Chapter 11

Public Policy Options

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This chapter summarizes various approaches that might be adopted as public policy to stimulate the retrofit of city buildings for greater energy efficiency. Most of the chapter deals with Federal level actions and choices. A discussion of what a hypothetical American city might consider initiating on its own is included, as well as a statement on the principal options open to States.

The Federal options are arrayed in a familiar manner; no direct intervention, moderate intervention, and substantial intervention. In practice, policy makers will select various combinations of the activities described here, or others, according to their belief in the effectiveness of the program and the importance of building retrofits in general. The options highlighted in the chapter reflect the findings of the study concerning the uncertainty of savings and the cost of financing as the principal factors affecting building owners' choices about retrofit investment. Cost calculations done by OTA for some new initiatives are included in the text. information on funding and details of existing programs will be found elsewhere in the report, particularly chapter 9.

The three policy categories reflect several real and distinct schools of thought now active in the energy conservation debate. After a period of activist governmental approaches to the problem, Congress has been presented with a greatly reduced budget recommendation, reflecting more emphasis on the overall economy than on energy. Another point of view that has developed over the past few years advocates increased local choice in energy issues, with the Federal Government playing a supportive or catalytic role only. All these perspectives can be found in this chapter.

As in other debates about the impact of Federal Government intervention on the American economy and society, there is insufficient data to conclusively support one point of view to the exclusion of others. There are fragments of information that can be used to support all these points of view but the difference among them ultimately comes down to a difference of belief–in the seriousness of the U.S. energy problem, in the benefits of increased energy efficiency, and in the benefits, or dangers, of Government intervention.

OPTION A–NO DIRECT INTERVENTION

The rationale for this definition of the Federal role is that energy retrofit is best left to the private sector. If the economy of the Nation is healthy, a wide variety of innovative technical and financial approaches will be developed to take advantage of the investment opportunities created by rising fuel prices. Efforts to reduce the uncertainty of retrofit results will be best undertaken by trade associations and other private groups with a stake in the results, not by the Federal machinery. States and localities, those units of government closest to the problem, would be free to act in their communities as they see fit. Issues of equity would be resolved through local responses and economic growth.

The underlying philosophy reflected here is that energy is a problem only because the national economy has not operated to provide accurate price signals and other characteristics of a free market. Government efforts must therefore be directed at allowing the market to operate correctly.

Accurate energy price signals would result from moving toward full marginal pricing for energy, through such steps as decontrol of natural gas and the removal of existing subsidies to fuels. Only those restrictions essential to the public health and well-being would be left intact; the lack of restrictions and standards would

allow for full competition and risk taking by entrepreneurs and investors. Investments in conservation would result from the decisions of consumers, choosing freely from supply and demand options.

Lowered interest rates and correspondingly reduced rates of debt service, provided by the healthy economy, would make those building owners dependent on debt financing far more likely to invest in energy retrofit than they are today. Greater capital availability, accelerated through such devices as the new tax depreciation schedules, would be preferred to targeted tax credits. Capital would thus be used to invest in the equipment of greatest value to the purchaser. The newly stabilized economy resulting from reduced rate of inflation and lowered interest rates would have the effect of lengthening the terms of available loans, thus lowering debt service and easing cash flow problems.

The competitive marketplace would give rise to voluntary development of standards by professional groups and tradespeople, and to disclosure of information. Rising prices would provide targets of opportunity in all areas of the buildings sector, as entrepreneurs find profitable areas of operation.

The traditional research and development (R&D) role of Government would remain, with Government funding only long-term, basic research in such areas as physics, engineering, and materials, with results made available to the private sector for application. No demonstration or commercialization efforts would be considered.

Under this approach, the Government would not prefer- one "solution" to the energy problem to another, but would act as a neutral body. The free economy, representing all consumers, would make investments based on market information, and the level of building retrofit would reflect its real economic value. Government actions to achieve this policy would include at least these points.

- Removal of price controls on natural gas, other price restraints on fuel costs, and Government support for any movement toward marginal cost pricing of energy, Removal of tax credits and other subsidies.
- Removal of unnecessary regulations that distort costs of energy supply or demand; reliance on the total economy to allocate costs of externalities.
- Efforts to stabilize the economy, lower inflation, and reduce interest rates. This would include balancing the budget, controlling the monetary supply, and whatever other steps were believed to lead to a steady, resilient marketplace.
- Continuation of governmentally funded research in basic areas, such as work on materials, heat flows, basic engineering, and other similar areas.

OPTION B–SMALL FEDERAL MARKET ASSISTANCE ROLE

This option reflects the view that energy retrofit is too important to be left entirely to the private market, since it is possible that an adequate private market response will not develop. Nonetheless, the role of the Government should still be limited. The limitation reflects two constraints; a view that limited Federal financial resources must be used carefully, and a view that ultimate acceptance of the conservation option does rest with the market economy. The view might be expressed as a belief that the best mechanism to accomplish conservation is the market, but that certain inevitable imperfections in the market will not disappear of their own accord, and that the market must be corrected. While price is still assumed to be the strongest driving force behind investment, some additional action by the Government is warranted.

Such a program would contain elements of information (including applied research), small-scale subsidies, and support for local decisionmaking.

Information

OTA concluded from this study that a large impact would result from reducing the actual and perceived risk and uncertainty surrounding the results of energy retrofit. Such an approach might include three elements.

Testing Individual Retrofits. Much of the data now used by energy auditors and others in the field for determining the savings from particular retrofits have come from the National Laboratories (Oak Ridge, Brookhaven, Argonne, Lawrence Berkeley, etc.). Their careful, scientific research programs for testing specific improvements to boiler technology, certain passive solar retrofits, and so on, provide a basis of reliable, accurate data. New products are now entering the market at a rapid rate; testing and documentation of new products and techniques by the laboratories will speed the process and generate information for private companies and local agencies. This is an applied research effort of a type not likely to be undertaken with similar credibility by trade groups or individual firms.

Comparison of Predicted and Actual Results From Packages of Retrofits. This is a role of critical importance now performed only on a very small scale by the Federal Government, **in conjunction with a few trade associations.** As clearly **indicated** in chapters **3** and 4, there is a great lack of data on actual retrofits of buildings by type, especially multifamily buildings, shopping centers, and small retail and office buildings. There is even less data on the difference between actual and predicted savings from retrofits. Investors accordingly respond with caution.

An example of this type of analysis is Saving School House Energy, by Arthur Rosenfeld at Lawrence Berkeley Laboratory. This project compared predicted with actual savings from nine school building retrofits. Where savings fell below predictions there was a detailed analysis of the problems (selection, installation, Or maintenance of retrofits) causing the shortfall.

Such meticulous comparisons of actual installations with predicted results may be best developed through the groups that building owners rely on for information; trade associations, professional societies, local civic associations and others. (Noninvestor owners may be more likely to be found in civic groups such as the chamber of commerce than in trade groups.) There are some existing Federal programs along this line. The American Hotel & Motel Association is retrofitting six different buildings i n several climates, and will **observe and document the results.** The Federal schools and hospitals program has stimulated many building audits; most measures applicable to schools and hospitals are also useful to retail and office building retrofits. OTA research in case study cities found that school and hospital audits and retrofits had built the reputation of local companies, and created a belief that retrofit was real and practical **for a local area.**

OTA calculated the cost of an efficient and well-designed program to collect data on retrofits of **5,000** buildings of different types. This data would provide a very substantial improvement in the knowledge on retrofits. A budget of $20 million assumes 150 person-years in design and data collection of retrofit packages, in collaboration with various trade and civic groups, such as those serving the restaurant community, multifamily dwellings, department stores and others. An additional $5 million could be used to pay building owners or auditors about $1,000 each for the trouble of maintaining accurate records of energy use before and after the retrofits, and making those records available.

Dissemination of Results. Additional efforts would be made to build on existing information distribution channels. This **would include more** work with appraisers, lenders, and other affiliated groups, and the development of regional and local data bases.

Other Information. Additional information programs would be consistent with this approach; these might be defined as applied R&D. For example, the Government might assist in the development of test procedures and support trade groups in the development of voluntary standards. Government assistance could be expected to produce acceptable, consensus-based standards more quickly than strictly private efforts.

Labeling programs could also be initiated by the Government in the voluntary context. Labels currently required on household major appliances have assisted consumers in making investment **choices** in a confusing area, and have been accepted as useful by a number of manufacturers. While new equipment purchased for commercial building **use will** generally come with specifications adequate for the trained engineers who will select and install them, products for homes require more common language. Labeling and standard measurement are measures that the Government can take to "correct" the market and increase the real competition.

Small-Scale Subsidy Program

The programs described here are existing small-scale subsidy programs that fit logically within the overall view embodied in option B.

Two subsidy programs approved by Congress might be tapped for expansion of the data needed on retrofit. Individuals and organizations receiving assistance through the Schools and Hospitals Programs, or the Conservation Bank, described in chapter 9, might be asked to participate in the documentation effort. These data (especially from individuals using the Conservation Bank) would not be expected to be as accurate and detailed as the documentation carried out by Government research, but enough is known about data collection to design a program to tap this source of information.

Energy tax credits are another existing subsidy program that increases information about what retrofits are being installed. At present, the tax credit available to individuals operates to provide some limited assistance, and results in expenses of about $600 million annually (twice the cost of the weatherization program). The tax credit system as it is currently constituted does provide information to the Government on the number and income level of people taking the credit, and the principal uses of the credit, The business energy tax credit is effectively restricted by implementing regulations in such a way that few commercial buildings can be assisted (see ch. 9).

Low-income energy assistance (costing $1.8 billion in 1981) might also be retained under this option, in order to try and meet the survival needs of low-income families, who are likely to be unable to cope with the cost pressures of a market-based energy approach (see ch. 5). The program might be tied to the weatherization program, which would also be continued. Families using income assistance might be referred to the weatherization program for coordination, or they might be allowed to use assistance money for weatherization work if they choose.

Federal Support for Low-Cost, Locally Defined Programs

Low-Cost/No-Cost Campaigns. The prototypical low-cost/no-cost effort took place in Fitchburg, Mass., and is described in detail in chapter 5. This program has been tried elsewhere and could be replicated in many communities. The effort was designed locally, involved community groups from the beginning, and set out to inform citizens about practical, low-cost changes to save energy. It resulted in a large response in terms of interest and energy savings. Such programs can simultaneously achieve energy savings and build a base for subsequent, more extensive audit and retrofit programs, They cost little in Federal resources but do require a small, well-trained and enthusiastic Federal staff.

Innovative Grants. The innovative grants for energy conservation given by the Department of Housing and Urban Development seem to have played a role in the development of strategies for such energy-activist communities as Portland, Oreg., Minneapolis, Minn., and others. The grants enabled communities to define careful approaches, involving the private sector and leveraging private funds. The flexibility of the grants is appealing to communities, and provides them with some resources for more innovative planning.

OPTION C–LARGE ACTIVE FEDERAL ROLE

This view is consistent with a philosophy which holds that if energy retrofit is an inexpensive use of energy capital, and if it is not likely to come about due to current conditions of the private market, the Federal Government should either subsidize or require all or most energy retrofit that is defined as cost effective. This point of view will generally emphasize the environmental and social costs of lagging behind on conservation, the national security value of reduced vulnerability to supply disruption, and other externalities. A serious rationale could include the stimulus of jobs in the building sector.

A policy reflecting this view would also stress the efforts at reducing uncertainty about retrofit results, described under option B. It would be more aggressive, however, in the areas of interest subsidies, direct payments to achieve retrofits, and regulation. These steps would be taken to ensure that the conservation yields were achieved quickly.

Interest Subsidies

The current high interest rates and short loan terms lead to a very high cost of debt service on loans for energy retrofit (see ch. 4 for an extended discussion). Thus, building owners dependent on debt financing, and unable to tolerate cash flow losses even for short periods, have seldom retrofitted their buildings, even for some very cost-effective measures. OTA calculated (see ch. 2) that about 4 Quads of annual energy savings will not occur in commercial and multifamily buildings because of owner unwillingness or inability to retrofit assuming that interest rates do not fall. Under option C, the Federal Government might set an ambitious goal of stimulating retrofits over 10 years that would save 2 Quads per year of primary energy at the end of that time. OTA estimates that this might be possible from a financing subsidy of $600 million a year for 10 years, (A general figure used by OTA and consistent with other recent work in the area of conservation is that about $20 billion of investment will be needed for each annual Quad of primary energy savings, or $40 billion total investment over 10 years. A subsidy of $600 million for annual retrofit expenditures of about $4 billion is a 15-percent subsidy.)

A financing subsidy of this magnitude could be used in a variety of ways to lower the financing costs of retrofit. Part of it could be used to lower interest rates (e.g., from 16 to 13 percent) and the rest to provide loan guarantees to persuade banks to lengthen loan terms. An extension of the current secondary market for property improvement loans to multifamily and commercial buildings should also have the effect of lengthening loan terms. As discussed in chapter 4, longer term loans at reasonable rates are sensible for energy retrofits because many effective retrofits will return savings over a long lifetime.

Direct Subsidy Payments

A number of available programs could be strengthened, increased, and focused more directly on individuals, businesses, and institutions involved in retrofitting. While these programs represent only changes in existing efforts, they could be targeted more explicitly to stimulate retrofit on a large scale in specific types of buildings.

Tax credits for residential uses by individuals would be continued and possibly increased in amount. They could be made refundable, so that people with little or no tax liability could participate fully. The business energy tax credit would be retained and revised so that commercial and retail businesses could take full advantage of this option. Information obtained from examining the data on tax credit claims could be used to fine tune the system, and identify groups or sectors with low participation.

Grants to States for training and information programs, particularly auditor training, would be intensified. Assistance of this type is a traditional State role, and builds network communication as well as skills.

Utility and other delivery mechanism programs would be strengthened, with emphasis on identifying targets for greatest potential

energy savings and "problem" sectors in local areas (such as multifamily buildings). The Residential Conservation Service (RCS) would be retained, perhaps with some modifications, as a method of requiring major utilities to provide home energy audits at minimal cost. Audit procedures and recommendations would be improved over time as knowledge expands. Audit and information programs for commercial and apartment buildings would also be supported, with flexibility built in to allow utilities to address those portions of their service population of most importance from the utility point of view (see ch. 8 for a discussion of utility interest), as well as providing information and assistance to other groups. Other delivery systems might receive support on a demonstration basis, to see if new, more effective mechanisms can be identified to facilitate retrofit. information on these experiments would be widely shared.

Massive Subsidy or Regulation

There appear to be two areas where a free market is unlikely to provide any direct incentives for a cost-effective rate of retrofit. Policymakers sympathetic to the views of option C would be likely to attach significance to both categories.

Low-Income Homeowners. These families have little chance of retrofitting to any cost-effective level based on their own resources. The current weatherization program could be doubled in scope over a period of 2 to 3 years to a rate of about 720,000 dwelling units a year (up from a 1981 rate of 360,000 each year). Over 10 years this would reach half of the estimated 14 million low-income dwelling units, at a cost of about $400 million a year (less than a quarter of the $1.8 billion used in 1981 for low-income energy assistance). These expenditures could be assumed to work toward reducing the cost of any energy assistance payments over time.

Tenant-Metered Multifamily and Commercial Buildings. To date, there is little incentive for owners of these buildings to make major retrofits, since tenants bear the direct burden of utility costs. OTA found no evidence that commercial or multifamily rentals are higher for energy-efficient buildings, although some owners interviewed believed that the market for office space might adjust to differences in energy efficiency sometime in the future. It is widely believed that multifamily tenants do not pay more for energy-efficient apartments than for energy-inefficient ones.

Given this situation, a policy of substantial Government intervention could take either of two approaches. One course would be to require any necessary improvements in building energy efficiency (if needed) prior to time of sale, while making subsidized financial assistance available to accomplish the task. Such a policy is difficult to implement given the American tradition of local control of real estate. It would have to be required of State governments, which in turn would have to require it of local governments. Another course of action would be to develop and implement a mandatory program of energy indexing of tenant-metered buildings.

Increased Support for Local Initiatives

Low-Cost/No-Cost . Campaigns could be used across the country to increase the involvement of citizens in retrofit and build community support for action.

Innovative Grants. Energy conservation grants would be made available to many more cities to allow for the specific development of action plans for the locality.

Conservation Bank. Funding would be used to involve private lenders, subsidize interest rates, and develop local information and community networks.

Community Development Block Grant (CDBG) **Funds Earmarked for Retrofits.** Communities may now use their CDBG moneys for energy conservation, subject to certain overall restrictions on CDBG funding priorities. An **increase in** CDBG funds would provide more money to a property improvement and retrofit process that is already well-established at the local level, is subject to continuing public review and comments, and must generally re-

fleet local priorities over time. Special funds. in this category could effectively be joined with housing rehabilitation funds for a big push to improve housing quality and cut costs of operating and maintenance. Localities could be specifically encouraged, or required, to extend their CDBG **programs to apartment buildings.**

District heating might be favored for Federal assistance under some versions of this philosophy. OTA calculates that subsidies could be provided to 10 citywide systems each costing $1.5 billion, This would divert about 0.3 Quad of oil and gas from heating use and replace it with coal, cogenerated electricity and energy from solid waste combustion. If this subsidy were provided in the form of tax-free industrial bonds, about $60 million per year per system in subsidized interest would total $600 million each year, or about 4 percent of the total $15 billion project cost for 10 systems. Taxes on this amount would not be paid to the Treasury, due to the tax-free nature of the bonds. Determining the actual cost to the Federal Government of this subsidy is complex, since a calculation would include impact on the taxable bond market, likelihood of investment in the bonds as opposed to taxable but potentially more profitable bonds, and the cumulative cost of interest subsidies on interest rates in the capital markets.

investments in district heating in the near future would lay the groundwork soon for an early 21st century economy based on coal and renewable. on the other hand, there are arguments to be made for delaying a large-scale subsidy of district heating until the decontrol of natural gas prices makes district heat more competitively priced with the price of direct use of natural gas for heat. Some years delay would also give more time for energy efficiency retrofits to buildings which are potential district heating customers, so that their heating demand is minimized and stabilized. This assists the planning and sizing of district heating systems.

It is possible to compare the value of savings from a $600 million a year financing subsidy to district heating with savings from a similar financing subsidy to building retrofit (see table 89). The value of 2 Quads of energy saved from building retrofits would be worth $14 billion at the 1981 average price for home heating oil at about $1 per gallon, or $20 billion to $30 billion at the current estimated price of synthetic oil from coal in 1981 dollars. (See the forthcoming OTA report, "Synthetic Fuels for Transportation, " for further discussion.)

The value of savings from an equivalent subsidy to district heating is much less. If district heating primarily serves to shift demand from premium fuels, such as oil and gas to coal, the savings comes from the price difference between the two kinds of fuel. At $4 per million Btu (about the current price differential between oil and coal for utilities), substituting **0.3 Quad** of heat from coal for heat from oil would be worth $1.2 billion.

Table 89.—Two Forms of Federal Subsidy

Subsidy type	Cost per year	Energy impact	Estimated value of savings (in dollars)
Subsidized $40 billion in conventional loans over 10 years for energy retrofit	$600 million	2 Quads saved annually after 10 years	$14 billion to $30 billion per year
Ten district heating systems allowed to use tax-exempt financing ($1 5 billion each), constructed 10 years	$600 million	0.3 Quad displaced annually from fuel 011 or gas to coal, solid waste or waste heat (after 10 years)	$1.2 billion per year

SOURCE Office of Technology Assessment

LOCAL GOVERNMENT OPTIONS

As this report points out, the local government has the strongest concern and the most direct connection to the local building stock. This section discusses what options are open for a targeted strategy based on different, well-defined groups of city buildings. Proximity and small scale allow city governments to coordinate programs and policies in a way that the Federal Government cannot. Personal appeals and persuasion can be used by individuals and groups at the local level. This section is not meant to suggest that cities will act independent of Federal policy; they will presumably continue to take advantage of whatever Federal assistance they can tap. The policies here point out choices that remain regardless of outside help (but assuming some resource and some interest at the local level.)

It is important to keep in mind the numbers of city buildings of differing kinds. The smaller buildings are by far the most numerous. Table 90 shows the building stock for a hypothetical but representative city of 400,000–Main Street, U.S.A. The only oddity about Main Street is that its housing stock is made half of wood and half of masonry (brick or cinder block) —this situation will be found only in certain regions of the Middle Atlantic and Southeast United States.

Table 90.—Building Stock of Main Street, U.S.A. A Hypothetical City of 400,000 Population[a] (total dwelling units, 150,000)

Category of building	Number of buildings
Total residential buildings	**82,300**
Single-family detached (wood frame)	**34,000**
Single-family detached, low income (wood frame)	**6,000**
Single-family attached (masonry)	**25,500**
Single-family attached, low income (masonry)	**4,500**
Buildings with 2-4 units (30,000 units)	**6,700**
Buildings with 2-4 units, low income (30,000 units)	**3,300**
Buildings with 5-19 units	**1,200**
Buildings with 5-19 units, low income	**600**
Buildings with more than 20 units	**340**
Buildings with more than 20 units, low income	**160**
Commercial buildings	
Small commercial buildings, less than 5,000 ft.²	**5,000**
Moderate, 5,000-50,000 ft.²	**2,500**
Large, more than 50,000 ft.²	**500**
Owner-occupied buildings	
Half of all sizes of commercial buildings:	
Small	**2,500**
Moderate	**1,200**
Large	**250**
One-third of multifamily with 2-4 units	**3,300**

[a]This table reflects the size distribution of housing units in central City areas in the United States, and an OTA calculation on the size distribution of commercial buildings in a central city area. No data is available on the actual distribution of commercial structures by central city location. Thus, the hypothetical city is typical of the mix of buildings that might be found across the country

Cities are free to start on their own any of the programs decribed above as options for the Federal Government. (Many Federal programs actually reflect efforts initiated by cities some years ago.) Cities can work well with trade associations to improve retrofit documentation. They may establish their own interest subsidy or loan purchase plans, as Baltimore and St. Paul have **done.** They may subsidize district heating through local bonds, undertake a low-cost/no-cost effort, or initiate full-scale direct weatherization themselves. They can force competing city departments, responsive to different Federal funding sources, to work together more closely. They can involve a local utility, a local insurance company or pension fund, or the local lending community. Several different types of successful programs by particular cities are described in the case studies in chapter 10.

This section draws on the study findings of technical retrofit potential for different buildings and the motivation of various sets of building owners. Combinations of these programs might be effective for various buildings. Cities will select types of buildings, neighborhood, or other areas of emphasis for a variety of reasons.

Single= Family Frame, Detached Homes —Moderate and Upper Income

There are about 34,000 of these in Main Street. Programs for this group will also apply to the approximately 3,000 owner-occupied multifamily buildings with two to four units (duplexes, walkup flats, etc.) Roof and wall insulation will be the most powerful retrofits for many of these buildings. old frame buildings may also profit from "house doctor" diagnosis and correction of thermal leaks. The city could organize a focused high volume campaign to promote one or two widely applicable measures, per-

haps in conjunction with a local electric utility if electricity is the dominant heating source. The utility might provide long-term loans. A program would be designed to payback on retrofits in less than 5 years. The city could establish an energy information and financing center to minimize owner confusion, deal with complaints, and even schedule retrofits if activity is heavy. Neighborhoods, or the city itself, could lower costs by acting as a bulk purchaser. Neighborhood groups would be involved to spread the word through churches, schools, and other groups, and to seek out elderly owners and others often missed i n general campaigns.

Masonry Single= Family and Small Multifamily Structures—Moderate and Upper Income

While wall insulation will not represent a good payback for these structures, attic insulation may (depending on attic construction). Storm **windows may also be important, depend**ing on climate and saturation i n the area. These buildings are good candidates for a high-volume, single measure campaign aimed at improving burner efficiency or replacing burners if needed. Local fuel oil dealers could be involved in this effort, along with the other groups **mentioned** in describing the frame building **cam**paign.[2]

Low-Income Owner-Occupied Small Houses

These buildings are prime candidates **for a** Fitchburg-type low-cost/no-cost effort to **build** confidence, perhaps followed up with low interest loans financed by city bonds. The loans might be used for more extensive retrofit. Loan terms should be arranged so that repayment is less than monthly fuel savings; i.e., total payments do not rise. Neighborhood groups can be used to bring the news and screen complaints.[3]

Low-Income Multifamily

For this category of building, two programs would be useful: one to advise tenants on available assistance programs for intervention assistance payments if needed, and one to develop mechanisms for identifying buildings that may be moving toward abandonment due to rent pressures and rising energy costs, Special assistance funds can be considered for landlords facing this problem. Negotiating groups composed of tenants and neighborhood leaders are a possibility for attempting to resolve landlord conflicts. Further, all weatherization efforts and energy retrofit should be coordinated with other city retrofit programs, to ensure that when investments are made in a structure, energy receives due consideration. In federally funded public housing, it is important that modernization funds be used with full consideration of rising energy costs,[4]

Owner-Occupied Small Businesses

If these are masonry or clad-wall buildings, retrofits should concentrate on lighting retrofits and adjustments to the HVAC system. The city could work with neighborhood business associations, perhaps targeting reviving neighborhoods which the community wants to keep afloat. The chamber of commerce might take on a project of obtaining information on lighting retrofits (fast-payback, so little or no financing should be required) and spreading the news. The city government could carefully reivew complaints on retrofits to protect the reputation of reputable contractors and identity problem retrofits early. As this group of owners becomes interested, encouragement to move toward larger retrofits would be helpful.

Tenant= Occupied Small Businesses

Tenants sometimes pay their own lighting and electricity bills, so they might be interested in lighting retrofits as well, especially if they are on long-term leases. **Information provided on the** importance of using energy only when operat-

'5CJmf> usefulexamplesarethePacticGas&Electricatticinsulationprogram(seech. 7)andtheMinneapolisblock-by-block retrofitprogram(seech. 1 0).

[2]The Philadelphia oil burrier replac ement programis a good model (see ch. 5).

[3]In addition to theFitchburgprogram (described in ch, 5), retrofit and rehabilitation programs in Boston and Pittsburgh (described in ch, 1 0) may be good models.

[4]New York City has programs to turn financially troubled buildings over to tenant management with technical assistance for dealing with energy conservation.

ing the building and other behavioral options would be important.

Large Tenant= Metered Multifamily

These buildings are likely to have decentralized heating systems—gas heaters or electricity. Retrofits to upgrade unit efficiency are likely to be expensive, but will save considerable energy, paying back in 5 to 7 years. The city government could consider requiring upgrading of heating and hot water equipment (which may be centralized) over a period of 10 years. Financing for the retrofits might be arranged through a utility, the State housing finance agency, or a bond issue. Tenants could be assessed monthly surcharges (less than the likely savings in energy costs to tenants) to help finance investments.

Large Master-Metered Multifamily

Hot water retrofits and retrofits to the central heating system should be of low (less than 2 years payback) and moderate (2 to 7 years payback) capital cost. The city government could help arrange long-term loans through lenders, perhaps with a shallow subsidy. This will be a small group of buildings; perhaps 100 out of 200 such large multifamily buildings in Main Street. Information on successful retrofits in other multifamily buildings, including control systems, should be of interest to this group of building owners, as they have a direct incentive to retrofit.

Large Businesses—Especially Owner-Occupied Buildings

This will also be a small group of buildings—several hundred. Many of these owners will have their own financing and access to good professional advice. Civic groups and city leaders could persuade them to be innovators and demonstrators of successful retrofits, and share their experience. It is important to provide publicity and attention to this campaign and publicize dollar and energy savings as reflecting the civic commitment of these people.

Public Buildings (Including Schools)

Bond money could be used for large retrofits, and expense money for small retrofits for these structures. The retrofits should be carefully documented and used to encourage businesses to invest. The diversity of city-owned buildings makes them a good laboratory. The city government could focus retrofits first on those building types that represent much of the city building stock for maximum utility of information, and advise citizens of savings through these retrofits.

Much of the material presented in chapter 10 describes what actual cities have done. It is clear that in all but a few cities, energy has been closely tied to other local priorities—economic development, equity, and so on. In general, energy campaigns will be successful if they are used to build on existing city strengths and priorities.

STATE POLICY OPTIONS

While States have a major interest in energy conservation, they do not have a strong and direct connection with building energy use (see ch. 9). States can support cities and assist their citizens in several ways.

Through the public utility commission, they can provide incentives (requirements or rewards) for utility auditing and financing plans. The rewards can be tied to the types of conservation that best serve the utility as well as the community, so that there is a mutual interest. In some States, load profiles and peaking characteristics will indicate a concentration on residential housing; in others, utilities will have a more natural interest in commercial structures. Florida and California represent models of this type of State action.

Housing finance agencies can play a crucial role in distributing funds for loan financing throughout the State, and State bonding author-

ity can also be used for this purpose. In areas where cities are financially strapped, funding support of this type may be the best possible assistance.

The energy codes for new building construction should be reviewed to make sure the State is keeping up with cost-effective opportunities. Energy efficiency in new buildings creates a competitive force that stimulates retrofit in existing buildings.

State resources can be used to provide training for tradespeople and documentation of retrofit results. Publications can be issued on "best choices" for the State, aimed at both the technical and the general community. Licensing requirements for energy trades should be reviewed in order to maintain high standards. Finally, agencies for reviewing consumer complaints can provide consumer protection as the number of retrofits increases.