Chapter 9

# Public Sector Role in Urban Building Energy Conservation

# Contents



## LIST OF TABLES



## FIGURE



## BOX

# Chapter 9
# Public Sector Role in Urban Building Energy Conservation

previous chapters of this report have assessed the likelihood that building owners will make investments in **energy efficiency as well as the likelihood that private marketing efforts by utilities and** energy conservation companies will succeed in persuading owners to retrofit. This chapter assesses public and nonprofit building retrofit programs and their likely impact on building owners.

Although many States, cities, and nonprofit and community groups have their own unique energy conservation programs, the framework for much energy conservation activity has been provided since 1973 by either Federal energy programs or by Federal housing rehabilitation and urban development programs. Federal pro**grams have provided sources of funding, regulatory authority, or technical assistance to these other, more local programs. For this reason, this chapter begins with a brief review of the most important Federal programs.**

**January 1982 marked the end of a year of extensive debate about the role of government in both energy and housing and urban development programs.** The outcome of the debate is still unclear. Before the debate began it was generally accepted that government should have a major role in both the promotion of energy retrofit in buildings and in urban building rehabilitation and economic development. Controversy about government energy programs was largely limited to the most effective form of the government role, and the proper degree of interaction between energy programs being operated by the Department of Energy (DOE), and housing and urban programs being operated by the Department of Housing and Urban Development (HUD). After nearly 7 years since the oil embargo, the period of experimentation by "pathfinder" communities such as Portland, Oreg., and St. Paul, Minn., was largely over and several effective models for successful State and local energy conservation programs had been developed that were likely to be adaptable to other communities. The current debate about the role of the Federal Government in energy conservation and housing interrupted what might be called the "second round" in which a second group of cities and States were beginning to institute types of programs that had already been successful elsewhere. The impact of the 1981 rapid shifts in Federal programs on the second round of State and local efforts in energy conservation cannot now be determined.

Following the description of the Federal programs, this chapter describes the general possibilities for State, city, and nonprofit programs within their constraints of tradition, authority, and resources. However, general prospects for public sector programs do not begin to capture the great variety of influences on State and local programs from their history, regional energy situation, and the fortuitous combinations of people and institutions that help to bring about innovative programs. To illustrate the inherently local character of programs that foster building energy efficiency, chapter 10 is entirely devoted to two kinds of case study. One set of case studies consists of brief descriptions of successful city programs among the "pathfinder" cities. A second set of case studies describes the full range of energy conservation activities in each of five typical cities: Buffalo, N.Y.; Des Moines, Iowa; Jersey City, N. J.; Tampa, Fla.; and San Antonio, Tex. Such descriptions are the best way to capture the many influences on building energy efficiency in a particular area, whether they are State or city government, public utilities, chamber of commerce, or community groups.

The end of this chapter also includes a section on the potential for retrofit of publicly owned buildings. In all the discussion of public sector programs to stimulate private sector retrofit, it should not be overlooked that city governments are also responsible for the energy efficiency of their own buildings. The last section of this chapter describes OTA's findings on the prospects for public sector retrofit of buildings.

# FEDERAL GOVERNMENT PROGRAMS

Three strands of traditional Federal policy converge to influence the energy retrofit prospects of buildings in cities. Building energy conservation programs, operated by DOE, are designed to stimulate energy conservation in buildings as a means of reducing our overall dependence on imported energy supplies and of reducing the likelihood of future sharp increases in energy prices. Housing and urban development programs, operated by HUD, are designed to stimulate rehabilitation of low- and moderate-income housing and the economic revival of neighborhoods and cities. Finally, income assistance programs include assistance to households in paying for high-energy costs due to recent price increases.

A change in party control in both the executive branch and the Senate has prompted a sharp debate, focused on the 1982 and 1983 budgets, about the proper role of government in all three categories of programs. Table 79 illustrates clearly the controversy surrounding energy conservation programs. Compared to a total of more than **$800** million appropriated in 1981 for energy conservation programs (including transportation and industrial energy conservation), the revised Reagan administration budget for 1982 (as of September 1981) retained somewhat less than $200 million, The omnibus Reconciliation Act of July 1981 restored the amount to more than $550 million and the appropriations bill settled on $400 million, including funds deferred from 1981.

For income assistance, the 1982 budget controversy was less sharp. The Reagan administration proposed a cut in energy assistance from $1,850 million to $1,400 million. Among the housing and urban development programs the 1982 budget controversy touched the Urban Development Action Grant Program but not the

**Table 79.—Recent History of 1982 Budget Proposals Affecting Energy Conservation in Buildings (millions of dollars)**

| | Original enacted fiscal year 1981 appropriations | Fiscal year 1982 budget | | |
|---|---|---|---|---|
| | | Revised Reagan budget[b] | Congressional authorization | Appropriations conference |
| **Energy conservation programs** | | | | |
| Energy conservation total[a] | $802.8 | $171.6 | $558.0 | $402.3 |
| State and local conservation programs, total | 452.9 | 94.0 | 351.0 | 244.0 |
| Low-income weatherization | 182.0 | | 175.0 | 150.0 |
| Schools and hospitals | 181.0 | 87.0 | NS | 50.0 |
| Energy extension service | 20.0 | 0 | 15.0 | 10.0 |
| State energy conservation programs | 47.8 | 0 | NS | 25.0 |
| Buildings and community systems, total | 113.7 | 27.4 | NS | 49.7 |
| Residential conservation service | 14.7 | NA | 2.2 | 3.5 |
| Community systems (district heating, etc.) | 13.6 | NA | 4.4 | 4.0 |
| Analysis/technology transfer | 5.9 | NA | 2.0 | 2.0 |
| Solar and conservation bank | 121.0 | 0 | 50.0 | — |
| Appropriate technology grants | 12.0 | 0 | 5.0 | 3.0 |
| **Energy assistance programs** | | | | |
| Low-income energy assistance | 1,850.00 | 1,400.0 | 1,875.0 | 1,875.0 |
| **Housing and Urban Development programs** | | | | |
| Community development block grants | 3,695.0 | 4,177.0 | 3,660.0 $ | 3,660.0 |
| Urban development action grants | 675.0 | 300.0 | 500.0 | 440.0 |
| HUD innovative grants | 83.1 | NA | NA | NA |

NA—not available,
NS—Not separately specified.
[a]See app. table A. I for history of fiscal years 1977-81 appropriations for these programs.
[b]As submitted to Congress, September 1981.
[c]Omnibus Reconciliation Act of 1981 (Public Law 97-35).
[d]Appropriations bill approved by conference committee, Nov. 4, 1981. Includes new budget authority and deferrals and transfers from 1981

SOURCES: Energy Conservation and Power Subcommittee of the House Energy and Commerce Committee; Housing Subcommittee of the House Banking, Housing, and Urban Affairs Committee; and the Office of Technology Assessment

community Development Block Grant (CDBG) Program. However, the deeper cuts required for the 1983 budget may affect the Community Development Action Grant Program.

This section briefly describes the Federal programs in two categories: 1 ) information and marketing of building retrofit, and 2) financial assistance to energy retrofit and housing rehabilitation. Chapter 5 has a brief description of two other important Federal programs, low-income energy assistance and weatherization.

No attempt is made to relate the description of the Federal energy conservation programs to cities since they have been designed to apply nationwide across urban boundaries. However, such programs can be used by city governments in programs specifically focused on urban buildings. Federal housing rehabilitation and urban development programs, on the other hand, are specifically tailored to cities.

## Information and Marketing of Building Retrofit

The most ambitious of the Federal marketing and information programs is the *Residential Conservation Service* (RCS), established in 1978 under title II of the National Energy Conservation Policy Act; $15 million was authorized by Congress for fiscal years 1979, 1980, and 1981; $40 million was authorized for audit training for fiscal 1980 and 1981.

According to regulations currently in effect (issued Nov. 7, 1979) the heart of the Residential Conservation Program is the requirement that all public utilities whose rates are regulated by a State regulatory authority promote and distribute information to residential customers about the availability of audits, the cost of purchase and installation of certain energy devices, and the potential savings from retrofit actions. The utility must also offer audits to all customers who own or occupy buildings of one to four units. Audits are usually "class A," which means an auditor inspects the building, although in some cases a do-it-yourself audit, called "class B," is used, The utility must arrange for financing, as part of the program, and can either make loans itself or maintain a list of banks willing to provide conservation loans. Similarly, the utility must maintain an approved list of contractors to perform retrofits (usually certified by the State). The program is administered at the State level, by a lead agency designated by the governor. This agency formulates a plan for the RCS program and ensures compliance with the plan.

The regulations governing the RCS would be made far more flexible under a "Notice of Proposed Rulemaking" recently issued for comment by the public. Utilities would be given far more leeway in determining the measures to be considered in an onsite audit and they would not be required to provide onsite audits, to arrange financing, or provide a list of contractors. [1]

About 65 utilities offered audits before the RCS program was mandated and many of these are likely to continue to do so, even if the programs were withdrawn. To date, more than 40 States and territories have announced their own RCS programs. More than 70 utilities now have audit programs underway; 80 percent of these offer financing; 75 percent supply at least one energy-efficient device (such as flow restrictors or heat pumps), and so percent provide assistance in finding a contractor to do the retrofit. The number of audits available to utility customers has quadrupled since 1977-78 just before the program began.[2]

According to one evaluation of 35 utility audit programs (including many formed prior to RCS), most programs had not reached more than 5 percent of their customers since their start. Four reported that more than 10 percent of their eligible customers had requested audits. Audit programs with larger response rates tended to: 1 ) be older which improved the word-of-mouth reputation of the program, 2) offer audits on evenings and weekends, 3) greatly simplify the process of requesting an audit, and 4) coordinate advertising closely with seasonal anticipation of high energy bills.[3] Additional informa-

[1] "Residential Conservation Service Program, " proposed rules. *Federal Register,* vol. 46, No. 218, Nov. 12, 1981.
[2] "DOE Compiles Information on State of RCS," *Energy Conservation Digest* VOl. V, No. 1, Jan. **4, 1982.**
[3] Eric Hirst, **Linda** Berry, and Jon Soderstrom, "Review of Utility Home Energy Audit Programs, " *Energy,* vol. 6, No. 7, pp. 621-630, Great Britain 1981.

tion on utility audit programs can be found in chapter 8 on "The Role of Utilities."

To date the RCS approach has not been officially extended to commercial or multifamily buildings. Under a proposed rule issued in February 1981, DOE proposed the creation of a Commercial and Apartment Conservation Service (CACS).[4] The proposed CACS rule was amended in the RCS proposed rule published November 12, 1981, and the status of the program is still unclear. Under the original proposed CACS rule, tenants in individually heated and cooled apartments, owners of centrally heated and cooled apartments, and tenants and owners of small commercial buildings would be eligible customers for the audit service. Owners could request the present RCS audit and receive the related services and arranged financing, or alternatively, the owner could request the specially designed CACS audit. This audit, as proposed, would be designed for building owners and would not include the additional services. Commercial buildings used for business, government, and nonprofit activities would also be eligible for CACS audits, but up to specified limits on monthly energy usage (less than 4,000 kilowatt hours of electricity or 1,000 therms of natural gas).

Another Federal program to stimulate building retrofits is officially called the Institutional Conservation Program, but is often referred to as the "Schools and Hospitals Program" in recognition of the categories of buildings that are its biggest beneficiaries. The program provides grants for energy audits for schools, hospitals, local government buildings, and public care institutions. Schools and hospitals are also eligible for grants to subsidize capital investments in energy efficiency; the other two building categories are not eligible.

As of February 1981, about $260 million had been obligated for institutional building grants and about 8,000 individual grants had been issued. According to a preliminary evaluation for DOE, a far greater share of hospitals (25 percent) and schools (16 percent) had taken advantage of the audit grants than had local government buildings (3 percent) or public care institutions (8 percent). According to the evaluation, the opportunity for a capital investment grant provides stimulus to undertake operational improvements in energy efficiency and to make low-cost investments.[5]

The evaluation cites anecdotal evidence that the program has stimulated retrofit among private buildings not eligible for the program. The provision of technical assistance to local energy officials and local architects, engineers, and energy auditors proved to be one of the unexpected tasks of the program. As a side-effect, the program has stimulated the development of a professional community of energy auditors and helped them build professional reputations in their communities. In at least one case study visited by OTA, schools and hospitals work was helping to expand the list of completed retrofits for local engineers, and contribute to their reputation for success.

There are several other small but significant Federal information programs to stimulate energy retrofit. One of these is the testing of energy retrofit measures at the national laboratories. The Brookhaven analyses of the impact of boiler retrofits, for example, are the standard references for energy auditors seeking information about such devices as stack heat reclaimers or modulating aquastats and were used for the retrofit analysis in chapter 3. There is a small Federal conservation program to develop the market for energy retrofits. A grant under this program funded the retrofit of six prototypical hotels and motels in several different climates. The results will be disseminated to members by the American Hotel & Motel Association (this project was discussed further in ch. 4). Finally, there is the Energy Extension Service (EES) created by title V of the Energy Research Act of 1978. EES is State run and usually administered through the State university system. Generally, EES promotes energy retrofit through

[4]Department of Energy, "Commercial and Apartment Conservation Source (CACS) Program, Proposed Rule, " 10 CFR, Part 458, *Federal Register, vol.* 46, No. 11, Jan. 16, 1981, p. 4482.

[5]"Status and Performance of the Institutional Conservation Program: An Interim Report," draft report prepared by the Synectics Group, Inc., for the Department of Energy under contract No. ACO1-80-CS64999.

person-to-person communication via workshops, hotlines, and shopping center booths. An evaluation of the program in the initial 10 pilot States found that audits, counseling and technical assistance were most successful in inducing retrofit actions and that small businessmen, as a category, took the most followup actions as a result of EES contact.[6]

## Financing

Federal financial assistance to building retrofit comes in two major forms: energy tax credits, and financial assistance of several kinds to housing rehabilitation. A third form, direct subsidies to retrofit under the Solar and Conservation Bank, was legislated but has not been implemented. The Federal Government also permits and encourages utility financing and financing assistance to retrofit under the RCS and provides financing of retrofit under the Institutional Conservation Program described above.

**Tax Credits.** The most far-reaching of the Federal financing programs is the Residential Energy Tax Credit. Owners or occupants of buildings with up to four dwelling units may claim up to 15 percent tax credit on an energy efficiency retrofit up to a ceiling of $2,000. The maximum credit is thus $300 per income tax return. For renewable retrofits the ceiling is much higher, $2,500 maximum tax credit.

In 1978, when the program covered more than a year and a half of retrofits (from April 1977 through December 1978), almost 6 million taxpayers took advantage of the credit to make more than $4 billion of energy retrofit expenditures. The total amount claimed for the credits has been about $560 million. By 1979, partly because the program only covered a year of retrofits instead of 20 months, participation had fallen somewhat to about 4.8 million taxpayers making about $3.5 bill ion of retrofit investments and claiming about $440 million in tax credits. Even at its lower 1979 level, the program reached more than five times as many households as have been affected by 6 years of Federal housing rehabilitation programs (see table 83).

The outstanding characteristic of the energy tax credit program is that middle and upper-income taxpayers respond in fairly high proportion while lower-income taxpayers hardly respond at all. Table 80 shows the response rate by income class for both the 1978 and 1979 returns. For the approximately 40 million taxpayers with adjusted gross incomes less than $10,000 per year, an average of 1 percent in both years took advantage of the residential energy tax credit. One obvious problem for the lower-income taxpayers is that they don't pay enough income tax to be able to take advantage of the credit. One out of four of the small fraction of taxpayers who did claim the credit had to carry the credit over into another year to take full advantage of it.

On the other hand, middle and upper income taxpayers responded in large numbers to the tax credit in both 1978 and 1979, more than 16 percent of the 22 million taxpayers with adjusted gross incomes over $20,000 in 1978 and more than 12 percent of the 26 million in this income class in 1979. Compared to the typical response rates of less than 5 percent to most utility audit programs, these are very large rates indeed.

**Table 80.—Response to Energy Tax Credits by Income Class, 1978 and 1979**

| Adjusted gross family income class | Total number of returns | Percent of returns requesting energy tax credits |
|---|---|---|
| 1978 **returns**[a] | | |
| More than $20,000 . . . | 22,300,000 | 16.5% |
| $15,000 to $19,999 . . . | 11,400,000 | 9.8 |
| $10,000 to $14,999 . . . | 14,250,000 | 4.5 |
| Less than $10,000 . . . | 39,900,000 | 1.2 |
| 1979 **returns** | | |
| More than $30,000 . . . | 10,986,000 | 14.3 |
| $20,000 to $30,000 . . . | 15,323,000 | 10.8 |
| $14,000 to $20,000 . . . | 13,954,000 | 6.5 |
| $10,000 to $14,000 . . . | 11,863,000 | |
| Less than $10,000 . . . | 40,485,000 | 0.9 |

[a]The 1978 tax returns covered almost 2 years Of retrofit S from April 1977 to December 1978.

SOURCES: Department of the Treasury, Congressional Research Service, and the Off Ice of Technology Assessment.

[6]See *Energy Extension Source Pilot Program, Evaluation Report After Two* Years, vol. 1: "Evaluation Summary" and vol. II: "State Reports, ICF & WESTAT," for DOE, Washington, D, C., April 1980. Also see *Comprehensive Program* and *Plan* For *Federal* Energy Education *Extension* and *Information Activities,* DOE, March 1980, p. 15-3.

The average retrofit expenditure for which a tax credit was claimed was over $700 in each year. More than half of all taxpayers in 1978 used the credit for storm windows or doors and more than 60 percent used it for insulation (see table 81). For about two-thirds of the taxpayers the size of the energy credit was less than $100 (see table 82). For these taxpayers, the amount expended was therefore less than $666. overall, it can be concluded that the energy tax credit reached a large share of middle and upper income households and stimulated at least some of them to spend modest amounts on energy retrofits. (Others would have retrofit anyway without the tax credit. ) One important side benefit of the tax credit program is that it provides excellent information on retrofits carried out by single-family homeowners.

**Table 81 .—Use of Residential Energy Tax Credits for Energy Conservation and Renewable Retrofits, 1978**

| | Number of returns | Percent of total | Amount expended | Average expenditure |
|---|---|---|---|---|
| Total returns | 5,940,169[a] | — | $4,205,636,000 | 708. |
| Total principal residences | 5,941,419 | — | | |
| Total energy conservation | 5,900,788 | 100.0[b] | 4,090,096,000 | 693. |
| Type energy conservation: | | | | |
| Insulation | 3,933,123 | 66.7 | 1,758,727,000 | 447. |
| Storm windows or doors | 3,342,373 | 56.6 | 1,790,437,000 | 536. |
| Caulking | 2,559,906 | 26.4 | 87,424,000 | 56. |
| Other | 826,463 | 14.0 | 453,509,000 | 548. |
| Energy conservation credits | 5,900,788 | — | 557,540,000 | 95, |
| Total renewable sources: | 68,102 | 100.0 | 115,540,000 | 1,697. |
| Type renewable source: | | | | |
| Solar energy | 56,643 | 83.3 | 110,798,000 | 1,956. |
| Geothermal | 1,736 | 2.6 | 3,142,000 | 1,810. |
| Wind energy | 10,395 | 15.3 | 1,600,000 | 154. |
| Renewable resource credits | 68,102 | – | $ 30,119,000 | – |

[a] Total doesn't equal sum of conservation and renewable returns because one return could claim both conservation and renewable credits and would be counted twice in disaggregate form

[b] Does not add up to 100 percent because more than one measure can be claimed on one return.

[c] The energy credit is 15 percent of this amount.

SOURCE: Internal Revenue Service Preliminary Report, Statistics of income-1978, Individual Income Tax Returns, Washington, D.C , 1980, p. 42.

**Table 82.–Distribution of Residential Energy Tax Credits by Amount of Credit, 1978**

| Residential energy credits[a] | | | | | |
|---|---|---|---|---|---|
| | | Total | | | |
| Size of credit | | Number of returns | Percent of total | Amount | Percent of total |
| $ 1 | under $ 100 | 3,971,531 | 66.9 | $178,755,000 | 30.4 |
| 100 | 200 | 1,105,628 | 18.6 | 153,357,000 | 26.1 |
| 200 | 300 | 394,979 | 6.6 | 96,727,000 | 16.5 |
| 300 | 400 | 435,137 | 7.3 | 130,803,000 | 22.2 |
| 400 | 500 | 5,830 | 0.0 | 2,598,000 | 0.4 |
| 500 | 1,000 | 20,384 | 0.3 | 15,181,000 | 2.6 |
| 1,000 | 1,500 | 3,788 | 0 | 4,345,000 | 0.7 |
| 1,500 | 2,000 | 665 | 0 | 1,094,000 | 0.2 |
| 2,000 | 2,200 | 564 | 0 | 1,175,000 | 0.2 |
| 2,200 | $2,500 | 1,502 | 0 | 3,546,000 | 0.6 |
| $2,500 + | | 161 | 0 | 403,000 | 0 |
| Total | | 5,940,169 | | $587,984,000 | |

[a] Total credits claimed in a year regardless of the limitation relative to tax liability and resultant CarryOver of credits.

SOURCE: Internal Revenue Service Preliminary Report, Statistics of income-1978, Individual Income Tax Returns, Washington, D C., 1980, p 6.

Tax credits have in practice not been available to multifamily buildings and only the investment tax credit has been available to most commercial buildings. The relevant credits are the business energy tax credit, authorized by the Energy Tax Act of 1978 (Public Law 95-618) and the investment tax credit (Public Law 95-600 and Public Law 95-61 8). Enacted to encourage general investment in capital equipment by business, the investment tax credit provides a 10 percent credit against the tax liability of a commercial enterprise. Investments qualifying for the credit must be "nonstructural, " and such investments are not allowed for hotels, or for any structure housing "primarily permanent residents. " Thus, the investment tax credit is clearly not available for investments in multifamily properties, or for the many types of envelope retrofits that might be indicated for certain structures.

Given the restrictions on the investment tax credit, much hope was placed on the business energy tax credit as a method for accelerating energy retrofit in commercial properties. Structural retrofits are eligible items under the business energy tax credit. The property must be depreciable and must have a useful life of 3 years or more. Like the investment tax credit, the credit can run back 3 years or forward 7, and unlike the investment tax credit, the energy credit can erase 100 percent of a business' tax liability.

Substantial problems developed in the promulgation of regulations for the energy credit. First, the regulations declared that the credit would be available only to those enterprises engaged in commerce "as a means or method of producing a desired result by chemical, physical, or mechanical action. " This definition of industrial or commercial process effectively eliminated most retail sales applications, restaurants, and other nonindustrial businesses.

Secondly, the Internal Revenue Service limited the credit to certain specifically defined energy property. These properties are the type normally used by large industrial concerns. They are recuperator, heat wheel, regenerator, heat exchanger, waste heat boiler, heat pipe, automatic energy control system, turbolator, preheater, combustible gas recovery system, and economizer. A final regulatory impediment to application of the credit is that credit is limited to that portion of the cost of the equipment that can be directly attributed to the conservation function; in other words, the portion of the equipment that performs any function other than conservation may not be qualified. The net effect of the regulations is that the business energy tax credit is essentially nonexistent for most retail businesses, and for multifamily structures.

**Housing Rehabilitation Programs.** Housing rehabilitation programs operated by HUD stimulated as a group major property improvement investments for about 850,000 dwelling units between 1975 and 1980 (see table 83). The largest of these programs is the CDBG program. Others are named after the sections of law which created them, section 312, section 8, and sections 221 d(3) and 221 d(4). The total volume of dwelling units rehabilitated under the latter three programs was less than a quarter of the number rehabilitated under CDBG from 1975 to 1979. These rehabilitation programs provide money for many aspects of housing improvement, only incidentally including energy efficiency improvements. Top priority usually goes to correction of building code violations that threaten health and safety, such as wiring deficiencies, structural weaknesses, or plumbing inadequacy. Basic energy efficiency measures, however, such as storm windows, insulation, and upgraded heating systems are also included in rehabilitation packages.

**Table 83.—Dwelling Units Rehabilitated Under Four Federal Housing Rehabilitation Programs, 1975-80**

| | Rehabilitation programs[a] | | | |
|---|---|---|---|---|
| Fiscal year | Section 312 | CDBG | Section 8 | Section 221d3 and d4 |
| 1975 | 6,041 | 66,000 | – | 889 |
| 1976 | 6,918 | 90,000 | 3,723 | 2,557 |
| 1977 | 8,718 | 103,000 | 12,901 | 5,694 |
| 1978 | 7,309 | 123,810 | 19,436 | 8,268 |
| 1979 | 16,500 | 170,896 | 26,562 | 8,201 |
| 1980 | — | 220,000[b] | — | — |
| Total (1975-80) | | 100,000[b] | 753,700 | – |
| Total (1975-79) | 45,486 | 533,706 | 62,622 | 25,609 |

[a]Fiscal year 1975.79 data from Annual Report to Congress on Section 312, Rehabilitation Loan Program.
[b]Estimates from J Kossy, HUD

SOURCES Office of Technology Assessment

Title I of the Housing and Community Development Act of 1974 as amended, established CDBG to eliminate slums and blight, assist low- and moderate-income persons, and respond to urgent local needs. Over 1,500 localities throughout the Nation have used CDBG funds for property rehabilitation. Many use these public funds to establish leveraged loan pools in conjunction with private lenders. The Housing Act and Community Development Amendments of 1980 provided specific authority for use of CDBG for loans for energy conservation improvements in rehabilitation housing. ' To date, CDBG funds have been made available in most cities primarily to owner-occupied buildings of up to four dwelling units. Large multifamily buildings have, by and large, not been affected by the program. An effort to expand the program to multifamily buildings is now underway in HUD, A pilot program in about 25 cities will provide CDBG subsidies to financial institutions who will in turn make medium-term (5 to 7 year) loans at subsidized interest rates to multifamily building owners. A little used HUD program to provide property improvement loan guarantees for multifamily y buildings (title lb) will be used to encourage banks to make longer term loans on multifamily properties.[8]

Although energy conservation improvements are encouraged under CDBG there is no comprehensive data on the number of communities that are using CDBG specifically for retrofit. Two large CDBG retrofit programs, Boston and Pittsburgh, are described in the case studies in chapter 10. Both cities shifted from a comprehensive rehabilitation program to programs aimed primarily at retrofit.

Several other smaller more specialized rehabilitation programs have been available to finance retrofit although they are scheduled to be phased out in the 1983-84 budget reductions. The section 312 loan program provides direct low-interest, long-term loans to property owners in approved areas, to finance or refinance rehabilitation in residential, nonresidential, and mix-used properties according to applicable urban renewal property rehabilitation standards. Loans are limited to $27,000 per single-family unit and $100,000 for nonresidential properties and can be repaid over 20 years at 3 percent interest, Low and middle income families receive priority. Rehabilitation financed by section 312 is required to include cost-effective energy efficiency retrofits along with other types of property improvements.[9] Section 8 for existing buildings is a program to provide subsidies to owners who are rehabilitating their existing buildings and will then rent them to low-income families.[10] Section 8 also requires cost-effective energy improvements. The section 221d(3) and 221d(4) programs authorize rehabilitation for low- and moderate-income housing originally financed with Federal Housing Administration mortgages.11 They do not have explicit retrofit requirements. Another program aimed at multifamily rehabilitation is section 241 of the Housing and Community Development Act of 1968 (Public Law 90-448) which authorized FHA insurance multifamily projects.[12] In 1979, Housing Act amendments provided that HUD could insure a loan under section 241 for purchasing and installing conservation measures, solar energy systems and purchasing or installing (or both) individual utility meters in a multifamily housing project.

The Federal Government has traditionally encouraged longer term financing for housing through the creation of a secondary market for mortgage loans. The Federal Home Loan Mortgage Corporation (known as Freddie Mac) purchases mortgage-backed securities from banks and in turn sells these to large financial institutions such as insurance companies and pension funds. In the winter of 1981, Freddie Mac issued guidelines for a pilot program to purchase home improvement loans for single-family homes

[7] *Housing and Community Development Act of 1974*, title I, sec. 105(a)(4), as amended by the Housing and Community Development Act of 1980.

[8] Presentation by Michael Ehrman, HUD, at a Community Energy Workshop meeting held at HUD on Oct. 29, 1981, and sponsored by the Center for Renewable Resources.

[9] Sec. 312 of the Housing Act of 1964.

[10] Sec. 8 was authorized in the Housing and Community Development Act of 1974 as part of the renumbered U.S. Housing Act of 1937.

[11] Secs. 221 d(3) and 221 d(4) are of the National Housing Act of 1934. They were created by Section 101a of the Housing Act of 1961.

[12] *Housing and Community Development Act of 1968*, Public Law 90-448, sec. 241.

from savings and loan associations. The loan amounts may run as high as $30,000 and the loan term as long as 75 years. They must be secured by a second trust. There are no plans to create a secondary market for property improvement loans for multifamily or commercial buildings.[13]

**Solar and Conservation Bank.** The formation of a solar and conservation bank (to be established within HUD) was authorized in title V of the Energy Security Act of 1980 (Public Law 96-299). The intended purpose of the bank was to provide subsidized loans for investments in energy conservation and renewable to low-income homeowners, multifamily building owners and owners of buildings used for small businesses (defined as businesses with gross receipts under $1 million).

A budget appropriation of $121 million was made for the bank in fiscal year 1981, but regulations were not formally issued before the Reagan administration requested that funding for the bank be eliminated from the 1982 budget. In the Omnibus Reconciliation Act of 1981, Congress restored $50 million and also included it in appropriations for fiscal year 1982. However, no official regulations have officially been issued. As proposed in preliminary regulations sent to Congress for approval in the winter of 1981, the bank would have provided subsidies in the form of lump-sum grants to lending institutions for eligible loans. The lending institution would then use the grant to reduce the interest rate over the term of the loan. Had the bank remained at a funding level of several hundred million dollars, it would be a considerably smaller program than the CDBG rehab program of nearly $1 billion per year.

**Urban Development Action Grants (UDAGs).**[14] These grants are used to leverage private investment to assist distressed cities and urban counties to strengthen their economic base. HUD has launched a demonstration program in six cities including Trenton, N. J., Rochester, N. Y., and St. Paul, Minn,, to subsidize interest rates loans for energy conservation from private lending institutions. In the first of these cities, Springfield, Mass., the housing authority and private lending institutions have used their funds to provide a $1.2 million loan pool.

## Summary: Impact of Federal Programs on Building Retrofit

Federal programs have reached, in one way or another, a large fraction of the single-family homeowners and small multifamily owner-occupants in this country. Through the tax credit information we know that a large fraction have actually made modest investments in energy retrofit. To date, Federal programs have not much affected owners of multifamily or commercial buildings. The programs, which were intended to assist such owners, the Solar and Conservation Bank and the Commercial and Apartment Conservation Service, have, respectively, gone unfunded or have not yet been implemented.

Several Federal programs provide a framework within which State and local programs to stimulate building retrofit can be developed. Some possibilities for State and local tailoring of Federal programs is described in chapter 10. The most flexible of the Federal programs for this purpose are CDBGs and UDAGs which are designed to complement individual local responses. Under its original regulations, the RCS program, was fairly standard from State to State although individual States certainly developed unique approaches to RCS. If the currently proposed regulations are adopted, the RCS regulations will permit States considerably more leeway to shape their own programs.

[13] Presentation by Mark Shaefer of the Federal Home Loan Mortgage Corporation at a community energy workshop meeting held at HUD on Oct. 29, 1981,

[14] Authorized in the Housing and Community Development Act of 1977. See Department of Housing and Urban Development, "Community Development Block Grants, Clarifications and Changes to Urban Development Action Grant, *Proposed Rule,*" *Federal Register,* vol 45, No. 93, May 12, 1980.

# ROLE OF STATE GOVERNMENTS

The State government influence on the retrofit of buildings in cities is indirect but can be powerful. All States regulate public utilities and distribute Federal funds for weatherization and low-income energy assistance. Some States have direct authority or substantial influence over local building codes and some States have important housing finance programs or energy tax credits.

Motivation for an active State role in developing building retrofit and other energy conservation programs can come from any number of perceived energy problems. Regardless of the category of problem, some States will be led by State officials to take action while neighboring States with similar problems do relatively little. Florida and California represent one category of problem that has prompted some State officials to take action. Although their climates are mild compared to Northern States, both are States with rapidly growing populations and noticeable strains on peak electric capacity. In both States it is not unrealistic to expect rapid increases in the prices of both electricity and natural gas. State officials are faced with difficult decisions on how to accommodate rapid growth in electric power. In both States it is relatively difficult to find sites for new powerplants. Such concerns have led State officials to develop several far-reaching energy conservation programs with considerable impact on the retrofit of buildings, inside and outside cities.

Minnesota, Massachusetts, New York, Pennsylvania, and other Northern States represent quite a different set of energy problems, which has also stimluated the development of substantial energy programs. population in these States is growing slowly. Electric utilities are not required to add new generating capacity. Some are expected to be over capacity for quite some time. On the other hand, winters are severe in all these States. Individual cities in all of them except Minnesota are heavily dependent on expensive fuel oil to heat homes. In all these States there is reason to be concerned about excessive hardship for low-income people and about erosion of the multifamily housing stock from the strain of providing adequate heat.

The most important State influence on building retrofit is probably through the regulation of utilities, followed in importance by building codes, allocation of Federal funds and State financing.

## Regulation of Investor-Owned Utilities

All States regulate the rates and usually the generating capacity plans of investor-owned utilities. In this capacity, a few States have developed explicit criteria for linking the development of utility conservation programs to approval of their electricity-generating plans.

The Florida State Public Service Commission **(PSC) has** adopted tough rules to reduce growth rates in electric consumption and the dependence on oil as a generating fuel. The PSC will review proposed rate increases against a utility's conservation record and conservation will be measured as an alternative to new plant construction as a means of "increasing capacity. " The State public utility commission (PUC) sets limits on demand growth for each utility, but how the company meets these growth limits is its own business. In the case of the Tampa Electric Co. (TECO), energy will be allowed to grow at 85 percent of TECO's customer growth rate and demand at 85 percent of that. TECO will be offering RCS audits to about 2,000 homes a year, but the company feels that the most promising route to meet the State requirement is by encouraging less energy use in new residential construction, as this is where most of the growth in demand is expected. As a result, TECO will subsidize installation costs of electric heat pumps and more efficient electric water heaters to the majority of new homes in its service area. [15]

The California PUC also evaluates a utility's conservation efforts when it considers rate in-

[15] The Florida public Utility Commission regulations and their impact on TECO are described in greater detail in the Tampa case study.

crease **proposals. This is part of the State's** overall energy philosophy that conservation itself is an energy resource, just as oil and gas are. All of the State's utilities now provide below market rate financing for insulation and interest-free loans for weatherization. [n response to the weatherization requirement, Pacific Gas & Electric, the State's largest utility set up the ZIP (Zero Interest Plan) program. Under the ZIP program, the utility will offer free audits to any residential customer and interest-free loans for certain energy saving measures, especially insulation. The State's four largest utilities have been ordered by the PUC to begin a 3-year program in which utilities will offer up to $960 in cash rebates and low-interest loans to 375,000 homeowners and landlords for the purchase of solar hot water heaters.[16]

A much larger number of States have developed residential conservation service programs under the November 1979 regulations described above. Programs of audits and retrofit services had been announced in 25 of the 41 participating States (including Puerto Rico) as of August 1981. Several States have developed innovative programs even within the fairly stringent Federal guidelines. Massachusetts has created a third party corporation, Mass-Save Inc., to operate the program. Most of Massachusetts' 59 utilities, (including municipal utilities) have contracted with Mass-Save to provide audits and retrofit services to their customers. As of January 1982, 64,000 audits had been conducted.[17] Massachusetts plans to expand the audit program to all multifamily buildings and commercial buildings regardless of the fate of the Federal CACS program. New York State passed the Home Energy Improvement and Conservation Act (HEICA) program in 1977 before the Federal RCS program was launched and later incorporated it into the New York RCS program. The HEICA program requires all utilities in the State to offer audits to customers and also to subsidize retrofit loans through local lending institutions down to the utilities own borrowing rate. In OTA's case study city of Buffalo, N. Y., both local utilities, National Fuel Gas and Niagara Mohawk, offered HEICA loans.

## Building Codes

States vary greatly in the extent to which they have any jurisdiction over local building codes. About 42 States have adopted some form of statewide building code, including a statewide energy code. However, in only five of these does the State code prevail such that it cannot be amended locally. Five other States have statewide building codes that can be amended locally. Four States have adopted model State codes which are available, but not mandatory, for local adoption.[18]

States do not have to have a mandatory statewide building code **in order to mandate energy efficiency standards** for new buildings. Florida, discussed below, is an example of a State with mandatory energy efficiency standards but no statewide general building code. As of January 1979, 37 States had some authority to adopt and implement energy conservation standards for some or all types of new buildings. Of these, 30 have authority for all new buildings while 7 have more limited authority.[19]

Most States have adopted the energy efficiency standard recommended by the American Society of Heating, Refrigeration & Air-conditioning Engineers (ASH RAE).

A few States, however, have created their own standards for new buildings. The most innovative of these is probably Florida where a statewide Model Energy Efficiency Code went into effect on October 1, 1980. The code assigns energy points to each energy consuming feature of the building on a graduated scale, so the less

[16] *Save Energy*, California Energy Commission, issue No. 3, fall quarter, 1980, p. 1.

[17] Massachusetts Stategovernment, Residential Conservation Service (factsheet), pp. 1-3. Interview with Carl Bittenbender, Maw-Save, February 1982.

[18] Sources for this information are conversations with officials at the National Conference of States on Building Codes and Standards (NCSBCS) and with William Connolly, New Jersey Department of Community Affairs. The five States with mandatory non-amendable codes are: Massachusetts, New Jersey, Virgina, Wisconsin, and Connecticut. The five with mandatory amendable codes are: Michigan, Minnesota, North Carolina, Kentucky, and Oregon. The four States with model building codes are: New York, Ohio, Georgia, and Indiana.

[19] *States Energy Conservation Standards for Buildings: Status of States' Regulatory Activities*. Published by the National Institute of Building Sciences, Washington, D. C., 1979,

energy a building uses, the lower its total score.[20] The code applies to all new buildings, additions, and structures where renovation accounts for 30 percent of the building's value or more. California has adopted energy efficient standards for new buildings and appliances and also runs an extensive program to train local building inspectors.[21]

Home rule tradition is a major reason why more statewide building codes (and energy efficient provisions) have not been enacted, Building codes are a jealously guarded local prerogative and there is usually resistance from both local officials and local builders to State codes. For new buildings, the less proscriptive the code, the more likely it is to be accepted. In Florida, for example, local homebuilders have been receptive to the State code because it does allow considerable flexibility in how standards are met.

Energy efficiency codes for new buildings have an impact on the retrofit of existing buildings in two ways. They affect the competitive climate for existing buildings by ensuring that new buildings are fairly energy efficient and thus fairly inexpensive for tenants who must pay their own utilities. In OTA's case study of Tampa, the influence of the Florida code was cited as an extra source of pressure on owners of existing buildings to retrofit. Energy efficiency codes for new buildings, especially one such as Florida's which gives builders a lot of choices, also help publicize the technical options for improved energy efficiency and help to lower the perceived risk of retrofit.

Minnesota is the only State to promulgate energy efficiency requirements for existing buildings. Under the State mandatory energy conversion standards for rental housing, all units must be weatherstripped by January 1, 1981, and must have other energy saving features (e.g., storm doors and windows, R-1 9 attic insulation) by July 1, 1983. Enforcement of the ordinance is by tenant complaint. No data is available on compliance, Under the State mandatory energy disclosure audit at time of sale provisions, new owners must be told if the unit meets State audit standards. All residential units are covered by this provision and auditors must be approved by the State building code division. Through its Housing Finance Agency, Minnesota also offers low interest home improvement loans to moderate-income homeowners and owners of rental buildings. The loans can be used specifically for energy and general home improvements and are designed to reach 1 to 6 unit structures. The income limitations have been sufficiently restrictive however so that few rental properties have been involved.** Such financing is available to the property owner but is not formally tied to the code inspection process.

## Allocating Federal Funds

States serve as the conduits for two Federal programs designed to help low-income households cope with high energy prices. Both of these programs, weatherization and low-income energy assistance are described in chapter 5.

For both programs, States provide overall planning and management and allocate funds to local government. Under current weatherization formulas which give heavy weight to heating degree days, the dilemma for Southern States such as Florida and Texas has been how to fairly spread around a small amount of funds. The Texas weatherization allotment would permit little more than 5,000 units per year. Low-income energy assistance funds within Texas have also favored counties with colder climates.[23] In OTA's case study city of San Antonio, officials found themselves at a disadvantage vis-a-vis other Texas cities in getting energy assistance funds to pay air-conditioning costs for elderly residents who are threatened by heat stroke.

Pennsylvania is one of few States that have been outstanding in the effective management

[20] *Shining Examples: Model Projects for Using Renewable Resources,* Center for Renewable Resources, 1980, p. 28,

[21] California Energy Commission, Op. cit., p. 55.

[22] Proceeding of the Multifamily Housing Workshop, Dec. 4-6, 1980, Deborah L. Bleviss, Federation of American Scientists.

[23] Interview with Joan Cappolino, Florida Department of Health and Rehabi l itative Services. Texas State Plan for Weatherization Assistance for Low-Income Persons, draft plan, October 1980, Texas Department of Community Affairs (TDCA), and interview with John Geistweidt of TDCA.

of the weatherization program to retrofit the dwelling units of low-income households. Pennsylvania's program dates from 1976, when the State funded the program on its own. Weatherization is run through the State department of community affairs, which has set high production goals. Each year, about 14,000 homes are weatherized, at a level of about 1,200 to 1,400 homes a month–more than double any other State. Furthermore, the Pennsylvania program has tried to address rental and multifamily units to a greater degree than other State weatherization programs. About 20 percent of the single-family homes weatherized in 1979 were renter occupied. The State has also tried to direct weatherization funds to buildings of five or more units, especially public housing.[24]

Very few States have effectively coordinated weatherization with energy assistance although there is usually some mechanism for referring households from one to the other. The programs are usually run out of different State departments, Weatherization is likely to be run through a community affairs department because it is administered through community action program (CAP) agencies. Low-income energy assistance is usually treated as an income maintenance program and managed out of a State welfare or human resources department and distributed out of community welfare offices (see fig. 57).

## Financing

States can help finance energy conservation programs in two ways–through State subsidy programs and through tax incentives. Many States now have housing finance agencies that provide mortgage subsidies and low interest rate financing. A few of these programs are now being directed toward energy conservation. The New Jersey Mortgage Finance Agency has offered 83A-percent interest loans for solar hot water heaters and other energy conservation improvements, under an experimental program. Up to $3,000 was allowed under the pilot for the purchase and installation of solar units and another $1,500 for other improvements, with a maximum loan term of 15 years. In an evaluation of the program, most participants took advantage of the full loan terms and indicated that they would not have installed solar units without the incentive. Furthermore, most participants (71 percent) had incomes of $40,000 or less.[25] The Minnesota Housing Finance Agency also offers low interest loans (described above) for energy conservation and general home improvement to owner occupants of one-to six-unit buildings. A special rental improvement demonstration program provides below-market interest rates to owners of rental properties occupied by low-income tenants.[26]

Through its taxing authority, a State can provide considerable incentive for energy conservation. The best known example of the use of the tax power is California's 55-percent tax credit on passive and active solar systems. Nearly 30,000 such credits were claimed in California in 1978, with a total subsidy of $25 million. The California subsidy, which can be taken on top of the Federal credit, reduces the cost of such units to $1,200 to $1,500 and the payback to 3 years.[27] California is now trying a 40 percent tax credit for conservation to qualified audits. In Oregon, tax credits are offered for weatherization and for installation of alternate energy sources.[28]

States may also provide enabling legislation for city tax incentive for energy conservation and renewable. New York State's J-51 program that allows cities to permit tax abatements for rehabilitation has been used by the city of Buffalo, N. Y., to provide tax abatements for energy retrofits for multifamily buildings. (This program is described in the next section on the role of city govern merits.)

[24] Interview with Ali Harper, Pennsylvania Department Of Community Affairs.

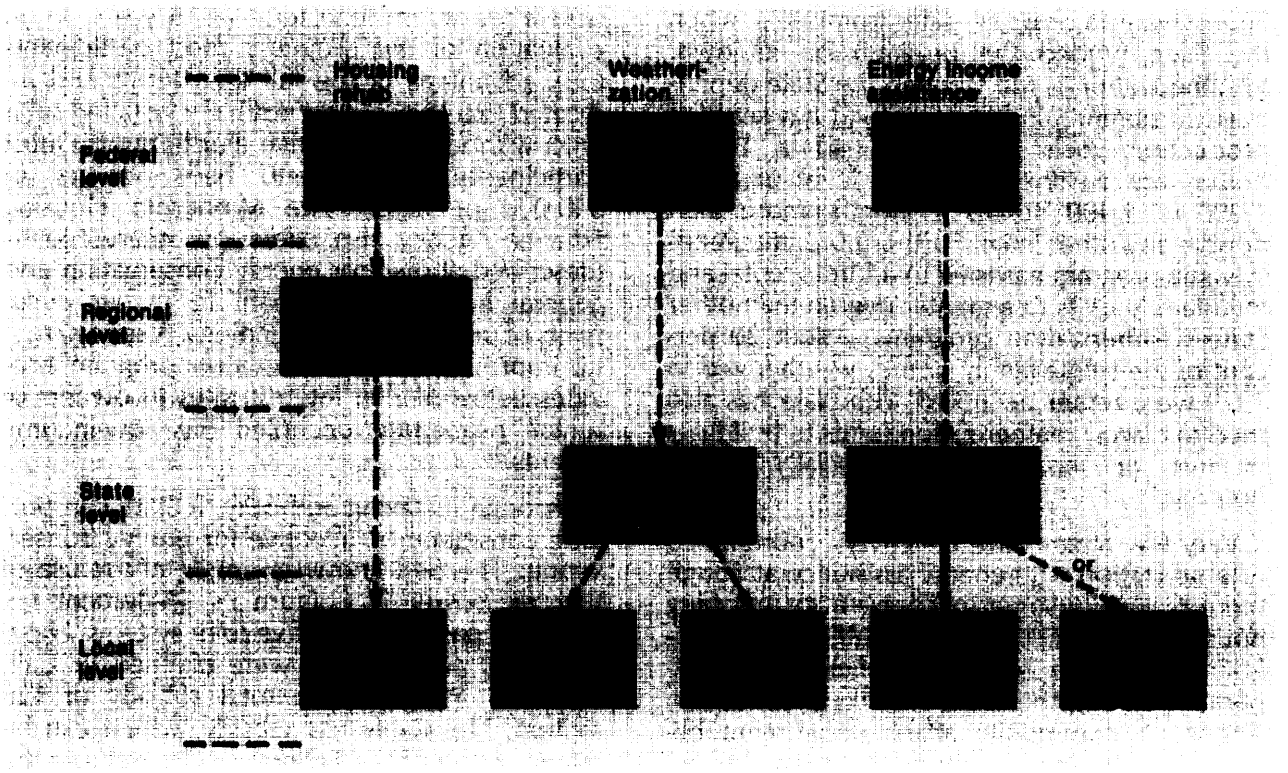
[25] New Jersey Mortgage Finance Agency Pilot program: Financing for Residential Solar Hot Water Systems, p. 1.

[26] Proceeding of the Multifamily Housing Workshop, Dec. 4-6, 1980, Deborah L. Bleviss, Federation of American Scientists.

[27] Community Energy strategies: A Preliminary Review, John H. Alschuler, Jr., May 1980, pp. 72-3.

[28] Ibid. p. 29.

**Figure 57.—Organizations Which Influence the Energy Retrofit of Housing for Low-Income People**




[a]Department of Housing and Urban Development
[b]Department of Energy.
[c]Department of Health and Human Services.
[d]Community Action Program.

SOURCE: Office of Technology Assessment

## Conclusion

States where officials and legislatures are motivated to develop programs to combat energy problems have some powerful tools to use in promoting energy efficiency retrofits. To date, most States have focused these tools on improving the efficiency of owner-occupied residential buildings of less than four units and have ignored larger multifamily and commercial buildings. The same tools, however, can be used to reach these other types of buildings as is clear from the Massachusetts utility audit program, California utility audit and retrofit program, and the Florida State building code.

# ROLE OF CITY GOVERNMENTS

Some cities have made names for themselves as "pathfinders" in the development of effective programs to stimulate the retrofit of buildings within their boundaries. Energy programs developed by six of these are described in chapter 10. But most city governments have not placed much emphasis on energy. To be sure more than 90 percent (according to a recent survey by the International City Managers Association (ICMA)), have taken steps to control energy

costs **in their own municipally owned buildings.**[29] **But that is** in their capacity as *building owners,* and is discussed at the end of this chapter. Only about half the cities surveyed had named energy coordinators and only 5 percent had full-time coordinators.

Cities with active energy programs have many reasons for developing them. Some are located in States such as Minnesota and California where State governments have utility policies, financial assistance, and enthusiastic energy staffs aimed at stimulating energy retrofit in buildings. Some such as Portland, Oreg., and St. Paul, Minn., have had mayors who have made energy one of their prime concerns because they perceive the link between energy problems and housing or economic development. Some cities, such as Baltimore, Md., Boston, Mass., and Buffalo, N. Y., have a tradition of neighborhood organization that lends itself to active energy programs. However, for every city with a reason to develop an active energy program, there are dozens with similar reasons who have not done so. To understand why this might be the case, this section describes the context for energy programs with in city governments, as well as the resources which cities might bring to bear in promoting the energy retrofit of buildings. For much of the discussion, the study draws on case studies of energy concern and activities in five "typical' American cities: Buffalo, N.Y.; Des Moines, lowa; Jersey City, N. J.; San Antonio, Tex.; and Tampa, Fla. The next chapter on case studies presents brief accounts of each city. Longer accounts will be published in a set of working papers as volume 2 to this report.

**Citizen Concern.** City officials in the five case study cities reported that citizen concern about energy did not, in general, reach city hall. The reasons given were different from city to city. In Buffalo, city officials believed that citizens blamed the utilities for price increases and not city hall. In fact the mayor of Buffalo had spoken against utility price increases in recent rate cases. According to officials in Buffalo, citizens see energy price increases as part of general inflation. In Des Moines officials believed that citizens regarded energy retrofit as their own responsibility and did not respond to government energy programs. In Tampa, citizens threatened with cutoff of kerosene supplies appealed to the county fuel allocation program but no direct citizen concern reached city hall. In San Antonio, citizen concern was expressed periodically at electricity and gas rate increases by the San Antonio City Public Service Board, a municipal utility .30

Even in a 1979 survey of 12 cities and counties with active energy programs DOE concluded that:

> In general, energy is not perceived by citizens or local officials as an urgent community problem, especially in comparison to specific other issues . . . the low level of citizen activity in the localities studied appears to reflect a widespread disbelief in the existence of an energy crisis, the lack of an identifiable energy issue in most jurisdictions, confusion about what are appropriate and effective measures, and the absence of clearly defined constituent groups with an interest in broad energy conservation .[31]

The one form in which city governments feel citizen concern directly is when there are complaints that landlords are not supplying enough heat. Officials in Jersey City, a case study city with predominantly multifamily buildings, reported that heat complaints increased from 2,400 to 3,400 from 1979-80 to 1980-81.32 Reflecting the far greater scale of New York City, heat complaints there increased from 225,000 to 320,000 in the 2 years from 1978-79 to 1980-81.[33] Virtually all cities include minimum heat requirements for multifamily buildings in their

[29] International City Management Association, *Urban Data Service Report,* vol. 12, No. 8, "An Assessment of Local Government Energy Management Activities."

[30] See the chapter on case studies for more details. Complete case studies and documentation of interviews and written sources used in preparing the case studies will be published in vol. 2: *Working Papers* of this report.

[31] Local Government Energy Activities: Detailed Analysis of Twelve Cities and Counties, USDOE, 1979. The 12 cities and counties were: Boston, Mass.; Pittsburgh and Allegheny County, Pa.; Dade County, Fla.; Los Angeles city and county; Oakland, Calif.; Alameda County, Calif.; Seattle and King County, Wash.; and Minneapolis and Hennipin County, Minn.

[32] See Jersey City case study.

[33] Information from Joseph M. White, director of operations, Division of Code Enforcement, New York City Department of Housing Preservation and Development.

building codes. Rapid increases in fuel prices, especially of fuel oil, have induced more landlords to save money by cutting back on heat.

It is against this backdrop of citizen apathy that mayors may decide that a campaign is necessary to alert people to energy problems and what they can do about them. The Fitchburg campaign (described in ch. 5) to make low cost/no cost retrofit materials and information available to its citizens had a side benefit of generating interest in energy programs. The St. Paul energy mobilization (described **in the case studies** in the next chapter) was also very successful in stimulating citizen interest in the potential for energy retrofit.

**Housing.** Virtually all cities have some kind of housing rehabilitation program. Energy efficiency is usually one of the goals of the housing program, although usually ranked in priority after structural problems and threats to hygiene and fire safety. The abandonment of housing in the central cities of metropolitan areas with stable or declining populations is regarded as a more general problem of housing supply and economics but in some cases, such as Jersey City and Buffalo, energy is perceived as the straw that broke the camel's back.

In Buffalo, officials cited concern about a shrinking property tax base as a reason to have programs for maintaining a healthy housing stock. In San Antonio, on the other hand, the deputy city manager reported that in Texas there is a strong tradition that private property as a "tax base" is of no concern to the city government, San Antonio not only has a growing population and tax base but is somewhat free of dependence on the property tax by its ownership of a municipal utility that provides 40 percent of the city's annual revenues. on the average, cities derive 40 percent of their revenues from property tax but in some cities the share is much larger. In Boston, for example, income from property tax is 70 percent of the total .[34]

**Economic Development.** The perceived link of energy to economic development is much weaker than the link to housing. In theory the creation of local retrofit jobs and reduction through retrofit of money spent on fuel oil and natural gas helps stimulate the local economy. A few cities have obtained UDAGs for energy conservation programs. These grants are intended to match private investment for purposes of creating local jobs. In practice, OTA was not able to identify any examples of explicit justification of city energy retrofit programs for purposes of economic development.

**Energy Among Other City Priorities.** In all the case study cities, energy was outranked as a concern by other pressing problems that did "reach city hall ." In Buffalo and Jersey City the overriding concern was general economic development through downtown development in Buffalo's case and through the attraction of new industries in Jersey City's case. In Tampa and San Antonio the inadequacy of the cities' storm sewers was a serious problem. Buffalo city officials were concerned about the safety of local bridges and streets. A recent survey of Michigan communities reported that energy ranked third–after public health and safety and inflation—among problems considered by Michigan municipal officials in the community planning process .[35]

**Building Retrofit Among Other Energy Priorities.** The retrofit of housing and commercial buildings within city borders is only one of several energy programs that a city might undertake. Apart from retrofit of its own municipal buildings (see discussion below) a city government might: launch **a car** and van pooling matching program (as did San Antonio), a street light efficiency program (Tampa), or a program to develop guidelines **for energy-efficient zoning** and site development (San Antonio). other programs and concerns such as these compete for the limited time of the city energy coordinator.

[34] Henry Lee, "The Role of Local Governments in Promoting Energy Efficiency, " Energy and Environmental Policy Center, JFK School of Government, Harvard University, December 1980, p. 12.

[35] " Michigan Officials Answer Energy Questions, " a report on a survey by Proaction Institute, *Energy Conservation Digest, vol.* **V, No. 1,** Jan. **4, 1982.**

## City Resources for Building Retrofit

If city officials decide to launch **one or more programs to promote energy retrofit** in their city's building stock they have several potential tools at their disposal: Federal housing rehabilitation funds, other Federal funds, local financing assistance through a bond issue or the tax system, building codes, and planning and organizational activity by city staff.

**Housing Rehabilitation Funds.** The several Federal housing rehabilitation programs described above are usually administered through a city housing or community affairs department. Cities differ markedly in their housing programs. At **one extreme, the city of Tampa funds a small number of extremely thorough rehabilitations (averaging $17,000 each), which are financed by the city for 20 to 30 years. Tampa's 1980 housing assistance plan set a 3-year goal of only 141 dwelling units.[36] At the other extreme, the cities of Portland, Oreg., and** Pittsburgh, Pa., have both developed high-volume rehabilitation programs each funding more than a thousand dwelling units each year. Both cities have developed close cooperation with local banks in processing applications for funds and making loans.

CDBGs make up the bulk of the typical city's housing rehabilitation budget. In 1980, 220,000 housing units were rehabilitated with CDBG funds at a total of $1 billion, about 60 percent of which was Federal money and the rest was leveraged private loans .37 For cities, setting CDBG priorities is a microcosm of the issues that confront the city at large. There are many claims on the CDBG dollar within neighborhoods and energy may not be high on the list, when it is competing with sidewalk repairs, flood control, and more general rehabilitation concerns. In fact, of 6,600 communities that receive CDBG funds, only a handful thus far have chosen to direct these moneys toward energy conservation in a serious way. HUD has documented 10 of these and about five **more are known .[38] Most city rehabilitation programs acknowledge energy as an objective** for rehabilitation but it is low on the list after correcting code violations and making exterior repairs that will help improve the ambience of a neighborhood. Boston and Pittsburgh are two notable exceptions (see case studies in ch. 10) which have used CDBG directly to promote energy conservation.

There are several advantages to close links between energy retrofit and more general rehabilitation programs. One is that older buildings may need substantial repairs in windows or roofs that are not strictly energy conservation but which are needed to make storm windows or roof insulation effective. A second advantage is that an owner generally considers the economic prospects of the building as a whole when considering an investment in **energy retrofit.** The owner's judgment that the value of the energy retrofit investment can be recovered is likely to be enhanced by the perception that the property is being generally upgraded through rehabilitation. CDBG rehab efforts are often concentrated in neighborhoods where many owners are persuaded to rehabilitate their property at the same time. Private rehabilitation in such neighborhoods may be linked to public investments such as tree planting, sidewalk repair, or storm sewers, These too can help convince an owner that the value of an energy investment can be recovered.

**Coordination of Energy Assistance, Rehabilitation, and Weatherization Programs.** Occasionally cities are able to coordinate three Federal programs that affect the energy costs of the urban poor. Generally each program administered by a completely different set of State, county, city, and nonprofit organizations. Figure 57 above displays the tangle of agencies involved. Federal housing rehabilitation funds are the only funds that come directly to city governments, generally to housing and community affairs departments through over 90 HUD area offices that manage the details of each city grant. Federal energy assistance funds

[36] Interview with Ron Rotello, director of housing inspections, city of Tampa; "Sixth Entitlement Application" [for CDBG funds] Department of Revenue and Finance, Bureau of Community Development.

[37] Judy Kossy, HUD, Office of Community Planning and Development programs.

[38] HUD, Office of Community Planning and Development, *Block Grant Energy Conservation Programs,* April 1980, HUD 568 (CPD).

are generally allocated by State welfare or human resource agencies to county welfare offices. Federal weatherization funds come to **State departments of economic development or community affairs and are then allocated to local nonprofit community action agencies.** In the case study cities, Buffalo and Tampa, there was very poor coordination among the agencies administering the three programs.

Des Moines, lowa, however, illustrates one approach that cities can use. The city government has one department for its antipoverty and community affairs programs. That department administers weatherization, low-income energy assistance, and housing rehabilitation. This is possible in part because the State of lowa chooses to let some cities, rather than only counties, administer welfare programs. Weatherization and direct cash assistance are well coordinated. Households are routinely referred from one to the other in Des Moines,

**Other Federal Funds.** Cities may also use Federal funds other than housing rehabilitation or weatherization funds for retrofit. The most important of these are probably the UDAGs described above in the section on Federal programs.

The financial base for Portland's comprehensive program is a $3 million UDAG, which helped leverage $12 million in private moneys. UDAG now includes energy conservation guidelines and can be used to help finance district heating, cogeneration, and waste-to-energy projects. Trenton, N, J., is using UDAG funds for its cogeneration project and St. Paul expects to finance its district heating plant partly through a UDAG (see ch. 6 on district heating). An advantage of UDAG for urban properties is that it can be used for many sorts of buildings–single-family homes, apartments, offices and commercial projects. Finally, federally funding for public housing (discussed at greater length in ch. 7) is an important resource for a large part of the urban multifamily stock. While there may be cutbacks in all of these Federal programs, they will still make an important contribution to many local budgets.

**City Financing of Building Retrofit.** Cities have two primary options for providing direct financial assistance to building retrofit: municipal bonds and property tax credits and abatements. The only two cities OTA identified that had provided retrofit financing through a bond issue were Minneapolis and Baltimore (see descriptions in the next chapter on case studies). Voters everywhere scrutinize bond issues carefully and are likely to turn down any for which there is not a strong constituency. Furthermore, bond ratings in many older cities have deteriorated over the past decade and some cities, such as Buffalo, are faced with State-imposed ceilings on indebtedness. Given these fund-raising difficulties the first claim for any bond financing is more likely to be energy retrofit of municipal buildings to save energy expense in the annual budget, but even this is difficult (see discussion at end of chapter).

Property tax credits and tax abatements could also prove a powerful incentive to retrofit. OTA found few examples of the use of property tax incentives to stimulate energy efficiency retrofit. At least two cities–New York City and Buffalo, N.Y.–have taken advantage of New York State's enabling legislation to encourage rehab through property tax abatement. New York City's J-51 tax exemption and tax abatement program, started in 1955, was designed specifically to upgrade the city's multifamily stock, but it has become an important energy conservation tool as well. J-51 allows up to 8 1/3 percent of the cost of improvements to be deducted from property taxes each year up to 20 years until the improvements are 100 percent paid for. Any building with three or more units is eligible. J-51 allows all of the basic energy conservation improvements—boiler and burner conversion, solar units, storm windows and doors, and insulation. In at least one case in Manhattan, it has been used to install solar units on a printing factory that has been converted to multifamily housing. In fiscal year 1980, 75,000 units in 14,100 buildings were rehabbed using the J-51 incentive. The total amount of tax incentives offered that year under the program was $116 million. The program has been an ex-

tremely popular one, so popular in fact, that the city now finds that the tax incentives are being used for co-op and condominium conversions that serve a higher income market, and there may be limitations on the use of J-51 particularly in Manhattan. While rehab officials in New York do not have precise figures on how the money is being used, they do have a strong sense that much of J-51 financing is going toward energy conservation. If that is the case, this program has been highly successful in reaching the difficult multifamily market.

Buffalo, N, Y., has developed a similar program to encourage energy retrofit in multifamily housing. The city offers a tax abatement for 80 percent of the cost of energy conservation improvements over a period of 10 years. Between November 1980 and December 1981 eight multifamily owners representing more than 200 dwelling units had received such tax relief.[39]

**Regulation: Building Codes and Rent Control.** Local governments have the responsibility for carrying out building code inspections even when there is a mandatory statewide code, In only a few places have actual energy retrofit standards been adopted by cities that go beyond State requirements. For the most part these are triggered by the sale or lease of a property and apply primarily to residential properties. Davis, Calif., requires R-19 attic insulation, low-flow shower heads, weatherstripping, and a hot water blanket on hot water heat for all single and multifamily buildings constructed before 1976. Portland, Oreg., Santa Clara County and Livermore, Calif., have similar requirements upon point of transfer, as do a handful of other communities. With the exception of Portland (see case studies), where the retrofit requirement is tied to the city's other energy programs, financing to pay for retrofit is not linked to these ordinances.

For cities that develop their own energy efficiency building codes, the first problem is how to set energy efficiency standards. Cities may follow the example of Minnesota and set simple specific requirements or they may follow the example of Florida and give points for a variety of energy-conserving measures. To date Portland has avoided setting any standards. The city's time-of-transfer requirement will not take effect until 1984. Enforcement of energy efficiency codes are also a problem. In the 1979 DOE study of 12 communities, it was reported that enforcing the ASH RAE energy efficiency standards for new buildings increased the time required for a building code inspection by about a third .[40]

Cities can also influence building retrofit through rent control ordinances. One city, Cambridge, Mass., specifically allows a pass-through of the cost of energy efficiency improvements up to the amount of the loan payments on the improvement. In other cities, such as San Francisco, owners are allowed to pass on the cost of major improvements, depreciated over 10 years. Energy efficiency investments may qualify as major improvements .4'

**Planning and Organization of Retrofit Programs.** For some kinds of retrofit programs, the availability of skilled and enthusiastic city staff in an energy office, housing department, or community affairs department may be as important as the availability of financial resources. Such staff can put together effective energy retrofit programs that draw on utility audit services, private financial resources, neighborhood community groups or co-ops for outreach (see next section on nonprofit groups) and private or public subsidy sources. An outstanding example of such imaginative packaging is the Minneapolis program for conducting concentrated audits and retrofits over 500 city blocks, described in the case studies in the next chapter. The energy bank component of the Minneapolis program requires cooperation between the city that is providing the funding through a revenue bond and the local gas utility, Minnegasco, which originates all loans and services them through its monthly billing operations. City-hired auditors visit the homes of residents organized block-by-block through neighborhood energy workshops. The entire program has been put together by the city energy office with close cooperation from the Minnesota Housing Agency.

[39] Interview with Tom Murphy, office of the mayor, Buffalo, N.Y.

[40] DOE Local Government Energy Activities, op. cit.

[41] Bleviss, op. cit. p. 79.

The most effective planning by cities pays close attention to the energy problems faced by specific constituencies such as small business building owners, owners of small multifamily buildings or owners of large multifamily properties. Ann Arbor, Mich., began its planning process by identifying the key groups in the planning process. City officials thus found it easy to move directly from plans to specific programs.

### Conclusion

The experience of the "pathfinders" has demonstrated several practical ways in which cities can make use of their normal authority and resources to stimulate the retrofit of buildings within their boundaries. That many, or even most, cities may be reluctant to develop large-scale programs, despite the example of the pathfinders, is not surprising, for several reasons explored in this section.

For one thing, conservation in buildings, with the exception of housing, is not traditionally the purview of local government. It is the responsibility of the private sector and while city hall can set an example, it cannot do much more. Secondly, there is always the nagging question of priorities. Energy is important in cities and most mayors know it, but whether it is more important than jobs, crime, and abandonment is not clear. Third, many mayors feel that the best way to get at energy problems is to deal with other over-arching problems. They perceive the energy problem largely in economic terms. If a locality's economy can be bolstered and more money put in citizens' wallets, rising energy costs would not hurt quite so much, There is a debate in many communities about whether energy costs should be attacked head-on or indirectly through economic and community development.

## NONPROFIT ORGANIZATIONS

The nonprofit community is sometimes called the "third sector" by observers and the appellation is particularly appropriate in the case of energy conservation. Virtually every city has at least one community group that has taken up the cause of energy. These activities have taken many forms—promoting conservation, experimenting with alternate sources, and protesting rate increases, among others.

There has been very little systematic effort to compile either descriptive or analytic data on these nonprofit groups. From OTA's case study cities (see ch. 10) and other descriptive sources, it is clear that the mission and activities of these groups vary widely and so does their influence. In some cities they are weak and disorganized while in others, the third sector has set the pace for the other two–government and profitmaking enterprise—when it comes to energy conservation action.

Buffalo, one of the case study cities, is a good example of the variety of nonprofit groups and how they interact with one another and other institutions in their energy work. The New York Public Interest Research Group (NYPIRG) has administered a neighborhood-based weatherization program that is a model for both local utilities and city housing officials. Another community group, the Buffalo Energy Project (BEP), is active in outreach programs, education and technical assistance, and promotion of alternative energy sources. BEP is working with the city to set up a windmill to provide power at Buffalo's waterfront park. The group has already been successful in aiding a private developer in designing a solar heated luxury housing project along the waterfront. A third group, Peoples Power, has pressed for lower utility rates and the establishment of a municipally owned power company. Buffalo does not seem to have strong neighborhood energy groups but these do exist in many other communities. A fourth example of nonprofit activity comes from the case study city of Tampa, Fla., where the chamber of commerce set up its own program (called the HEAT program) to provide energy audits to small businesses, Chamber of commerce members made "sales calls" on about 180 small businesses and about one-third of these signed up for a visit from an energy auditor.

These programs illustrate what is probably the most important function of such nonprofit organizations. They provide a link of trust between building owners considering energy retrofit of their buildings and government programs, utilities or private for-profit companies who are trying to persuade them to retrofit. St. Paul worked with many neighborhood nonprofit organizations to develop specific programs in the months following the St. Paul mobilization, described in the case studies of chapter 10.

Nonprofit groups have other advantages. They can draw on diverse sources of funds and are not constrained by narrow legislative missions in the way that government is. So, in theory, these groups can overcome some of the turf problems that, for example, would separate weatherization from rehabilitation activities or job counseling within city government. Very few nonprofit community groups are well financed, but they can draw on a vast supply of volunteer manpower and in-kind contributions that typically is unavailable for government and business. This is especially valuable in cities, such as Buffalo, where energy is an important issue but where public funds are limited.

From several sources, such as the U.S. Consumer Affairs Office, OTA compiled descriptions of 15 nonprofit community groups involved in building retrofit around the country. (See box O for a sample of these.) Of the functions performed by the 15, by far, the most common is outreach. This can include blanketing a neighborhood with brochures, conducting training workshops and seminars, and even setting up demonstration projects. The next most frequent activity was the purchase and installation of equipment. Only one group was involved in outright financing of energy improvements and it worked closely with the Tennessee Valley Authority which runs one of the largest energy conservation financing programs in the country. This distribution of activities is not particularly suprising. Outreach is a low budget activity that can easily be accomplished by volunteers. Financing requires access to funds that is generally quite limited for such nonprofit groups,

Funding for these groups comes from a variety of places. The most common public sources are CSA, Action, and HUD, especially through community development block grants. These are all funding sources threatened by the 1982-83 budget cuts. Foundations have also been supportive in a few cases. While many nonprofit groups have applied for grants for demonstrations from sources such as the National Center for Appropriate Technology, HUD, and DOE, there is very little such money available. But even in the absence of money, these groups have continued to work away, albeit on shoestring budgets. By and large, the main resources and energy for these groups has come from committed volunteers dedicated to the energy cause.

## Energy Cooperatives

One specialized form of nonprofit enterprise is the cooperative which in theory could be useful in stimulating energy retrofit. Traditionally, cooperatives have offered a wide range of consumer services, including housing, food, insurance, and furniture. In the 1930's, Rural Electric Co-ops (RECs) provided much of the electricity needed in rural parts of the country .42 There are several ways in which the co-op idea could take root i n cities. These include establishing co-ops for bulk fuel purchasing, weatherization, and solar equipment.

Despite their potential, OTA was able *to* identify only a handful of urban energy co-ops across the country although fuel wood co-ops have flourished in rural areas. To many consumers, the advantages of these enterprises are more theoretical than real. Energy co-ops require heavy capitalization and strong management, just like any other successful business enterprise. They also require active participation of members, a commitment that has thus far not been forthcoming perhaps because the benefits are still perceived as uncertain.

**Weatherization.** A weatherization co-op could offer several benefits to its members: dis-

[42]Jerry Hagstrom "Whose Co-op Bank?" *Working Papers*, July/August 1980, p. 26.

counts on materials and equipment; in-house servicing; amortized repayment schedule to members; and nominal upfront costs to members. This type of co-op would basically act as a broker between members and producers. Surprisingly, only two such co-ops were identified by OTA.

The Solar and Insulation Co-Op, Inc. **(SICI), Lansing, Mich., was established in April 1980 as** a worker-owned producer co-op. SICI sells and installs insulation (20 homes to date), window quilts and other conservation materials, and solar hot water systems. The co-op is presently contracting with the State bureau of community services to weatherize 50 low-income residents' homes. Another co-op, the Boston Materials Buying Co-op, sells blown-in insulation and related materials and interior/exterior storm windows to members at cost of purchase and delivery. In addition, it conducts technical education programs and has published a basic home repair report. An important aspect of both co-ops is the sharing of information, skills, and buying power .43

The success of these co-ops is dependent on their access to capital in order to obtain maximum materials discounts. To ensure member acceptance, the co-op may have to offer fully amortized financing over a long period of time for materials that are fairly expensive. The weatherization co-op may have more of an impact on cities and low-income people than other co-op types. However, because of the need for large capital outlays and time commitments, very few of these co-ops exist.

**Solar Co-ops.** Solar co-ops can undertake the manufacture, installation, and sale of solar equipment, and provide solar energy information. Several solar co-ops exist in the country. The Sante Fe Community Solar Co-op Association provides Santa Fe students with an individualized multimedia curriculum in passive solar theory and application. It hopes to do a five-county solar retrofit demonstration project and would like to move into energy auditing and retrofit. Solar co-ops also require large amounts of capital to obtain materials at a discount and long-term financing to keep and attract new members. To be successful, a solar co-op must offer net savings and install high quality equipment at a discount. [44]

**Bulk Fuel Purchasing.** Fuel purchasing co-ops do not in themselves stimulate energy retrofit but they provide an energy-related service to consumers and an organizational structure that could in theory be expanded to energy retrofit. OTA identified only two operating fuel purchasing co-ops.

The Association of Neighborhood Housing Developers (ANHD) in New York City found that per unit fuel oil costs negotiated on a volume basis would be from 11.4 percent (for No. 2 fuel oil) to 25,3 percent (for No. 6 fuel oil) less than current average fuel costs for buildings which were not cooperative members. In 1980, the ANHD organized 105 predominantly low-income, tenant-owned apartment buildings for inclusion in its bulk fuel oil buying program. Also, the Housing Energy Alliance for Tenants' (HEAT) has established a bulk fuel cooperative with 39 buildings in its network. HEAT is working with several established housing organizations in New York City, such as the People's Development Corp., Harlem Restoration, and numerous tenant-managed buildings.[45]

However, there are problems in putting together a fuel purchasing co-op. Because of the volatility in oil prices, distributors are reluctant to set discount price, Also, the high return on fuel sales has removed the incentive for dealers to build stable clientele. These problems were quite evident in Cranston, R. I., where plans for a fuel oil co-op failed to materialize because of the unwillingness of distributors to work with co-op people. Another constraint to establishing this type of co-op is large capital requirements, which are seasonal and short term. Member capitalization could provide some dol-

[43] *"Futures" for Energy Cooperatives,* DOE, Office of Commercialization, Conservation and Solar Energy, December 1980, p.69.

[44] "List of Known Energy Co-ops," Michael Freedburg, Conference/Alternative State and Local Policies. No date.

[45] Conference/Alternative State and Local Policies, "Energy and the Co-op Bank: A Role for the National Consumer Cooperative Bank in Meeting Community-Based Energy Needs," December 1979, p.9; telephone conversations with Anne Hartwell ANHD, Nov. 10, 1981.

lars but not nearly enough in low and moderate income areas. To attract and keep members, the bulk fuel purchasing co-op would have to offer clearcut savings and attractive payment plans .46

**The National Consumer Cooperative Bank (NCCB).** The NCCB was established by an act of Congress to provide financial and technical assistance to existing and emerging co-ops and was signed into law on August 20, 1978. One of the Bank's goals is to put 35 percent of its money into low-income co-ops or those that serve primarily low-income groups. Also, the NCCB intends to spend no more than **35** percent of its assets for housing co-ops and up to 10 percent for producer co-ops, leaving 55 percent for consumer and self-help co-ops. The Bank has been affected by recent funding cuts and it remains to be seen if it will give a boost to the formation of new energy co-ops.

[46]Conference/Alternative State and Local Policies Seminar, "Energy and the Co-op Bank," Dec. 20, 1979.

## Conclusions

Community and business nonprofit organizations and energy co-ops can offer a valuable flexibility to energy retrofit. More important, they can provide a missing climate of trust between building owners and tenants contemplating retrofit on the one hand and government or for-profit retrofit programs on the other. However, at this stage their overall influence on retrofit appears to be limited first of all because of lack of access to capital and second because of the management challenge of developing a successful retrofit program. Community and business groups are probably best suited to outreach, the function they perform most frequently. Energy retrofit co-ops may become more common as the techniques and benefits of retrofit become more widely known. A stable source of capital and technical assistance, such as the National Consumer Cooperative Bank could also stimulate the formation of more energy retrofit cooperatives in the future.

### Box O.-A Sampling of Nonprofit Groups

**North Omaha Community Development, Inc. (NOCD), Omaha, Nebr.–NOCD is a nonprofit community-based coalition of 14 organized neighborhood associations. Its goals and objectives include the development of a comprehensive community plan to guide areagrowth; development of an energy conservation program to rehabilitate and weatherize area homes; and promotion of food, health, and energy co-ops. Much of the funding for NOCD activities is obtained through city CBDG funds. NOCD is earmarked to receive $1.7 million of the city's $5 million CDBG funds. In addition, NOCD has been awarded an ACTION Mini-Grant to implement an energy conservation program. Presently, 25 volunteers, trained in home energy auditing, are visiting homes and providing homeowners with recommendations to improve energy efficiency. While inspecting homes, the auditors will also provide the homeowner with general information regarding energy conservation and renewable energy sources.'**

**11th Street Housing Development Fund Corp., New York, N.Y.-Originally organized as a farmer's co-op, the 11th Street Corp. is now a nonprofit neighborhood association in the process of building a 525 $ft^2$ greenhouse on top of a renovated building. In 1973 the farmers co-op group decided to reoccupy an abandoned burned-out building shell at 519 E. 11th Street with the help of a city program called "sweat equity." The "sweat equity" program allowed low-income people to use their labor as a downpayment on city loans to buy and renovate deteriorated buildings. After lengthy negotiations, the group won a $177,000 sweat equity loan from the city in 1974. All of the renovation was to be done by future occupants with each person contributing a minimum of 8 hours/week. In March 1976 the corporation was formed. Since then the corporation has secured a $43,000 grant from CSA for an energy conservation and solar hot water project. With the aid of another nonprofit group, set up to provide technical assistance (see below), as well as tenant**

owners and volunteers, the building was insulated, storm windows installed, and solar hot water systems built. Another CSA grant was given to the corporation for the construction of a small wind generator, which provides about one-third of the lighting in the buildings halls and other common areas, Because of the insulation and the wind generator, energy costs have been cut substantially, and w&n excess electricity is generated by the windmill it flows into the Consolidated Edison grid. Con Ed must pay for the excess electricity.[2]

**The Energy Task** Force, New York, N.Y.—ETF is a group of architects, engineers, builders, and educators that advise, train and educate low-income community groups about energy matters in New York City. The group puts strong emphasis on community outreach through workshops and demonstration projects. ETF has provided technical assistance to the 11th Street Corp. in constructing and installing its windmills. Other ETF projects include R&O for a prototypical rooftop greenhouse for a tenement building; weatherization and conservation workshops, and the retrofitting of a five-story tenement building in New York City's Lower East Side. ETF also completed an urban solar and energy conservation manual. Much of the money to carry out the technical assistance comes f r o m CSA.[3]

**San Bernadino West Side Community Development Corp.,** San Bernadino, Calif.—The corporation is a nonprofit group dedicated to teaching area residents valuable job skills while rehabilitating the area. West Side residents were trained to build a centralized sun-powered energy system, which would heat 10 homes, and a solar greenhouse, which would provide produce for local residents. The centralized system consists of 7 2 solar collectors, arranged in elevated rows behind the homes and a 4-ton, 5,000-gallon tank with storage capacity to heat all 10 homes for 4 sunless days. From 1973 to 1979, t& corporation has trained over 650 clients, majority of which have gotten jobs with nearby California corporations. In the c1979,ration opened its Energy Technology Center, a certified solar vocatier@ school, Funding for these projects has come from HUD, CSA, CETA, and the California State Energy Commission.[4]

**South Memphis Development** & ~ &
The corporation and the Tennessee Valley Authority are responsible for creating Solar Mere= . . t o constructuse[5]

phis, a project which helps area homeowners cut heating costs by offering an affordable solar water heating system, and provides training and employment to local residents. The systems are installed by' local contractors and parts are purchased from l<The businessmen. corporation offers 20-year loans at low-interest rates of 3.3 percentand monthly payments Since May 1978, 2,4@ systems have been installed in over 400 homes in Memphis and Shelby County. The success of the p get has led to the planning of an expansion of% ? project across the Western Tennessee Valley.[5]

The **Urban Ark,** Evanston, @-The Urban Ark is a nonprofit conservation project sponsored by the Evanston Environmental Association (EEA) and the city's office of housing. Local officials allocated $50,000 from the city's fiscal year 1980 CDBG entitlement-=futwls for a neighborhood information and demonstration program on the viability of solar energy retrofitting to benefit low- and moderate-income families. Families in neighborhoods meeting CDBG income requirements and living in weatherized homes were eligible for the Solar Demonstration Program, which included audits and installation. A minority housing contractor was selected to work on the first three homes. The EEAeachites that homeowner will save?jetwa440 to 60 p@&@ off the cost of his/her @@r fuel bill and expects the payback to raperiodmto 9 years.

The Urban Ark is currently running workshops to teach a variety of conservation techniques to plansborhood residefor and securing an independent staass for Urbaa Ark not-for-profit calsonizaticunderway. Ark intends to apply #or additional CDBG funding to sponsor an energy co-op among participants, and

[1]North Omaha Community Development, Inc., Newsletter, "With One Voice," vol. 1, June 1980.

[2]Energy Task Force, *No Heat, No Rent: An Urban Solar and Energy Conservation Manual,* 1977; U.S. Department of Housing and Urban Development, "Neighborhood Energy Strategies," GPO 311-300/36, Washington, D.C., 1980, p.5.

[3]Energy Task Force Fact Sheet, no date.

[4]U.S. Consumer Affairs Office, *People Power,* Washington, D.C., no date, p. 282.

[5]U.S. Consumer Affairs Office, *People Power,* Washington, D.C., no date, pp. 210-211.

[6]U.S. Department of Housing and Urban Development, Office of Community Planning and Development, *Block Grant Energy Conservation,* April 1980, pp.20-30 (HUD-568-CPD).

## WHEN THE CITY GOVERNMENT IS THE BUILDING OWNER

City **governments are not only potential developers of programs to persuade other to retrofit; they are owners of buildings** in their own right. There are, according to one estimate, over 100,000 municipally owned buildings including those owned by cities suburbs, and small towns. In addition there are estimated to be almost 300,000 school buildings, most of which are owned by local school districts .47

According to a recent survey by the international City Managers Association more than **90** percent of all cities have taken steps to curtail energy use in municipal buildings. Almost 90 percent have conducted audits in one or more of their buildings. For about 60 percent of the cities surveyed, energy is the second biggest item in their budget after personnel .[48]

At the same time there is only sketchy data on what energy efficiency improvements are actually being made in such buildings. According to data in a 1981 DOE survey of commercial (nonresidential) buildings, buildings owned and occupied by the government were more likely than privately owned buildings to have regular maintenance and somewhat less likely to have had recent improvements in energy efficiency such as weatherstripping, calking, insulation, treated glass, or outside shading. There is no data about investments in improved heating and cooling systems for either publicly or privately owned buildings.[49]

The above survey data is compatible with OTA's observations on the retrofit of municipal and school buildings in the five case study cities. officials in all five cities were concerned about escalating energy costs and all had taken steps to curtail them with greater and lesser success.

In Tampa, electricity use by buildings (most of Tampa's building energy use) represented about 5 percent of a total city budget of about $80 million. Des Moines' building energy cost was a much lower fraction of the total budget, a little more than 1 percent. The other case study cities did not break out building energy use as a budget line.

For all the cities, however, making operating improvements to save energy was easier than making capital investments in energy efficiency. Tampa, San Antonio, and Des Moines all set energy reduction goals for each department head for both building energy use and vehicle use of fuel. These were firm quotas in the case of Tampa; goals in the other cities. Both Jersey City and Des Moines had "energy squads" in their cities reminding employees to turn off lights and turn down thermostats. In neither city did they work as hoped. Said one person close to the effort in Jersey City, "People just didn't understand what we were doing. They would still turn up the thermostats and open the windows." Public Service Electric & Gas officials estimate that Jersey City failed to realize a potential $100,000 a year in energy savings. On the other hand, the school district serving Tampa (Hillsborough County) has taken an imaginative approach to stimulating good energy management among its schools. A portion of the savings are returned to principals to use as they decide. In 1979-80, $73,000 out of $172,000 savings were returned to principals for their use.

officials in all the cities realize that capital investments in energy efficiency would cut down on operating expense for energy. In most cities, however, it has been difficult to obtain capital for any but the shortest payback investments. in Jersey City the city will not spend money on energy improvements unless it is paid for by someone else. Federal public works funds paid for new windows on a firehouse, for example. City officials prepared two proposed bond issues for energy retrofit in Buffalo but voters turned them down. Buffalo's bond rating has deteriorated to a B and the State has imposed

---

[47]The actual estimate is 116,000 municipal buildings made in the course of an evaluation of the DOE Schools and Hospitals Program. "Status and Performance of the Institutional Conservation Program: An Interim Report," Synectics Group, Inc., for the Department of Energy, draft report May 1981, p. 3.

[48]International City Management Association, op. cit.

[49]*Nonresidential Buildings Energy Consumption Survey: Fuel characteristics and Conservation Practices*, Department of Energy, Energy Information Agency, June 1981, pp. 229-230.

limits on new bond issues. Des Moines has prepared a 5-year capital improvement plan for municipal buildings including energy conservation measures, but does not expect to find the funds unless there are Federal public works funds available. lowa has placed a 4 percent limit on growth in assessed valuation in 1981-82 and this has exacerbated a problem of declining tax revenues said to be due to an exodus to the suburbs typical of many cities. In previous years, Des Moines has used general revenue sharing funds for capital projects but more recently has had to use these for operating expenses. Des Moines has not even been able to find the funds for five energy audits of city buildings set as a goal last year. All three of these cities have linked energy efficiency measures, when possible, to other major repairs on their buildings. All of them, for example, have installed roof insulation when roofs are repaired.

More schools than municipal building have been retrofitted in some of the five cities. Buffalo has completed audits on all its schools and has retrofitted about 40 of them using a Federal public works grant. A little money has also been made available from a city bond issue for building repair. The school board has a professional property management staff including an energy analyst. The Hillsborough County School Board, covering Tampa's schools, also has an energy advisor and is proceeding methodically. Once testing is complete on a computerized energy management control system in one school, it will be extended to 16 other schools. The school district has been successful in using bond issues to cover the capital costs of these investments.

As owners of buildings, city governments and school districts resemble large corporations and insurance companies in one respect, Like these private owners of buildings (see ch. 4) they have professional property management staffs and even their own energy conservation advisors. They can test retrofits in one building before applying them to other buildings. They can set realistic energy saving goals for managers. However, such public building owners also resemble individual and small partnership owners of buildings in their limited access to capital and their very short payback criteria. Thus the prospects for energy savings through better operations and managment in the public buildings are probably better than in many privately owned buildings and the prospects for energy savings through capital investment i n energy efficiency are probably worse.