Office of Planning and Development reviews responses and makes recommendations to the Building Department. Based on OPD's recommendation, the building inspector will either issue or deny the permit.

Burden of Proof:

A special solar access permit shall not be issued if the abutting neighbor can show that he/she has made an expenditure of at least \$250 on planning and designing a structure, or any other clear and convincing proof that progress has been made towards a structure which is consistent with present zoning regulations but which would shade the proposed system. An abuttor may also object on the grounds that a solar access permit will prevent development enjoyed by surrounding property owners.

In the event that an abutting neighbor has reason to believe that the solar system will reasonably restrict his/her future development plans but does not have evidence to show that progress has been made toward a structure which would shade the proposed system, the burden of proof will rest with the solar collector applicant. The applicant must show that the solar system is located in such a way as to minimize adverse effects on nearby property and must make necessary financial computations.

Appeals Procedure:

If there is an objection to the building inspector's decision, an appeal can be made to the Zoning Board of Appeals. Notice will be sent to all parties in interest. All special solar access permit hearings shall be held in accordance with the rules of the Board of Appeals and shall be on record and open to the public.

Exceptions:

The Zoning Board of Appeals may grant an exception to a solar access permit if it would restrict the reasonable plans for development of an abutting neighbor. The Board could then approve the solar access permit with a specific authorization for the abuttor to develop in a way consistent with a reasonable plan. For the exception to remain valid, the abuttor must develop within a reasonable period of time (to be determined by the Board). If the abuttor does not move ahead with his/her plans, the solar permit owner can file with the Board a request for removal of the special exception.

Enforcement:

Once a solar access permit is granted it will be recorded with the Building Department and the Department of Planning and Development.

Cards will be filed on abutting property that is restricted by the solar access permit. All cards will be filed by street address. Whenever an application is made for a building permit, the solar access protection file should be checked first to determine if solar access protection will be infringed.

If an applicant's property is affected by a solar access protection permit, the permit holder will be responsible for proving that the proposed plans will infringe upon the efficiency of the solar system. A solar access permit is void if upon inspection, the system is not performing to permit application claims.



Length of Protection:

Solar access protection will continue in effect until:

- voluntary non-use of the solar system for a period of one year
- the owner no longer claims access
- or -- failure to operate the system for a period of one year

Vegetation:

It will be the responsibility of the solar collector applicant to negotiate with the abutting property owner regarding the shading of the collector by existing vegetation. The burden will be on the solar collector owner to pay for the pruning. If applicant wants protection from vegetation, then he/she must record the exact location and type of vegetation in site plan. Abutters will have the opportunity to review the plan and make changes if the applicant left out any existing vegetation.

The burden to prevent shading from vegetation planted after a solar access permit is issued rests on the owner of such vegetation. This provision will be enforced by complaint.

Sun Angle Chart:

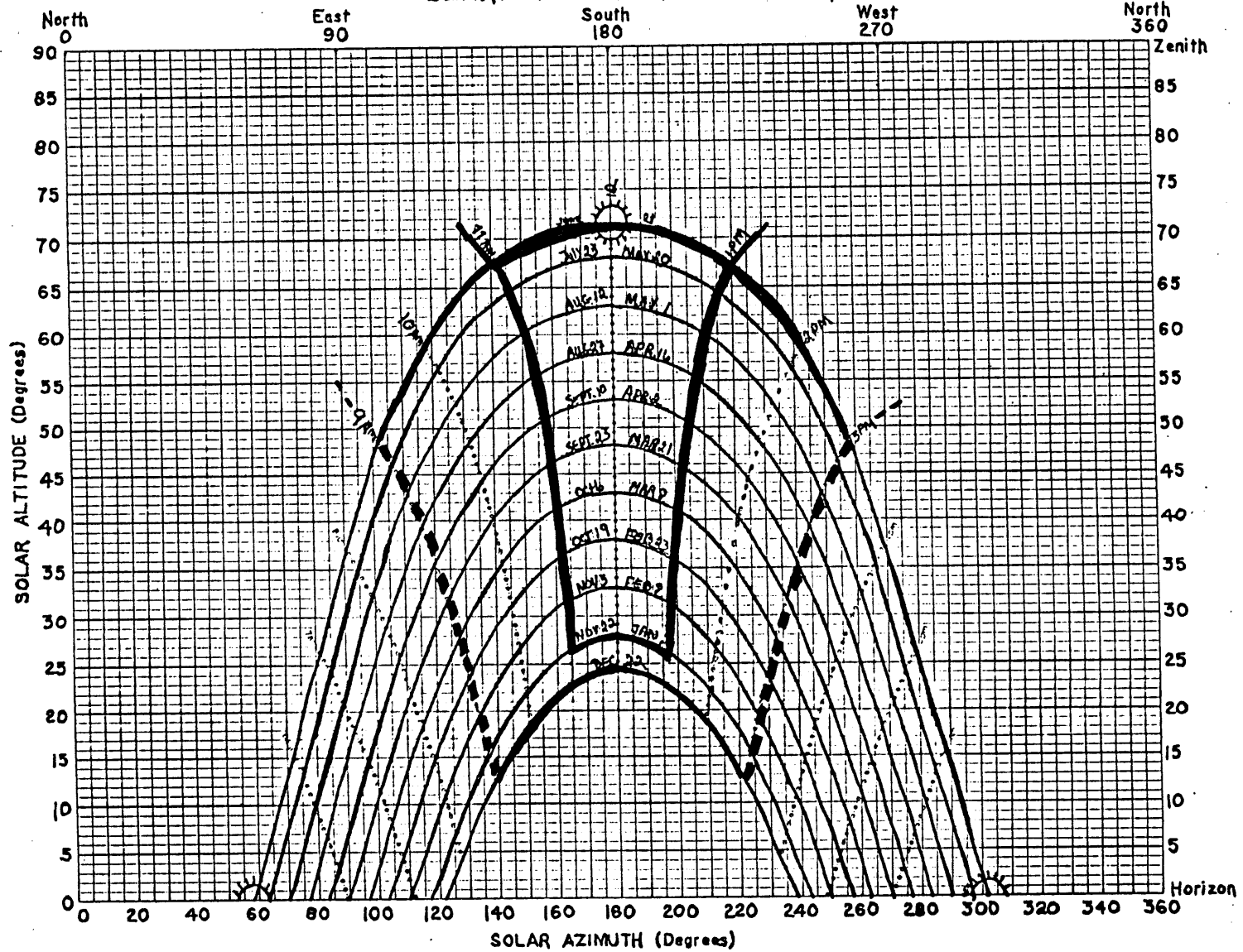
The sun angle chart on the following page shows the two levels of protection provided in the solar access permit recording process:

1. Guaranteed Protection -- any future structure or vegetation that falls in this area would be prohibited. This area falls in between the hours of 11 a.m. and 1 p.m. and the months of January 21 through November 22.

2. Partial Protection -- any future structure or vegetation that falls in this area may be prohibited if it would significantly reduce the efficiency of the registered solar collector. This area falls between the hours of 9:00 a.m. to 11 a.m. and 1:00 p.m. to 3:00 p.m. The burden of proof falls on the solar collector owner to show how much energy will be lost by the obstruction. The Building Department, in consolidation with the Office of Planning and Development, will make the decision.

The Bennett Sun Angle Chart is taken from Robert Bennett,<sup>1</sup> Sun Angles for Design (Bala Cynwyd, Pa: Bennett, 6 Snowden Road, 19004).

# BENNETT SUN ANGLE CHART



42° NORTH LATITUDE

BENNETT SUN ANGLE CHART

## APPENDIX C SOLAR ENERGY AS A PUBLIC PURPOSE

This appendix will review the legal precedent which local communities can look to when planning for solar access. Many of the issues are centered around the general zoning authority of a locality. Questions surrounding the public taking of private property and the limits of police power are still being confronted in the courts today. The issues which have been resolved and those which remain unanswered will be addressed as well.

In short, the discussion will establish a legal framework within which Somerville can decide to what degree and with what legal certainty it can establish solar access as a public purpose.

### ZONING AS AN APPROPRIATE TOOL

#### A. Background

The history of zoning has been controversial; local land use regulations have been argued on all levels of the judicial system up to the Supreme Court. Even so, the questions surrounding the amount of control a locality can exercise to restrict property use will certainly continue to be debated. For the purposes of this discussion, the issues of "taking" and "police power" are most relevant to the subject.

Most states have enacted state zoning enabling acts to specifically authorize municipalities to undertake zoning as a valid public purpose. Under this authority, communities are allowed to control land use.

The interpretation of this authority has not gone without challenge

in the courts. The Supreme Court in 1926 first tested the extent of local authority to control land use in Village of Euclid vs. Ambler Realty Co. 272 U.S. 365 (1926). The court held that zoning is a valid exercise of police power if it can reasonably be related to the public health, safety, morals or the general welfare.

In a later case, the Supreme Court defined public welfare to mean protection of "spiritual as well as physical, aesthetic and monetary values" (Berman v. Parker 348 U.S. 26 (1954)). The courts continued to define the exercise of police power by relating it to public purpose. The public purpose test has been the main obstacle for communities to overcome when making land use decisions. Courts have recognized that the public purpose doctrine is not static but changes to meet new developments and conditions of time.<sup>1</sup> In addition to the public purpose issue, communities must also be concerned with the taking of private property.

According to the Supreme Court in Goldblatt v. Town of Hempstead, the police power must identify public need, balance economic consequences of regulation with the community goals and address the fairness of the regulation, as a means of achieving these goals, against the alternatives considered (369 U.S. 590 (1962) at 594). In general, the Supreme Court relieved the concern of local governments that zoning decisions are unconstitutional if they prevent property owners from devoting their lands to its most profitable use, if the above criteria are met. Severely restricting private property without compensation, however, is in danger of being considered a taking (Averene Bay Construction Co. v. Thatcher, 178 N.Y. 222 (1938)). Moreover, a zoning ordinance is not unconstitutional if it limits the

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<sup>1</sup> Sharon Stanton White, Municipal Bond Financing of Solar Energy Facilities, Solar Energy Research Institute, SERI/TR 434-191, December 1979, p. 6.

use of or depreciates property values, unless it can be shown that the measure is unreasonable in terms of necessity or that the diminution of value is such as to be tantamount to a confiscation " (Golden v. Planning Board of Ramapo, 30 N.Y. 2d 359, 334 NYS 2d 138, 285 NE 2d 291 (1972)).

In this respect, the test becomes a matter of balance for private loss against a public gain. For example, the issue of taking was addressed in Penn Central Transportation Co. v. City of New York. (U.S. 46 LW 4856, June 1978). The case, commonly known as the Grand Central Terminal Case, involved restricting the height of New York's Grand Central Terminal because of its official designation as a historic landmark; the City denied a permit to build a 50-story skyscraper on top. According to the Supreme Court, the City's restriction on air rights development was upheld as being in the public interest and did not constitute a taking. Solar law experts interpret the Grand Central case to support the belief that solar access protection is, in fact, in the public interest, even if there is a diminution in value of neighboring property.<sup>2</sup>

To date, there have been two court cases which have directly confronted the question of solar access. In Katz v. Bodkin<sup>3</sup> (1 sol. 1L. Rpt 495 (1979)), the court overturned a building inspector's refusal to grant a permit for a solar hot water collector on the grounds that the panels exceeded the 10% area rooftop clause under the height exceptions on the town's zoning ordinance.

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<sup>2</sup> Northeast Solar Energy Center, Proceedings of a Workshop on Solar Access Legislation, July 1979, p. 7.

<sup>3</sup> Robert C. Barrett, Overcoming the Solar Zoning Barrier: Katz v. Bodkin, Solar Law Reporter No. 5, p. 931.

Here the court addressed the question of solar energy and the public welfare directly by stating "the purpose of restrictive zoning must give way to the declared policies of federal and state governments to promote solar energy use and development."<sup>4</sup> The Judge then referred to the state's energy law which

"imposes upon municipalities the duty to review their rules and regulations and to not only make them consistent with the state declared policy for energy conservation but, where inconsistent, to make necessary changes to comply with these stated purposes."<sup>5</sup>

In the end, the town now treats applications for energy-conserving devices as special-use permits and these are made directly to the town board.

In D'Aurio v. Zoning Board of Appeals (410 NYS 2d 425, (Sup. Ct. Albany City, 1978)), the court made the opposite decision. A variance for ground-mounted solar collectors was denied on the premise that the homeowner had not shown significant economic hardship or sufficient difficulties (no attempt had been made to locate the collector elsewhere). The homeowner had already purchased the collectors which were to be located in the front yard; the collectors were large and exceeded the town's front yard setback limits. Moreover, despite the homeowner's promise to hide the collectors with landscaping, neighbors objected vigorously to the variance. The neighbors were also concerned with the possibility that children,

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<sup>4</sup> Ibid.

<sup>5</sup> Ibid (referring to New York State Energy Law § 3.105 (2)).

curious about the new attraction, might get burned by a hot collector or pipe. Finally, the decision came at a time when energy was not yet a widely-recognized problem.

As the above cases show, and a history of environmental law indicates, land use issues are becoming more related to the preservation of scarce natural resources. With increasing frequency, policymakers are asking questions about the impact land use decisions have on land and natural resources.<sup>6</sup>

Massachusetts addressed this issue in its 1975 amendment to the zoning enabling Act.<sup>7</sup> The new zoning changes authorize specifically-local zoning innovations such as cluster zoning, planned unit development, incentive bonuses and billboard phase-out. Implicit in the zoning change, when considered in construction with the Home Rule Amendment, is the authority to use zoning to manage solar access, growth, aesthetics and water zoning.<sup>8</sup>

Although not specifically stated, Somerville could use its zoning authority to establish solar access protection as a valid exercise of police power by

1. establishing solar access protection as a public purpose
2. ensuring that property use is not unfairly restricted.

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<sup>6</sup> F. Bosselman and D. Callies, The Quiet Revolution in Land Use Control, Council on Environmental Quality, 1971.

<sup>7</sup> Chapter 808 of the Massachusetts Enabling Act.

<sup>8</sup> Philip Herr, "Innovative Zoning Possibilities," A Guide to Massachusetts New Zoning Act: Chapter 808 of the Acts of 1975.



## APPENDIX D ENERGY USE IN SOMERVILLE

The following data are excerpts from the initial report prepared by the Boston Neighborhood Network for the Somerville Citizens Energy Advisory Committee.<sup>1</sup>

### SOMERVILLE ENERGY BREAKDOWN BY SECTOR

SECTOR	RELATIVE ENERGY USE	ENERGY COSTS
Residential	35%	\$22 million
Municipal	2%	\$2 million
Commercial/ Industrial	21%	\$12.5 million
Transportation	42%	\$35.9 million

### SOMERVILLE ENERGY BREAKDOWN BY SOURCE

SOURCE	RELATIVE ENERGY USE	ENERGY COSTS
Oil	29%	\$22 million
Natural gas	22%	\$12 million
Electricity	5%	2 million
Gasoline	43%	36 million
Coal	1%	22.7 thousand
Bottled gas	1%	51 thousand

<sup>1</sup> Boston Neighborhood Network, Executive Summary, Initial Energy Inventory Report for Somerville, Massachusetts, March 24, 1981.

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