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**Chapter 10**  
**Case Studies**

# Contents

	Page
<b>Pathfinder Cities: Six Energy Retrofit Programs That Have Worked. . . . .</b>	<b>269</b>
<b>Building a Constituency for Energy in St. Paul. . . . .</b>	<b>270</b>
<b>An “Energy Smorgasbord:” Portland, Oreg. . . . .</b>	<b>270</b>
<b>Minneapolis: Low Cost Loans for High Cost Energy Improvements. . . . .</b>	<b>272</b>
<b>Retrofit and Rehab: A Tale of Three Cities:</b>	
<b>Pittsburgh, Boston, Baltimore. . . . .</b>	<b>273</b>
<b>Pittsburgh . . . . .</b>	<b>274</b>
<b>Boston . . . . .</b>	<b>274</b>
<b>Baltimore . . . . .</b>	<b>275</b>
<b>Large-Scale Retrofit: Prospects in Five Typical Cities. . . . .</b>	<b>276</b>
<b>Buffalo . . . . .</b>	<b>277</b>
<b>Des Moines. . . . .</b>	<b>281</b>
<b>Tampa . . . . .</b>	<b>283</b>
<b>Jersey City. . . . .</b>	<b>285</b>
<b>San Antonio . . . . .</b>	<b>288</b>
<b>Summing Up. . . . .</b>	<b>290</b>
<b>Chapter IO Appendix: information on the Housing Characteristics, Heating and Cooling Equipment, and Residential Fuel Use of the Case Study Cities . . . . .</b>	<b>292</b>

## LIST OF TABLES

<i>Table No,</i>	Page
<b>84. Population indicators: Case Study Cities . . . . .</b>	<b>276</b>
<b>85. Climate Data: Case Study Cities . . . . .</b>	<b>276</b>
<b>86. Average Residential Gas and Electric Rates: Case Study Cities, . . . . .</b>	<b>277</b>
<b>87. Housing Characteristics: Case Study Cities. . . . .</b>	<b>277</b>
<b>88. Federally Assisted Housing and Energy Program Activity: Case Study Cities. . . . .</b>	<b>277</b>
<b>A-1. Housing Characteristics: Case Study Cities. . . . .</b>	<b>292</b>
<b>A-2. Residential Heating and Cooling Equipment: Case Study Cities. . . . .</b>	<b>294</b>
<b>A-3. Residential Fuel Use: Case Study Cities . . . . .</b>	<b>295</b>

## LIST OF BOXES

	Page
<b>P. Buffalo . . . . .</b>	<b>278</b>
<b>Q.Des Moines. . . . .</b>	<b>281</b>
<b>R.Tampa . . . . .</b>	<b>283</b>
<b>S. Jersey City. . . . .</b>	<b>286</b>
<b>T.San Antonio . . . . .</b>	<b>288</b>

Just as it is difficult to predict the outcome of a retrofit for a particular building, it is similarly hazardous to posit what factors in a city will come together to create an environment that fosters conservation activity. In some cities, rapid rises in utility rates will focus private attention on the need for retrofit. In others, a concern that high energy prices are escalating the pace of abandonment and housing deterioration will arouse public concern for linking retrofit with rehab. Some cities benefit from their State's aggressive interest in energy conservation. Others have a mayor or city manager who links the community's future to conservation. In some cities, the leadership may come from a single lender, or an active chamber of commerce, or a group of architects and engineers. In other cities, neighborhood and community groups provide the spur. **In some cases, a Federal demonstration grant or the creative use of block grant funds puts energy high on the civic agenda. In some cities, the utility, through a vigorous marketing of audits and financing, helps foster retrofit.**

In a few cities, "pathfinder cities," many of these factors come together to create the energy that fosters retrofit on a large scale. This has happened in Portland, Oreg.; in St. Paul and Minneapolis, Minn.; and to a lesser extent in Boston, Mass.; Pittsburgh, Pa., and Baltimore, Md. This chapter begins with descriptions of effective energy conservation in these six cities to illustrate the combination of local traditions and leadership and effective program design that

can bring about energy retrofit in buildings on a fairly large scale.

In most cities, however, the interest in conservation is the product of incremental actions, of slow starts and stops, that eventually add up, although the total may be difficult to calculate. **But exactly what the factors are that work, where they will work, and what their outcome will be is almost impossible to predict.** There are about as many possible combinations as there are cities. Indeed, one of the only generalizations that can be usefully made about energy and cities is that energy issues are not isolated problems. Interest in energy and initiatives to deal with energy issues, no matter who the prime movers are, is really a function of the overall urban environment—its economy, its politics, the condition of buildings and a variety of other factors. The importance that energy is given at the local level depends largely on what other things are of concern in the community. To illustrate the diversity of influences on the prospects for improvement of building energy efficiency, OTA conducted case studies of five typical cities: Buffalo, N. Y.; Des Moines, Iowa; Jersey City, N. J.; San Antonio, Tex.; and Tampa, Fla.

The rest of this chapter summarizes first, the case studies of six effective building retrofit programs in the "pathfinder" cities and second, the case studies of the prospects for retrofit of urban buildings in five typical cities.

## PATHFINDER CITIES: SIX ENERGY RETROFIT PROGRAMS THAT HAVE WORKED

Not all the "pathfinder cities," which have been leaders in developing energy retrofit programs, are represented in the six descriptions that follow. Some, such as Los Angeles and Seattle, have been described elsewhere.<sup>1</sup> Energy ret-

<sup>1</sup>There are several surveys of community energy programs: John H. Alschuler, Jr., *Community Energy Strategies A Preliminary Re-*

view. A report to the Ford Foundation May 1980; *Proceedings of the Multi-Family Housing Workshop*, Dec. 4-6, 1980. Report prepared by Deborah L. Bleviss, Federation of American Scientists; Council of Northeast Municipalities, CONEM, *Multi-Family Energy Conservation: A Reader*, published July 1981.

Philadelphia Furnace Efficiency Retrofit Program could be added to the list. Both of these are described in chapter 5.

The retrofit programs described include:

- one communitywide mobilization (St. Paul),
- one retrofit program linking utilities and citywide regulation (Portland),
- one retrofit program linking utilities and neighborhood groups (Minneapolis),
- three programs that link housing rehabilitation and retrofit programs (Boston, Pittsburgh, and Baltimore).

### Building a Constituency for Energy in St. Paul

Mayor George Latimer has made energy a cause celebre in St. Paul and in contrast to most other cities put it at the top of the municipal agenda. On January 18, 1980, the mayor announced the "St. Paul Energy Mobilization" designed to get information on low-cost/no-cost weatherization to every home and business in the city. The mayor mailed out 110,000 energy questionnaires to virtually every household and business in the city to survey energy attitudes and activities. On 3 days in mid-February a small army of 3,000 city employees and volunteers was deployed throughout St. Paul. All nonessential city employees were given the 3 days off to participate in the mobilization. Almost 40 percent of the households and businesses in the city were reached under the program.<sup>2</sup>

The mobilization was only part of a broader energy effort started by the city that includes development of a district heating network for St. Paul and construction of a model energy industrial and residential parks

While there is no good data on the extent to which low-cost/no-cost measures were actually taken in St. Paul, the city's efforts are noteworthy for two reasons. First, as a result of the

<sup>2</sup>Susan Shullaw, "A Salute to St. Paul: Now Entering Energy City . . .," *Buildings*, November 1980.

<sup>3</sup>Deborah R. Both, Robert Dubinsky, and Sue Bodily, *A Description of Integrated Retrofit Delivery Systems and Innovative Conservation Services Programs in Selected Localities*, The Rand Corp., March 1981 (N-1 67 J-DOE), p. 32.

mobilization, St. Paul now has one of the best data bases on energy needs and activities of any city in the country. Second, and even more important, the mobilization clearly built up a constituency for energy conservation in the city. As John H. Alschuler, Jr., observes in his evaluation for the Ford Foundation: "Finally, the St. Paul community was indeed 'mobilized.' Almost every businessman, homeowner, and tenant in the city was in some way impacted by the effort. For some, the mobilization provided only information, for others it was a way to participate and help to solve the energy crisis," "Since the mobilization, the city has worked closely with the strong neighborhood groups in the city and has primarily relied on these organizations to implement specific energy programs. The city energy office has sent a Caulkmobile, manned by volunteer weatherization teachers, to each of the city's 17 neighborhoods. The Caulkmobile visits on Saturday mornings and delivers caulking materials and free help to local residents.

### An "Energy Smorgasbord:" Portland, Oreg.

In 1979, the city of Portland passed an ordinance outlining a comprehensive energy policy for the city. It included the following stipulation:

All buildings in the city shall be made as energy efficient as is economically possible as determined by costs of conservation actions and price of energy. **The retrofit of existing buildings for the purpose of energy conservation shall be accomplished through voluntary actions initially, with mandatory requirements imposed 5 years after the adoption of the policy. Retrofit programs and the requirements must be cost effective, comprehensive, and have the most equitable impact possible on all sectors of the community.**<sup>4</sup>

In evaluating the portland energy policy for the Ford Foundation, John H. Alschuler, Jr., observes: "The symbol of the Portland Energy Policy is its mandatory requirement. The guts of the policy is its commitment to provide financial

<sup>4</sup>Alschuler, op. cit., p. 93.

<sup>5</sup>Ordinance No. 148251, "An Ordinance Adopting an Energy Conservation Policy for Portland," Aug. 15, 1979.



Photo credit: St. Paul Office of the Mayor

In St. Paul, Minn., a Caulkmobile visits neighborhoods and distributes materials and information for caulking and other low cost energy efficiency measures

**arrangements which permit compliance with the policy without undue hardship. ”<sup>6</sup>**

Portland’s retrofit requirement is as comprehensive as any that exist and **would be infeasible** for most property owners without some form of subsidized financing. Property owners are required to install, before selling the building, any measure that is estimated to pay back in energy savings in 10 years or less. The requirement will not apply to actual building sales until 1985. Subsidized financing is available. Both local utilities—Pacific Power & Light (PPL) and Portland General Electric (PGE)—offer free audits and zero interest loans, with repayment upon sale of the home, to single-family owner-occupied units. PGE had completed 6,100 audits (out of 7,200 requests) and 3,350 customers have undertaken weatherization. PPL has not broken out data for Portland, but its activity level has also been high. Zero interest loans in both cases have been in the \$1,500 to \$1,600

<sup>6</sup>Alschuler, op. cit., p. 32.

range and the participants in the program have mostly been middle- and upper-income customers.<sup>7</sup> However, the program is limited to owner-occupants whose financial capacity allows them to support additional debt. This covered only about 12 percent of the units in the city.

To reach other single-family homes, the vast supply of rental housing, and commercial and industrial properties, Portland Energy Conservation, Inc. (PECI), the not-for-profit corporation set up to administer the program, assembled a \$15 million loan pool provided by 12 local lenders and **supplemented** by a \$3 million urban development action grant (UDAG). The package includes the following financing: zero interest 1-year loans to businesses and investor-owners of residential properties for audits. In addition, PECI will offer rebate of audit costs for businesses that invest in retrofit measures recommended in the audit:

<sup>7</sup>Both, et al., op. cit., pp. 6-14.

- 3 percent interest loans for retrofit **for** eligible low- and moderate-income families, and a hardship waiver **for households whose income is 50** to 80 percent of the median and who spend more than 25 percent of their income for housing.
- An interest subsidy to lenders to pay the difference between the market interest rate (currently 16 percent) and the subsidized rate of 8 percent. This subsidy is designed to increase access to private financing for Portland residents who may not be eligible for other subsidies. This same subsidy program is available to multifamily owners.
- Loans of 3.5 percent interest to landlords whose tenants are primarily low and moderate income.

These programs were developed in part to supplement utility audit financing and also to fill in the vacuum left when a State loan program which subsidized rates down to 6½ percent went defunct. Under the State program, lenders would be subsidized in the form of a tax credit down to a 6½ percent rate. The hitch was that there is a 12 percent ceiling on loans when State funds are involved and when interest rates zoomed beyond this limit, lenders were not interested. There are efforts now to make the ceiling more flexible so that this program can be revived as yet another subsidy option. Similarly, while the city programs are directed almost exclusively toward single-family and multifamily owners, commercial property owners are expected to finance improvements on their own. The city expects to extend its retrofit incentive programs to commercial property owners in the future, however.

Since December, when the single-family program was launched, about 700 homeowners have requested audits under the program. It is much too early to know how widespread the program will be, but the Portland approach can certainly provide an excellent test of whether the code/finance mixture is successful in reaching a variety of urban building types. There are several factors in favor of the Portland approach. Perhaps the most important is the widespread participation of the private lending community in the program. Twelve lending institu-

tions set up the loan pool at a hefty level—close to \$15 million. Not only does this expand the financing opportunities but it also may encourage greater participation of commercial and multifamily owners who are often leery of pure government programs. “One of the reasons we have been successful thus far,” notes Steve Chadima of the Portland Energy Office, “is that we have gotten participation up front from these lenders.” Beyond the private participation in the program, is the wide range of financing incentives available. Chadima says Portland’s package is “one of the most enticing smorgasbords for **energy available anywhere,**” and he is **probably right. True, Portland does hold a stick over building owners,** in the form of the mandatory retrofit requirement, but between the city, the lenders, the utility, and possibly the State, there is certainly an abundance of carrots.

### Minneapolis: Low Cost Loans for High Cost Energy Improvements

Minneapolis has set an ambitious retrofit goal—and adopted a sophisticated strategy **for reaching** it. The objective is a 30-percent reduction in residential energy use by 1990. Meeting this objective will require (among other things) reducing energy use in four out of five homes by 45 percent. \*

The chosen instruments for this effort are the Neighborhood Energy Workshop and the Energy Bank. The entire program draws upon the early and aggressive involvement of the State of Minnesota and the city of Minneapolis in conservation efforts, the strong tradition of public service and private sector cooperation in solving Minneapolis community problems, and a lot of learning from conservation experiments across the country.

The Energy Bank itself will finance retrofits up to **\$3,000** per home. Funding comes from a revenue bond issued by the city, which in turn was used to establish a tax-exempt line of credit at a consortium of 17 **banks.** The banks agreed to

\*This account was based on data supplied by Ken Nelson of the Minnesota House of Representatives and phone conversations with Sheldon Strom, Minneapolis. City Energy Coordinator and Eric Nathanson, Minnesota State Housing Authority.

provide the city with a 10-year line of credit at 10 percent interest. This means that loans can be financed at 11 percent **for 10 years—almost unheard of capita! cost rate in 1981. Minnegasco (Minnesota Gas Co. ) the local gas utility, originates all loans, and services the loans through its monthly billing operations. (Thus, the banks have no servicing costs. ) As an additional incentive to conserve, Minnegasco also provides participating customers with a rebate of up to \$100** for their installation of approved energy saving equipment. Qualifying improvements have a simple payback of 10 years or less. All Minnegasco customers in good standing are eligible for Energy Bank loans, following an audit by Neighborhood Energy Workshop or the area Residential Conservation Service (RCS) audit.

The *Neighborhood Energy Workshop* has been designed to maximize the use of scarce resources (auditors and time of residents, as well as tools) and build momentum through personal involvement. Workshops vary slightly for three basic groups of consumers; they differ by income category. Each workshop is based on block participation; a certain number of participants must attend the workshop to make the block eligible **for the audit and an Energy Bank loan**. Higher levels of participation are required as incomes rise.

Following intensive advertising, phone calls, and the distribution of leaflets and materials on the block, participants come to the Saturday

morning workshop with a completed audit form of their own house. Along with coffee and doughnuts, they hear a presentation on various techniques of saving energy in Minneapolis homes, including both changes in the way they use energy and technical solutions. Materials and some tools are distributed at the workshop. In the afternoon, people work on their individual homes, with neighbors and program staff helping those who cannot do their own work. The auditors go from house to house, armed with the audit forms submitted in the morning. Each occupant is expected to meet the auditor at the door with energy bills, a tape measure, and a flashlight. The auditor then moves through the home as quickly as possible, looking for unusual problems and reviewing the standard items covered in the audit sheet. **A** separate appointment is made for a Minnegasco service representative to check the heating system. The audit techniques have been **influenced** by the work at Princeton University developing "house doctor" techniques for efficient audit and retrofit.

The Minneapolis program has been built up gradually, so that audit techniques and workshop routine could be tested. A small-scale effort the first year **covered 1,800** households, or about 150 blocks. The city hopes to expand the program to **500** or 1,000 blocks in 1982. Most resources will be directed to lower income areas, but the idea is to provide help in saving energy in many neighborhoods.

## RETROFIT AND REHAB: A TALE OF THREE CITIES: PITTSBURGH, BOSTON, BALTIMORE

Most cities operate programs to rehabilitate and conserve existing housing. Usually these programs are tied to code enforcement and are designed to bolster available housing for low- and moderate-income residents. Rehab programs are generally funded out of Federal moneys—Community Development Block Grant (CDBG), sections 312 and 8, among other programs. Regulations encourage the use of such programs in part for **energy conservation**. But

there are many claims on the rehab dollar and usually energy is not the top claim. In the typical list of priorities for rehab repairs, code enforcement will come first. Then may come exterior repairs to help improve the overall neighborhood ambience. And then may come energy. Or once code violations have been addressed, there may not be any explicit ordering of repairs. Only in a few cases is energy conservation an explicit and high priority **for the rehab dollar**.

The combination of retrofit and rehabilitation is important for several reasons. First of all, in most cases, the ceiling on rehab financing is much higher than for energy conservation repairs alone. This means that many important retrofit measures, such as upgrading heating systems become feasible under rehab programs whereas they could not be attempted with lower level energy loans and grants. This higher threshold is particularly important when it comes to multifamily properties. But even **more important, retrofit cannot be isolated from major repairs** in some of the most seriously deficient housing. What good is insulation or a new storm door, when a roof is in total disrepair? Yet, the typical weatherization program cannot touch such major deficiencies. These are the province of the rehab program. **When the two are combined**, as they are in a few places, energy conservation and rehabilitation can work in concert.

### Pittsburgh

One of the Nation's largest and most successful rehab programs is operated in Pittsburgh, Pa. \* From 1975 to 1980 the Pittsburgh rehabilitation program made over 5,600 loans for general rehabilitation of owner-occupied property and over 600 loans for rental property rehabilitation. In addition, there were more than 600 loans for emergency repairs (to correct dangerous code violations, etc.). This program also has an important energy component. This year, Pittsburgh will allocate \$600,000 in CDBG funds to its "rent break through energy conservation" program. Under the program, owners of buildings with from 1 to **25** units can receive an outright grant of up to **\$2,000** a unit for energy improvements. occupants of the building must fall within section **8** limits (with incomes at or below 125 percent of the poverty threshold) and the landlord must agree to hold rents constant for up to 2 years. Since March 1980 when this program was started, **505** dwelling units in **285** buildings have been retrofitted.

\*This account was based on interviews with Paul C. Brophy, director and Norma Sue Madden, real estate analyst in the Pittsburgh Department of Housing; and on an unpublished summary of the Pittsburgh rehabilitation program, Office of Community Planning and Development, HUD (undated).

Virtually any energy improvement, including tenant metering, is eligible under the program. However, grants are approved only after a city inspection and first priority goes to measures to improve efficiency, such as insulation, caulking, and storm doors. The limit on the grant amount is \$50,000 per building.

Another city rehab program for rental housing improvement allocates grants of up to \$5,000 a unit for general rehab, upon execution of a rent limitation agreement. This program, funded out of \$2 million in CDBG funds, is designed to reach buildings whose occupants are primarily low-income tenants. City regulations require that energy conservation be included in the rehab work.

The city's most extensive rehab program is oriented toward the homeowner and funded out of an \$11 million tax exempt bond issue and CDBG funds. Twelve local lenders originate and service loans to eligible homeowners. The loans are secured by the Federal Housing Administration, title insurance and bought by the Pittsburgh Redevelopment Authority. In the regular loan program, the banks originate loans at 9 percent which are then subsidized by the authority down to 4 percent for homeowners with incomes below section **8** limits (see ch. 9). Properties must be in designated target areas of the city. The authority also administers a special loan program to people whose income falls below \$7,000. The authority may forgive up to 100 percent of the principal, depending on the income of the recipient. Energy conservation is a required improvement under both programs. In addition, the authority provides \$400 home insulation matching grants to recipients of regular and agency loans. There were 1,500 such matches in 1977-78. The average amount for loans under this program is \$12,000 per unit.

### Boston

In Boston, the city weatherization program (WIP) has supplanted Boston's Home improvement program as the city's main housing rehabilitation activity. \* Under this program, funded

\*This account was based on information supplied by Karen Sumarborg, planning director, Mayor's Office of Housing, Boston.

by \$5 million in CDBG funds during its first year, the city provides free energy audits and rebates to owner/occupants of one- to six-unit properties for energy improvements. Virtually the whole city is covered by the program, which is operated out of 10 housing site offices scattered throughout Boston.

Under the program, an applicant applies for an energy audit performed by the city which does a work writeup of eligible improvements. The city will fund any code-related repair related to energy efficiency. At a minimum, this includes attic and wall insulation, weather stripping, caulking, and smoke detectors (the last is a nonenergy requirement included in this program). The applicant then arranges **for** conventional financing from one of several lenders participating in the program. These lenders have been providing financing at about 1 percent below the going rate for energy improvements. After the work is completed and certified by the city, it provides a rebate ranging from 20 to 40 percent of the cost, depending on the income of the applicant and the extent to which tenant units are involved.

The WIP program began in September 1980 and about 1,400 free audits have been requested since then. There have also been approximately 700 applications for rebates as of the end of March 1981.

Much of the groundwork for WIP was laid by the city's earlier rehab program, Home Improvement Program (HIP). Between 1965 to 1981 when that program was in operation, close to 17,000 cases were handled. HIP helped get word out to the public about the city's role in rehab financing. More importantly, staff developed a close working relationship with local lenders. Today, banks that participate in the program consider the rebate program when they underwrite home improvement loans, thus making this sort of financing **more available than** in many other cities, particularly for **moderate-income** households.

Boston housing officials have tried to make the program as attractive as possible to small multifamily owners. Moderate-income owner occupants receive a 20-percent rebate on the

cost of improvements to their unit and a 40-percent rebate on improvements to tenant units. Low-income owner occupants receive a 40-percent rebate for their units and a 40-percent rebate for tenant units. The ceiling on construction costs starts at \$5,000 for a one-unit building and goes to \$15,000 for five-to six-unit buildings. Based on the experience with HIP, under which terms were basically the same, Boston officials expect that more than half the applicants under WIP will be small multifamily owners. Under the previous program, about 10 percent were in fact owner-occupants of five- to six-unit properties. Boston officials would also like to expand the program to commercial buildings and are hoping that the loan amount and the size of the rebate will make the program attractive to such property owners.

### Baltimore

Baltimore also offers a special energy incentive program as part of its rehab activities. \* Called the "energy loan," **it provides** 11½ percent 7-year loans between \$500 to \$3,500 for a range of retrofit measures, including insulation, storm windows, solar units, and replacement of burners. Tenant meters, fireplaces, heat pumps, and upgrading of interior windows are not eligible under the program. The energy loan is limited to owner-occupied one- to four-unit **properties, and** has been funded out of a \$2 million municipal bond issue. Loans are issued through four participating private lenders, after an evaluation of the application by the city.

While WIP has **become** Boston's major rehab activity, the "energy loan" is only one of several rehab options in Baltimore. The city has an active 312 program, and several loan and grant programs for low- and moderate-income applicants funded under Federal, State, and local auspices. The energy loan can be coupled with these other rehab programs and there is nothing that prevents someone from using other city **incentives for energy improvements. However, the energy loan** is the only city rehab program

\*This account was based on information supplied by Anna Baumann, assistant to the Mayor's Energy Coordinator, Mayor's Office of Housing, Baltimore.

that uses private lenders, and it is explicitly designed to handle smaller, energy-related jobs. The Baltimore program was just launched and it is impossible to get a sense of what activity under it will be. The program does not offer

special incentives to multifamily owners. While it would certainly like to reach such property owners, the program is really designed to assist owners or the smaller properties that make up most of this city's housing stock.

## LARGE-SCALE RETROFIT: PROSPECTS IN FIVE TYPICAL CITIES

To gain a better understanding of the diversity of local retrofit environments, OTA prepared case studies of five cities that are broadly representative of different types of large communities around the country. None are especially known for energy programs. The cities are: Buffalo, N. Y.; San Antonio, Tex.; Des Moines, Iowa; Jersey City, N. J.; and Tampa, Fla. The cities not only vary by size, region, and climate, but also by economy, governance, predominant housing type, and primary heating fuel. They all have some energy conservation activity going on, but the catalysts for the activity, and its precise nature and impact vary substantially. The cities were deliberately selected to reflect the range and variations in American cities.

Basic information can be found in tables 84 through 88 on each city's climate, population, housing stock, energy prices, and local housing and energy programs. The appendix at the end of the chapter has further information on the nature of the housing stock and types of heating and cooling system in each city.

The case studies are based on extensive interviews conducted in person and by telephone by an OTA team during the fall and winter of 1980-81. These interviews were supplemented by background material provided by local sources and by OTA staff research.

This chapter summarizes the material in a set of longer case studies to be published as "Volume 11: Working Papers." All sources for the

**Table 84.—Population Indicators: Case Study Cities**

	Tampa	Buffalo	San Antonio	Jersey City	Des Moines
1975 population . . . . .	280,340	407,160	773,248	243,756	194,168
Change, 1970-1975 . . . . . percent. . . . .	0.9	-12.0	9.1	-6.4	-3.6
<b>Population, 65 and above (1970) . . . . . percent. . . . .</b>	12.4	13.3	8.4	11.3	9.8
<b>Median family income (1969) . . . . .</b>	<b>\$7,677</b>	<b>\$8,794</b>	<b>\$7,731</b>	<b>\$9,305</b>	<b>\$10,238</b>
<b>Households below poverty level (1969) . . . . . percent. . . . .</b>	14.9	11.2	17.5	10.3	6.9
Households below 125 percent of poverty level (1969) . . . . . percent. . . . .	20.9	16.1	24.5	15.1	10.5

SOURCES: County and City Data Book, 1977; U.S. Department of Commerce, Bureau of the Census.

**Table 85.—Climate Data: Case Study Cities**

	Tampa	Buffalo	San Antonio	Jersey City	Des Moines
Mean January temperature (°F)	60.4	23.7	50.7	31.0	19.4
Mean July temperature (°F) . . .	81.9	70.1	64.0	74.8	75.1
Mean annual possible sunshine <sup>a</sup> . . . . . percent. . .	67.0	50.0	64.0	60.0	62.0

<sup>a</sup>Mean annual possible sunshine is the relationship between the number of hours of sunshine as recorded by instrument at stations having automatic sunshine recorders for a considerable period of time and for which records have been summarized, and the number of hours between sunrise/sunset for each day during the year.

SOURCES: County and City Data Book, 1977; U.S. Department of Commerce, Bureau of the Census.

**Table 86.—Average Residential Gas and Electric Rates: Case Study Cities**

	Electric cents/kWh	Gas cents/therm
Jersey City <sup>a</sup> . . . . .	8.0	52.0
Buffalo <sup>bc</sup> . . . . .	6.0	46.0
Tampa <sup>de</sup> . . . . .	5.8	47.0
San Antonio <sup>f</sup> . . . . .	4.5	23.5
Des Moines <sup>g</sup> . . . . .	6.0	38.0

NOTE. All rates are averages and include adjustment and service charges

SOURCES  
<sup>a</sup>Public Service Electric & Gas Co. Average residential rate as of Apr 17, 1960.  
<sup>b</sup>Niagara Mohawk power Corp Average residential rate, based on 500 kWh/month usage as of Mar 18, 1981 rates  
<sup>c</sup>National Fuel Gas Average rate as of February 1980  
<sup>d</sup>Tampa Electric Co Average rate as of November 1979.  
<sup>e</sup>Peoples Gas System, Inc Average rate as of 1977  
<sup>f</sup>City Public Service Board: Average residential rates as of July 1981 Average gas rates as of September 1981, but gas rates change monthly, depending on transport costs and other factors, as allowed by State regulations.  
<sup>g</sup>Iowa Power: Rates are 12 month averages as of Sept 30, 1981

material summarized here can be found in the full case studies.

What emerges is a picture of retrofit activity in a particular city at a particular time. The “particular” is important to emphasize. The reader should be wary of generalizing from these cities. Rather, the message that should be drawn from these case studies are the many possible variations and combinations that can help induce retrofit in the urban setting.

### Buffalo

In Buffalo, energy conservation is widely recognized as an important local issue by many groups in the city. But energy is only one of

**Table 87.—Housing Characteristics: Case Study Cities**

	Tampa	Buffalo	San Antonio	Jersey City	Des Moines
Total housing units . . . . .	100,857	166,142	203,226	91,997	72,349
Occupied housing units . . . . .	94,889	157,951	190,692	87,853	68,506
Owner-occupied . . . . .	63,921	69,453	118,922	24,697	45,408
Percent . . . . .	67.4	44.0	62.4	28.1	66.3
Renter-occupied . . . . .	30,968	88,498	71,770	63,156	23,098

SOURCE 1970 Census, Detailed Housing Characteristics

**Table 88.—Federally Assisted Housing and Energy Program Activity: Case Study Cities**

	Tampa	Buffalo	San Antonio	Jersey City	Des Moines
Housing rehabilitation (1977-80: units) . . . . .	535a	4,400 <sup>b</sup>	739 <sup>c</sup>	800 <sup>d</sup>	445 <sup>e</sup>
Weatherization (1977-80: units) . . . . .	400 <sup>f</sup>	1,1359	h	62 <sup>i</sup>	1,511 <sup>j</sup>
Low-income energy assistance (1980-81: aid recipients) . . . . .	1,360 <sup>k</sup>	49,167 <sup>l</sup>	50,784 <sup>m</sup>	n	6,345 <sup>o</sup>

SOURCES  
<sup>a</sup>City of Tampa Energy Conservation Coordinator Covers period July 1975 to September 1980 and includes only community development block grant program  
<sup>b</sup>Buffalo Neighborhood Revitalization program Yearly breakdowns for the period are: 1977: 400; 1978: 1,100; 1979: 1,200; 1980: 1,700 Totals include sec. 312 and community development block grant programs  
<sup>c</sup>San Antonio Development Agency: Represents community development block grant, sec 312, emergency home repair and moderate-income rehabilitation programs Yearly totals for the period are: 1977: 183; 1978: 187; 1979: 165; 1980: 204.  
<sup>d</sup>Jersey City Department of Planning: Approximate total for 1979-81. Includes community development block grant, sec. 312 and 8, rehabilitation totals  
<sup>e</sup>City of Des Moines Neighborhood Development Administrator 157 homes were rehabilitated under the sec. 312 program between 1977-80. yearly breakdowns are the following: 1977: 16; 1978-79: 59; 1980: 65. In 1980, 268 homes were rehabilitated with community development block grant funds  
<sup>f</sup>Community Action Agency of Hillsborough County, Covers period June 1976 to March 1981. Yearly totals are the following 1976-78 191, 1979: 72, 1980: 84; 1981: 53  
<sup>g</sup>Totals are for Hillsborough County.  
<sup>h</sup>New York State Department of State, Office of Economic Opportunity Yearly totals for the period are: 1977: 100; 1978: 0; 1979: 592, 1980: 443  
<sup>i</sup>No program  
<sup>j</sup>New Jersey Department of Energy, Office of Low-Income Energy Conservation: Represents completed units for 1960 only.  
<sup>k</sup>Capital View Housing Center and Des Moines office of Neighborhood Development: Yearly breakdowns are: 1977: 148; 1976: 434; 1979: 166; 1960: 763  
<sup>l</sup>City of Tampa Energy Conservation Coordinator  
<sup>m</sup>Erie County Department of Social Services: Figures are for Erie County for period, Oct 1, 1980 to Apr. 17, 1961.  
<sup>n</sup>Texas Department of Human Resources: In 1980, 45,984 households received home energy assistance for heating in Bexar County; in 1960, 4,800 households received home energy assistance for cooling For the latter, only persons 65 and older are eligible for assistance The heating figures are for the period Jan 1 to Mar. 31, 1981, cooling totals are for August to September 1961  
<sup>o</sup>Not available.  
<sup>p</sup>Des Moines office of Neighborhood Development

many challenges confronting government and the citizenry in Buffalo. The others include high unemployment, a deteriorating city infrastructure, an old and dilapidated housing stock, and a largely low-income and elderly population with many social service needs. The average residential customer gas bill in Buffalo was almost \$700 for 1981. (Gas is the predominant home heating fuel.) However, more than 30 percent of Buffalo's population has incomes of less than \$10,000 and within this income group, energy costs can come to as much as 30 percent of income. Electricity costs in Buffalo are about \$0.45/kWh, right in the middle nationally, but the utility has requested a major rate increase, so many commercial customers that rely on electricity will also feel the brunt of rising energy costs. Buffalo's average winter temperature is about 24°, but the city is one of the windiest in the Nation.

There have been three types of responses to rising energy costs. The first is to shift the blame to the utility. An active citizens group in Buffalo, People's Power, has loudly advocated a municipal utility in the belief that such an institution would bring lower rates. Other citizens groups and the mayor have opposed rate increases for both gas and electricity. For their part, Niagara Mohawk and National Fuel Gas, the main ener-

gy suppliers, both run large-scale audit programs and offer low cost loans, but find that public response has been quite small and largely limited to middle-income households. Of 460,000 National Fuel Gas customers in western New York, slightly more than 3,200 have requested audits since 1977 and only 564 loans have been made. Utilities must offer audits and 11 percent 7-year loans under the State's Home Insulation and Energy Conservation Act. In the case of both Niagara Mohawk and National Fuel Gas, however, the utilities also see energy conservation as in their own best interest. For Niagara Mohawk, the objective has been to defer capital expense for additional generating capacity. For National Fuel Gas, it has been effective public relations.

City government programs have been the second response to rising energy prices in the city. The city has passed a resolution targeting some of its \$24 million in CDBG funds specifically for energy conservation. The city offers tax abatement/exemption for 80 percent of the cost of energy conservation improvements in multifamily buildings over a period of 10 years. Eleven multifamily owners (representing more than 200 units in all) have applied for such tax relief since November 1, 1980. The city has audited several municipal buildings and make

### Box P.—Buffalo

Buffalo is an aging Northeast port city, with a weak economic base and a steady drop in population. At the time of the case study visit, the unemployment rate was almost 9 percent, second only to Jersey City among the case study cities. Much of the city's population is below the poverty line; more than one-quarter of the households are headed by retirees. The majority of the housing stock, mostly wood-frame single-family homes, was built before 1939. Much of it is in poor condition. Buffalo's economy has suffered serious erosion and between 1973 and 1979, 75 factories in the area closed and some 17,000 jobs were eliminated. Moreover, the backbone of Buffalo's current job base, the automobile industry, is a troubled sector of the national economy. The key civic issue in Buffalo is economic development.

But there is another side to Buffalo. It is embodied in the current mayor, a man of infectious optimism whose spirit has reinvigorated the city and its citizenry. While many might describe Buffalo as a dying city, the mayor refuses to give up. A recent \$16.5 million UDAG will help finance a new hotel and two downtown office buildings. Luxury townhouses are going up in a center city waterfront site. Several other downtown office buildings have been constructed. While most of the neighborhoods in the city badly need help, Buffalo has its chic urban revitalization areas that have attracted boutiques, restaurants, and urban brownstoners. Through an aggressive housing rehabilitation program that emphasizes exterior facelifts as much as code enforcement, the mayor hopes to revive other neighborhoods in the city as well. Buffalo is a city of strong ethnic neighborhoods and has several active community groups.



some energy improvements under its capital budget program, although these resources are quite limited. Both the school district and the housing authority have taken major initiatives to cut energy costs. The city allocated \$4 million of public works funds to the school district for the purpose of retrofitting school buildings. Public building energy costs have increased dramatically in Buffalo and are of great concern to the city whose budget is severely strained from several other quarters as well.

Buffalo has a large older and deteriorated housing stock, primarily of wood frame construction. Local officials estimate that there are about 30,000 dwellings in **need of weatherization, of which 10,000** are occupied by low-income households. The city has an active rehab program and works closely with local lenders, such as the Buffalo Savings Bank, to finance housing improvements. While there is concern over energy by local housing officials, funds are only now seriously being directed to retrofit. The main emphasis in the program thus far has been on code enforcement and exterior improvements. The weatherization program run by the local poverty agency, has **been ham-**



*Photo credits Office of Technology Assessment*

In the winter, cold winds blow from the west across Lake Erie into downtown Buffalo chilling Buffalo's housing stock of densely packed frame buildings



Photo credit: Office of Technology Assessment

The Buffalo Savings Bank (buildings on left) and Niagara Mohawk Electric Co. (right) have both developed programs to stimulate retrofit of buildings

pered by administrative problems and has weatherized only a few hundred structures since 1977. Energy problems have been tackled most aggressively in Buffalo from outside of government, particularly by nonprofit groups and energy conscious designers. These energy activists have worked closely with government and the utility in several cases. The New York Public Interest Research Group (NYPIRG), working with National Fuel Gas, conducted 1,250 audits in low-income homes in a year, and has run several training programs through the community development program to teach low-income residents about energy conservation. Another nonprofit group, the Buffalo Energy Project, has worked with local builders

to develop luxury solar townhouses on the city's waterfront and with the city to place a windmill in Naval Park. A downtown business group is also cooperating with the city and the local housing authority to recycle an abandoned public housing project into an energy efficient low- and moderate-income residential development. In addition, local architects and engineers have designed several downtown buildings using innovative energy technology, including solar units and heat pumps. In general, however, the older office buildings that dominate Buffalo's downtown have lacked sufficient cash flow to consider major energy improvements, even though they are caught in a tight competitive race for tenants with newer, more energy efficient buildings now being built downtown.

The reinvigorated downtown is symbolic of the third response by the city to its energy needs. This response is best summed up by an assistant to the mayor who observes: "The city's approach is to attack economic development issues and to bring more money to Buffalo. That is how we are attacking the energy problem." Thus, in the city's housing program, rehab funds are assigned first to correcting code violations and then to exterior beautification. Only if money is left over does energy get addressed, unless it is associated with code violations. The theory is that if neighborhoods have a more positive physical environment, then investment dollars will start to flow into them. Similarly, the mayor has devoted considerable attention to garnering Federal funds, such as UDAGs, for downtown improvement. The city is building a single line subway system. It has also submitted an application to study the feasibility of a downtown district heating system that would be tied into downtown development.

Buffalo's progress in retrofit will probably be slow but steady. Large numbers of buildings are not likely to be retrofitted in the near future. But the city and the nonprofit community in particular have established a framework for a working relationship that appears to be leading to small but positive steps to making many of the buildings in the city more energy efficient. Both utilities are committed to their audit programs

and are bound to reach a substantial share of their customers over time.

### Des Moines

Des Moines is an extremely cold city during winter months and more than **50** percent of the city's housing was built before 1940. The city

has recently felt the shock of some large utility rate increases. In January 1981, Iowa Power & Light put into effect a 14 percent electric rate increase and a 6 percent natural gas hike. Residential fuel use is about evenly divided between the two. Despite these factors", energy conservation has not been an important local issue in Des Moines and is not likely to be.

#### Box Q.-Des Moines

**Des Moines is a medium-size Midwest regional center. The city is relatively prosperous, with a strong economy and a low unemployment rate. Downtown Des Moines is vibrant, with much new office construction. The city has a strong service sector and is a center for insurance and publishing, among other businesses.**

**Much of the housing in Des Moines was built before 1940 and the majority of this older housing stock is of wood-frame construction. However, because of the relative affluence of the population, housing is generally in good condition. There are few multifamily buildings in the city although there is expected to be more such housing in the future.**

**Neighborhood groups in Des Moines are not particularly strong, but the business community is. The Des Moines Housing Council has taken an active role in downtown development and housing issues. The lending community also seems to have a strong community spirit.**

**Des Moines has a strong city manager and issues of management and planning are important in this city in both the public and the private sector.**



*Photo credits: Office of Technology Assessment*

Downtown Des Moines is prosperous and the business community is active in civic affairs. The largely single-family wood frame housing stock is kept in good condition by a relatively affluent population, and is already fairly energy efficient

First of all, the city is relatively prosperous. Unemployment is low and household income is high. Second, even with the hikes, utility rates are not especially onerous. Average home heating bills range from **\$464 to \$600 annually. And perhaps most important, Des Moines residents have already made many of the retrofit improvements necessary to survive in a climate** where winter temperatures average under 20° F. Iowa Power & Light, the major utility, estimates that about 50,000 customers have made energy saving improvements since 1973, although only a fraction (3,000) have taken advantage of the utility's 9 percent 3-year loans.

Interest in energy conservation in Des Moines is diffuse. Citizens have dealt with the need for energy retrofit in a self-reliant, independent fashion that characterizes much of the activity in this city. Homeowners and businesses have taken the necessary steps to make their buildings more energy efficient both for survival in the harsh climate and for competitive business reasons. Assistance has come not from government, but rather from the utility and local lenders. Des Moines Savings has a nationally recognized lending program for energy conservation that offers loans of up to \$2,000 at 1 percent below the market interest rate. In addition, energy efficiency is an important part of the savings and loans' underwriting standards and as a result of its appraisal policy and its low-interest loans, about 4,000 customers have taken advantage of Des Moines Savings financing for energy improvements since 1977. Other banks in the Des Moines area are also beginning to push energy conservation in their lending programs, although none have gone so far as Des Moines Savings. Commercial building owners in Des Moines have also taken basic energy saving steps, both for cost savings and to keep pace in a highly competitive office market with much new space going up. The presence of the State capitol, with some solar demonstrations on State buildings and an active State energy program, has also helped to spur private interest in retrofit.

City government in Des Moines has a strong interest in conservation. It has a national reputation as a well-managed city and energy has

grown in importance for the city manager and his staff. This year energy expenses will run \$4.5 million, second only to personnel, in Des Moines' expense budget. Tax revenues have been declining in the city and the State has imposed a 6-percent limit on growth in assessed valuation for 1980-81 and a 4-percent limit for 1981-82. The city has been forced to use general revenue sharing funds normally reserved for capital improvements for its operating budget. Thus, reduction of operating costs, such as energy, is a high-priority managerial item.

The manager has set up an energy policy committee to set specific goals for each department. The committee has organized building energy squads, cut down on the fleet, and purchased more energy efficient equipment. The city engineer has completed audits in several buildings and is programming capital improvements within the tough constraints of the budget.

Des Moines has also taken a strong management approach to helping low-income families deal with energy problems. There are about 20,000 low-income families in the city and they live in older, poorly insulated units. The city has its community development and antipoverty programs in one department, which makes for an efficient delivery center for energy programs designed for the poor. Direct cash assistance and weatherization programs are well organized and coordinated in Des Moines in contrast to most cities. The weatherization program has reached more than 1,200 homes in the last 3 years and about 4,400 families have received cash assistance. The city has also run smaller demonstration programs for both conservation and solar in conjunction with local community groups. The rehabilitation program is oriented primarily toward code enforcement, but lack of storm windows and ceiling insulation are considered code violations and would be covered under the program. Future plans for the rehabilitation program call for even greater attention to energy conservation and an expansion to multi-family buildings.

One goal of city officials is to set an example for the rest of the citizenry in terms of conserva-

tion. Thus far, they have an issue without a following. The planning director, who heads the energy committee, and at least two public interest groups, have tried to fan interest in energy conservation in Des Moines. There has been talk of developing a community energy plan and instituting a retrofit requirement for existing housing. But public interest in making energy conservation a high visibility political issue has been small. Perhaps this is because the most necessary retrofit work in Des Moines has already been done.

### Tampa

Tampa's benign climate and its relatively new building stock have somewhat mitigated the impacts of high energy costs. Rising costs have been felt, however, by the city government, which is just pulling out of a fiscal crisis and by low-income households in the city, about one-third of whom are elderly.

However, conservation activities in Tampa largely emanate from Tampa Electric Co. (TECO) and they are aimed at the middle class new home buyer or builder. TECO's interest in turn is sparked by an extremely aggressive State Public Service Commission (PSC) that adopted stringent rules in September 1980 to reduce the growth rate of electric consumption (especially weather sensitive peak demand) and the use of oil as a generating fuel. Under its rules, the PSC will review all proposed rate increases against

the utility's conservation record and measure conservation as an alternative to new power-plant construction as a means of "increasing" capacity. Under the PSC rules, TECO is being held to strict limits on increases in kilowatt demand and kilowatt-hour consumption; energy is allowed to grow at 75 percent of TECO's customer growth rate and demand at 72.25 percent of that. Utility officials are concerned by the growing gap between summer and winter peaks and project high winter peaks in the future. While industrial and commercial growth is expected, the largest new market and the biggest problems appear to be coming from new residential customers, a sector that is expected to continue to grow. So TECO has proposed a 7-point conservation strategy heavily targeted toward the new residential market. The strategy includes first cost subsidies for installation of heat pumps, discounts for high efficiency storage water heaters, an expanded audit program, and a test program for direct load management. TECO expects to place heat pumps in 2,000 homes each year for the next 5 years, a move that will reduce energy usage by as much as 60 percent in these residential units. It has also set a goal of 1,800 to 2,000 audits a year for the next 5 years.

The results from audits so far have not been encouraging. TECO has mailed out fliers to 42,000 customers with higher than average home energy usage, and has pushed audits through the media and mailings. About 1,800

#### Box R.—Tampa

Tampa is a well-established port city that benefited strongly from the spurt in southern regional growth, but more recently has seen major new development move out of the city to the broader metropolitan area. This shift in the city's fortunes has been reflected in a declining tax base, budgetary problems, and a growing consciousness of the importance of housing and neighborhood development. The city's mayor inherited a serious budget deficit his first year in office and has tried to put the city on a strong management-by-objective footing.

The shift in urban-suburban fortunes is reflected primarily in residential growth. Downtown Tampa is actually undergoing something of a commercial boom, with dramatic office and hotel complexes rising on several prime corners. The city's port is still active and Tampa has benefited from the overall tourist draw of the region, a fact that is reflected in the city's gleaming, ultramodern airport. The business community in Tampa seems strong and the chamber of commerce has played an active role in several areas, including energy. In contrast, neighborhood groups are very weak. The small public interest community is concerned primarily with environmental matters.



*Photo credits: Office of Technology Assessment*

Tampa's downtown is booming although residential growth continues to shift to the suburbs. Single-story bungalows are typical of Tampa's largely wooden housing stock

**customers have requested audits in the past 2 years, but there is no indication that they have followed through on recommendations. Interest from the existing home market has been particularly low, according to TECO officials and other Tampa energy experts.** However, a State energy efficiency code has helped to contribute to more energy efficient new buildings.

While TECO has not focused attention on commercial buildings in its market area, local business people have been quite concerned about the impact of rising energy costs. In a model program, the city's chamber of commerce has joined with TECO and the local engineering society to sponsor low cost audits for local businesses. The Hillsborough Energy Audit Team (HEAT) program is targeted toward local businesses whose utility bills are between \$1,000 to \$17,000 a month. In the first year of the program, about 60 firms—or 34 percent of those contacted—signed up for the program. The chamber expects to target HEAT to small businesses in the future. Followup has been a major problem with the program and, as with the TECO residential audits, it is not clear that building owners have actually implemented the recommended measures. In Tampa, financing for improvements such as retrofit is now two points above prime, more than many businesses can afford. On the other hand, the office market in the city is highly competitive and new buildings have to adhere to the strict State code. To keep pace with the market, owners of several older Tampa buildings have made energy-related improvements, such as replacing oversized air-conditioners and installing computerized energy management systems.

The other locus for conservation activity is city hall. Tampa has a managerially oriented mayor who inherited a heavy deficit and was forced to lay off a substantial number of city employees in his first months in office. The mayor has set fuel usage quotas for each city department and converted much of the fleet to subcompacts and propane powered cars and trucks. The city is using CDBG funds to convert street lights to high-pressure sodium vapor lighting to cut costs. The city has also conducted audits of several buildings and installed an

energy management system in the library. Both the housing authority and the school board have been energy conscious, and the housing authority has received several grants from the Department of Housing and Urban Development to experiment with solar applications.

Tampa has about 22,900 households that require housing assistance and an estimated 12,000 substandard homes. The county weatherization program has reached about 360 units in Tampa since 1976, but has been hampered by federally imposed limitations on supervisory personnel. City rehab programs do include some energy work, but the basic thrust of the Tampa rehab program is for major long-term improvements. The average loan is for \$17,000 and lasts 20 to 30 years. Very few homes are rehabbed each year, because of the attention given each unit, and the city's 3-year housing assistance plan sets a goal of only 141 rehab units.

In Tampa, public interest groups, lenders, and energy designers are not potent forces for conservation. The spur for large-scale retrofit is coming primarily from TECO and the chamber of commerce and it is contingent on private response. The prospects are summed up in a sobering comment contained in TECO's submission to the Public Service Commission:

**Although Tampa Electric is committed to enthusiastically pursue its conservation programs, it should be reiterated that the electric utility customers, and not the utility serving them, hold the real key to the success or failure of energy conservation programs.**

## Jersey City

Jersey City is a depressed Northeast city, with a large low-income population and a very poor housing stock. More than half the units in the city are heated by oil and consumers have experienced burdensome price increases in recent years. In 1980-81, the price of home oil heating increased by 50 percent.

The impact of energy has been felt throughout Jersey City. Housing officials attribute escalating abandonment of buildings to high energy

### Box 9.—Jersey City

At first blush, Jersey City is a dying mid-Atlantic city. But Jersey City has an advantage that most other similar localities lack. It is across the Hudson from midtown Manhattan and is about 10 minutes away from both Wall Street and Broadway, via a 30 cent PATH subway ride. Jersey City has overwhelming housing and community development problems, but the city is trying to capitalize on both its magnificent view and its proximity to New York to turn its fortune around.

At the moment this vision remains in the realm of dreamland. The city has a 10 percent unemployment rate and 30 percent of its housing units are substandard, with many in dilapidated multifamily buildings. Industry has fled the city to the attractive industrial parks in the Hackensack Meadows and other areas. Some neighborhoods show signs of a brownstone revival, but most are extremely poor in both spirit and condition. Jersey City's municipal government has tried to cope with these problems with a strong spirit, but the city is hamstrung by serious fiscal problems, exacerbated by a rapidly eroding tax base. Neighborhood groups and the business community appear dispirited.



Photo credit: New Jersey Bureau of Neighborhood Preservation

Jersey City's population is largely housed in small- and moderate-sized masonry multifamily buildings

**prices.** The code enforcement bureau has experienced a 50 percent increase in complaints for heat shutoffs from 1980 to 1981 (from 2,400 to almost 3,400). Credit terms have been tightened on oil deliveries. Federal cash assistance applications far exceed the capacity of available funds.

The problem in Jersey City is exacerbated because much of the population are renters in older multifamily buildings and neither the building owners nor their tenants want or can take responsibility for retrofit. Everyone is concerned about energy in Jersey City but in this predominantly low-income community few have the resources to do much about it.

That puts a heavy responsibility on government. Jersey City has a tough code enforcement program that includes both a housing court and receivership action. But many landlords would sooner abandon the building than make improvements that they cannot afford. The city also has a rent control ordinance that allows only limited increases for higher energy prices. In any case, much of the low-income tenantry could hardly afford higher rent.

The city has tried to address energy conservation in the context of overall housing problems that are extremely serious. The Jersey City Redevelopment Agency (JCRA) offers a 30-percent grant to homeowners and owner-occupied one- to four-family properties for correcting code violations and making major property improvements. The maximum grant is \$20,000 for a four-family building. In three of the city's neighborhood preservation areas, JCRA also offers a 50-percent grant for multifamily properties with low-income tenants, up to \$500 a dwelling unit. Repairs are for housing code violation, barrier removal, energy conservation and cost-reduction measures, in that order. About 837 loans and grants have been made by JCRA. Jersey City also has a home improvement grant program available for owner-occupied one- to four-family dwellings in other parts of the city, which can either be a match or an outright grant (for very low-income households). In 1981, the city will earmark \$200,000 of CDBG funds specifi-

cally for energy conservation measures under the program. The volume of Federal weatherization activities in Jersey City has been very low, only 62 units completed in all of 1980.

Energy has been a serious problem in city buildings but without Federal or State funds to defray the cost of capital improvements, the city can do little within its budget constraints to tackle retrofit projects. The main government activities have been public relation campaigns aimed at city employees and local residents. These have generally met with poor response. The business community in Jersey City has also been very unresponsive. There is little competitive pressure for improvements in the office or commercial markets. Banks and energy suppliers have shown little interest in actively promoting conservation; also energy has not been an important issue for public interest and neighborhood groups.

As in Buffalo, the mayor has decided that energy is best tackled as part of the city's overall economic environment. Jersey City is working with Public Service Electric & Gas (PSEG), the major electric utility, to develop a district heating plant for the downtown, as a lure to new investment. The mayor has also aggressively pushed industrial development projects throughout the city and neighborhood projects that stress exterior over interior improvements. A JCRA 50-percent matching grant for upgrading heating systems in small multifamily buildings was dropped in favor of grants for facade beautification or what one local rehab official calls "the Catherine-the-Great approach to rehab."

The prospects for large-scale retrofit in Jersey City are extremely poor, mostly because of lack of resources and lack of confidence in the future of the city. Rather than improve their properties, building owners and businesses are moving elsewhere. Cities that rely on oil heat have experienced the shock of rapidly rising energy prices sooner than other communities but the deregulation of natural gas may make Jersey City's story merely a forewarning of what will happen in other places.

## San Antonio

In San Antonio, the city and its energy future are closely entwined. The City Public Service (CPS) Board, a municipally owned utility, provides electricity and gas for San Antonio. A third of San Antonio's municipal budget comes from the utility and this revenue has helped pay for city services and keep the tax rate low. CPS has also provided the energy that has fueled the growth of a city that prizes economic development and wants more of it.

Typical residential electric and gas bills average around \$57 a month; summer cooling bills for the very hot San Antonio season are somewhat higher. These rates are not excessively high, nor has the city experienced the staggering rate increases all at once that have occurred in other communities.

For the most part in San Antonio, the concern is not so much with the cost of energy as with its supply. When concerns are raised against price, the villain is not the utility but the railroad companies which have increased coal hauling rates markedly in recent years. The railroads have become a favorite public whipping target of local officials.

CPS's dependence on coal is largely an outgrowth of the curtailment of natural gas sup-

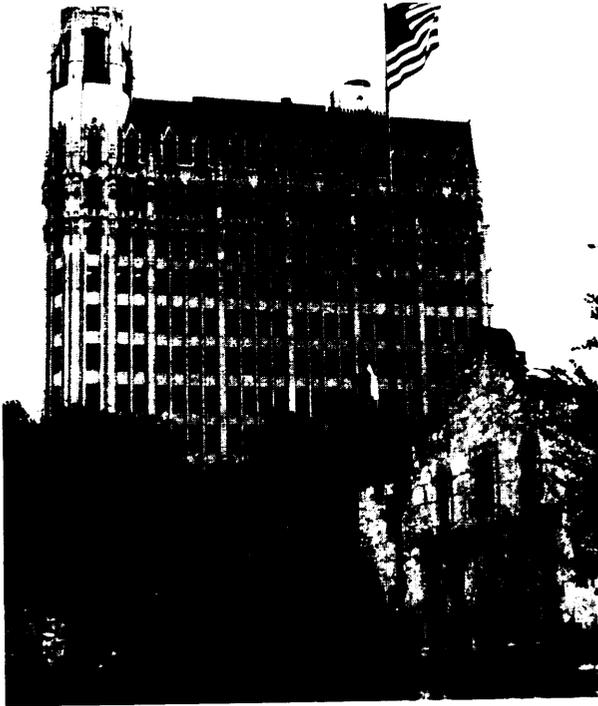
plies on which it had relied up to about 1973. The Coastal States Gas Corp. and its subsidiary LoVaca Gathering Co. defaulted on gas supply contracts and left CPS and San Antonio in a brief but frightening energy supply cutoff. CPS moved quickly to diversify its energy sources and moved heavily into coal. At the time hauling rates were low, but they have more than tripled. These events of the past have had far-reaching ramifications beyond the high price of moving coal. For one thing, there is a lingering fear among many San Antonio business people that the city will be caught up short again by an energy cutoff, even though there is no rational basis for this fear. There is also the feeling that the utility has been burned twice, first by gas, now by coal, and that means a need to further diversify power sources. In response to this need, CPS has become a major partner in the South Texas Nuclear Project, an action that has engendered considerable controversy by environmentalist, consumer groups, and neighborhood organizations.

CPS has promoted an audit program but response in San Antonio has been extremely poor. The business community has not been particularly interested in energy issues. San Antonio has a major center for solar research at Trinity University, but advanced energy technology such as solar or heat transfer systems are

### Box 7—San Antonio

San Antonio is the largest city in Texas and it combines many of the attributes of a high-growth community with those of a Northern industrial town. The city's growth and economic development is a major civic issue in San Antonio. One of the problems of a rapidly expanding low-income minority population is aggravated by inflation and recession. San Antonio has a low unemployment rate—5.6 percent—but many of its citizens are relegated to low-paying jobs with not much of a future. The city's economy is dominated by tourism and the few military bases in the area. There is considerable new growth in downtown San Antonio, particularly in the vicinity of the Tower of the Americas, built during the New Deal but reinforced into a prime tourist attraction by more recent administrators. However, in contrast to the fancy hotels, there is another side of San Antonio—72 percent of its housing stock is substandard and much of it is in just poor condition. City housing officials feel it is most cost-effective to tear the units down and rebuild new ones, rather than repair the old ones.

In 1977, San Antonio shifted from an at-large council to a council of 10 members (plus the mayor), elected from district districts in the city. This shift has had a significant impact on how the city is run and community groups are very powerful in the city. San Antonio has had a string of activist mayors that have exerted strong leadership in helping the city balance the needs of a local business community interested in growth and the serious problems of its low-income citizenry.



also only meagerly represented in the community.

The major interest in energy conservation per se has come from city government. Like several of the other case study cities, San Antonio's managers are concerned about the increasing share of the city's budget taken up by energy, but their focus is on energy use in city vehicles not in city buildings. The city has cut its fleet sharply and is converting much of it from gasoline to propane. City departments have strict fuel budgets and merit increases for department heads are tied to the extent to which fuel budgets are met. Several municipal buildings have been retrofitted and more such activity is programmed. The city has also tried to set an example for the community at large. The employer-based ride-sharing program is one of the best in the country and has involved Kelly Air Force Base and several other major local employers. Recently, San Antonio received funding from the Department of Energy for a demonstration



*Photo credits Office of Technology Assessment*

After a period of stagnation new construction has started again in San Antonio's downtown surrounding such tourist attractions as the Alamo. San Antonio's housing stock is largely of wood; much is in poor condition

project to encourage energy conservation in small businesses. The city has also interjected energy conservation issues in the planning process and has set up an Energy Conscious Development Committee to examine regulations to see which inhibit and which encourage energy savings.

San Antonio has a very large low-income population and **27 percent of the housing** in the city is substandard, according to local rehab officials. Some, in fact, are so dilapidated that the city has started a replacement housing program in which the substandard units are demolished and new homes built in their place. The San Antonio Redevelopment Agency (SARDA), a quasi-independent agency, runs the housing programs for the city and does include energy conservation as part of rehab activities. But it is minor compared to the overall rehab work necessary for San Antonio's poor housing stock. Nevertheless, SARDA loans and grants are virtually the only weatherization activity in the city. The Federal weatherization program does not operate in San Antonio because of a dispute between the State and city over the administration of the program. While some community groups have aggressively urged greater attention to energy conservation, their protests have been directed primarily at the South Texas Nuclear Project. The argument is that the money spent on this powerplant could better be put to weatherizing low-income homes. City CDBG funds, which have been used for energy and rehab in other cities, are not spent in this way in San Antonio and most community residents are not urging a redirection of CDBG moneys to energy.

At present, most San Antonians are more concerned about other things in their community, such as better jobs or adequate water supply, than energy. The push for conservation is weak and uncoordinated, with the exception of the city's own program to make government more energy efficient. But their example has not spilled over to the rest of the community and until it does the prospects for large-scale retrofit in San Antonio will remain small.

## Summing Up

These five cities show the great diversity of energy conservation activity across the Nation. The locus of energy conservation activity in each city varies and the cast of energy leaders changes. For example, in Tampa the utility is a spur for conservation, while in Jersey City and San Antonio, the utility as an active conservation force is quite weak. In Tampa and Des Moines, the business community has played a prominent role; in the other communities, the business community has been a weak force. In Buffalo, neighborhood groups and private energy designers have been active in promoting conservation, often in concert with the city and the utility. This has not happened to a great degree in the other cities. And while housing preservation and economic development are important in all five cities, the way these issues are framed and addressed varies substantially. In Tampa, for example, intensive but low-volume rehabilitation is the prime focus of housing activities. In Buffalo and Jersey City, facade improvements are important. In San Antonio, demolition and rebuilding are key components.

There are also some important similarities among these cities, from the point of view of energy. All five have been affected by energy price increases in recent years, although the level and impact of rate increases does vary. **All** five cities have audit programs run by the utility or oil dealers. In all five, local government has taken steps to reduce its own consumption of transportation and building energy. All of the governments have emphasized operating changes rather than capital investments to reduce energy use in municipally owned buildings. **The** use of CDBG and other public funds to address the retrofit needs of low- and moderate-income citizens has been minimal but is growing. The impact of weatherization has been extremely small. Above all, while energy prices are of some concern in these cities, energy has not been a major political issue. In fact, it has been rather far down on the civic agenda for both government and the public.

The experiences of these cities also corroborate several of the major findings of this study. They include:

- City government has not made energy conservation a high priority item except in its own operations.
- A major source of local funding, **CDBGs**, is only minimally used for retrofit and most of this activity is indirect, through rehab activities.
- Utilities had audit programs before the Federal regulations and are likely to continue them even if Federal regulations are withdrawn. Only a few of the utilities in the case study cities expect a significant impact on demand such that energy conservation could help to avoid capital expenditure for new generating capacity.
- Energy conservation programs and rehab programs by and large do not deal with multifamily buildings.
- There is very little interest in solar energy in the case study cities, largely because building owners doubt that it will pay off.
- The weatherization programs have been hampered in dealing with the low-income housing stock of these cities by restrictions on handling auxiliary repairs. The weatherization programs has by and large not been coordinated with the housing rehabilitation program.
- An activist State government can subtly influence conservation in local areas. The

most dramatic example of this among the case study cities was Tampa where both the State requirements for utility conservation programs and a State building code have spurred conservation activity.

Above all what comes through in these case studies is that all the programs in the world will not make a difference in increasing the rate of retrofit if people are not concerned enough about energy to take the first step. Most of these case study cities have at least one major retrofit program. Yet all report a generally low level of interest by both homeowners and the business community. The one group that is heavily burdened by energy price increases—the poor—have the interest but lack the resources. And even in the case of low-income households, other problems, such as overall housing conditions, may far outweigh their interest in energy.

In all of these cities the pace of retrofit is slow. The prospects for large-scale retrofit are not particularly promising in the short run. Only time can tell whether the pace of retrofit is also steady and whether, like the tortoise, the retrofit race will be won over a decade or more by slow and steady improvement in the energy efficiency of the building stock. It is possible to take a long perspective when dealing with the building stock of these cities much of which has been around at least a half century.

## CHAPTER 10 APPENDIX: INFORMATION ON THE HOUSING CHARACTERISTICS, HEATING AND COOLING EQUIPMENT, AND RESIDENTIAL FUEL USE OF THE CASE STUDY CITIES

**Appendix Table 1.—Housing Characteristics: Case Study Cities**

	Tampa	Buffalo	San Antonio	Jersey City	Des Moines
Housing characteristics					
Total housing units . . . . .	100,857	166,142	203,226	91,997	72,349
Occupied housing units . . . . .	94,889	157,951	190,692	87,853	68,506
Owner-occupied . . . . .	63,921	69,453	118,922	24,697	45,408
percent . . . . .	67.4	44.0	62.4	28.1	66.3
Renter-occupied . . . . .	30,968	88,498	71,770	63,156	23,098
Units in structure					
All year-round units . . . . .	128,217	166,106	203,237	91,925	72,332
1, detached . . . . .	94,585	43,530	152,048	6,162	50,723
1, attached . . . . .	2,606	1,561	4,274	4,395	141
2 . . . . .	6,174	76,937	11,202	24,409	4,783
3 and 4 . . . . .	4,864	21,919	8,663	12,901	3,854
5 or more . . . . .	15,014	22,147	24,512	44,040	12,017
Mobile home or trailer . . . . .	4,974	12	2,538	18	814
Owner occupied . . . . .	84,930	69,472	118,871	24,259	45,359
1, detached . . . . .	77,956	35,876	112,496	5,085	42,532
1, attached . . . . .	254	231	657	3,654	48
2 . . . . .	1,470	28,991	2,509	11,065	1,299
3 and 4 . . . . .	516	3,539	672	2,476	411
5 or more . . . . .	587	823	592	1,979	339
Mobile home or trailer . . . . .	4,147	13	1,945	18	730
Renter occupied . . . . .	35,927	88,481	71,853	63,583	23,136
1, detached . . . . .	12,812	6,857	33,176	940	6,593
1, attached . . . . .	2,256	1,277	3,356	654	87
2 . . . . .	4,039	44,578	7,640	12,722	3,222
3 and 4 . . . . .	3,669	16,444	7,038	9,679	3,070
5 to 9 . . . . .	4,099	7,949	5,173	15,081	3,796
10 to 19 . . . . .	3,974	4,123	3,233	9,586	2,810
20 to 49 . . . . .	1,906	2,525	3,542	8,631	1,843
50 or more . . . . .	2,345	4,728	8,102	6,272	1,631
Mobile home or trailer . . . . .	827	—	593	18	84
Year-round vacant for rent . . . . .	3,890	4,685	7,708	2,765	2,244
1 . . . . .	1,101	294	2,635	76	391
2 to 4 . . . . .	1,014	2,866	1,565	901	459
5 to 9 . . . . .	594	422	849	713	554
10 or more . . . . .	1,181	1,103	2,659	1,075	840
Year structure built					
All year-round units . . . . .	128,217	166,106	203,237	91,925	72,332
1969 to March 1970 . . . . .	6,053	166	6,483	450	2,183
1965 to 1968 . . . . .	14,280	884	20,598	2,853	3,921
1960 to 1964 . . . . .	19,600	1,894	22,332	3,648	5,151
1950 to 1959 . . . . .	38,993	9,378	60,011	4,695	13,526
1940 to 1949 . . . . .	19,511	11,391	41,387	7,734	8,217
1939 or earlier . . . . .	29,780	142,393	52,426	72,545	39,334
Owner-occupied . . . . .	84,930	69,472	118,871	24,259	45,359
1969 to March 1970 . . . . .	2,654	39	2,744	63	569
1965 to 1968 . . . . .	8,503	196	10,457	664	1,944
1960 to 1964 . . . . .	15,543	596	14,335	1,374	3,810
1950 to 1959 . . . . .	30,753	4,379	41,140	1,116	10,861
1940 to 1949 . . . . .	11,178	3,486	23,025	1,120	6,253
1939 or earlier . . . . .	16,299	60,776	27,170	19,922	21,922
Renter-occupied . . . . .	35,927	88,481	71,853	63,583	23,136
1965 or March 1970 . . . . .	7,641	778	11,557	2,308	2,828
1960 to 1964 . . . . .	3,440	1,178	7,004	2,221	1,182
1950 to 1959 . . . . .	6,696	4,827	16,283	3,438	2,301
1940 to 1949 . . . . .	7,251	7,594	15,857	6,030	1,713
1939 or earlier . . . . .	10,899	74,104	21,152	49,586	15,112

Appendix Table 1.—Housing Characteristics: Case Study Cities—continued

	Tampa	Buffalo	San Antonio	Jersey City	Des Moines
Structural characteristics					
<b>Plumbing facilities</b>					
With all plumbing facilities . . . . .	95,912	160,428	190,831	86,401	69,018
Lacking some or all plumbing facilities . . . . .	<b>4,868</b>	5,679	12,328	5,555	3,319
Lacking only hot water . . . . .	<b>2,988</b>	624	5,358	2,741	144
Lacking other plumbing facilities . . . . .	1,880	5,055	6,970	2,814	3,175
<b>Piped water in structure</b>					
Hot and cold . . . . .	<b>97,439</b>	165,204	194,238	88,686	71,726
Cold only . . . . .	<b>3,294</b>	864	8,259	3,240	483
None . . . . .	<b>47</b>	39	662	30	128
<b>Flush toilet</b>					
For exclusive use of household . . . . .	<b>99,428</b>	162,589	199,542	90,397	69,820
Also used by another household . . . . .	1,091	3,334	1,972	1,398	1,953
None . . . . .	261	184	1,645	161	564
<b>Bathtub or shower</b>					
For exclusive use of household . . . . .	99,047	161,303	196,604	89,416	69,309
Also used by another household . . . . .	1,108	3,370	2,008	1,171	2,064
None . . . . .	625	1,434	4,547	1,369	964
<b>Complete kitchen facilities</b>					
All year-round units . . . . .	100,780	166,107	203,159	91,956	72,337
For exclusive use of household . . . . .	98,926	160,223	197,310	90,101	70,799
Also used by another household . . . . .	272	676	324	384	<b>100</b>
No complete kitchen facilities . . . . .	1,582	5,208	5,525	1,471	<b>1,438</b>
Renter occupied . . . . .	30,968	88,498	71,770	63,156	23,098
For exclusive use of household . . . . .	29,908	84,905	69,123	61,740	22,168
Also used by another household . . . . .	198	486	201	305	73
No complete kitchen facilities . . . . .	862	3,107	2,446	1,111	857
<b>Access</b>					
With direct access . . . . .	100,727	165,816	203,014	91,674	72,252
Locking direct access . . . . .	53	291	145	282	85

SOURCE 1970 Census, *Detailed Housing Characteristics*

**Appendix Table 2.—Residential Heating and Cooling Equipment: Case Study Cities**

	Tampa	Buffalo	San Antonio	Jersey City	Des Moines
<i>Air conditioning</i>					
All year-round units . . . . .	128,188	166,101	203,268	91,911	72,341
Room unit					
1 . . . . .	33,383	11,018	44,587	21,128	21,671
2 or more . . . . .	13,878	2,642	35,215	9,165	4,093
Central system . . . . .	22,693	1,574	41,522	2,247	10,692
None . . . . .	58,234	150,867	81,944	59,371	35,885
<i>Heating equipment</i>					
All year-round units . . . . .	128,217	166,106	203,237	91,925	72,332
Steam or hot water . . . . .	909	41,896	3,078	66,965	9,467
Warm-air furnace . . . . .	25,599	78,820	55,065	8,301	59,520
Built-in electric units . . . . .	13,780	983	6,030	1,063	228
Floor, wall, or pipeless furnace . . . . .	21,438	5,690	32,392	723	1,372
Room heaters with flue . . . . .	43,212	31,086	36,654	9,304	1,349
Room heaters without flue . . . . .	14,066	3,800	41,119	1,981	239
Fireplaces, stoves, or portable heaters . . . . .	7,867	3,498	27,546	3,140	144
None . . . . .	1,346	333	1,353	448	13
Owner occupied . . . . .	84,930	69,472	118,871	24,259	45,359
Steam or hot water . . . . .	422	14,472	1,170	17,830	1,606
Warm-air furnace . . . . .	18,534	42,432	34,263	3,667	41,826
Built-in electric units . . . . .	6,946	250	2,703	240	93
Floor, wall, or pipeless furnace . . . . .	18,632	2,746	23,774	260	846
Room heaters with flue . . . . .	28,782	8,015	19,381	1,526	795
Room heaters without flue . . . . .	7,339	732	23,079	266	105
Fireplaces, stoves, or portable heaters . . . . .	4,012	780	14,102	425	83
None . . . . .	263	45	399	45	5
Renter occupied . . . . .	35,927	88,481	71,853	63,583	23,136
Steam or hot water . . . . .	431	25,008	1,718	46,352	6,902
Warm-air furnace . . . . .	5,684	33,815	17,526	4,204	15,036
Built-in electric units . . . . .	5,953	698	2,933	795	127
Floor, wall, or pipeless furnace . . . . .	2,037	2,763	7,393	449	477
Room heaters with flue . . . . .	11,965	20,846	15,063	7,364	425
Room heaters without flue . . . . .	5,784	2,714	15,263	1,569	121
Fireplaces, stoves, or portable heaters . . . . .	3,225	2,516	11,407	2,540	48
None . . . . .	848	121	550	310	—

SOURCE 1970 Census, *Detailed Housing Characteristics*.

Appendix Table 3.—Residential Fuel Use: Case Study Cities

	Tampa	Buffalo	San Antonio	Jersey City	Des Moines
All occupied housing units. . . . .	120,686	157,958	190,727	87,802	68,384
<b>House heating fuel</b>					
Utility gas . . . . .	10,282	142,806	172,981	37,747	64,153
Fuel oil, kerosene, etc. . . . .	70,378	10,423	975	45,650	1,986
Coal or coke . . . . .	—	1,242	—	1,094	372
Wood . . . . .	354	22	240	122	—
Electricity . . . . .	28,590	1,121	10,863	1,159	842
Bottled, tank, or LP gas. . . . .	9,485	1,312	4,515	964	662
Other fuel . . . . .	263	883	312	795	369
None . . . . .	1,334	149	841	271	—
<b>Water heating fuel</b>					
Utility gas . . . . .	9,437	149,621	170,802	44,564	64,381
Fuel oil, kerosene, etc. . . . .	1,655	2,009	213	36,876	115
Coal or coke . . . . .	41	624	—	689	—
Wood . . . . .	—	37	22	—	—
Electricity . . . . .	100,164	2,529	7,129	953	2,524
Bottled, tank, or LP gas . . . . .	5,106	2,164	4,475	1,266	841
Other fuel . . . . .	486	554	156	766	—
None . . . . .	3,797	420	7,930	2,688	523
<b>Cooking fuel</b>					
Utility gas . . . . .	14,640	132,093	155,557	83,311	49,023
Electricity . . . . .	90,993	23,510	29,393	1,937	17,365
Bottled, tank, or LP gas. . . . .	13,261	969	4,212	1,248	1,446
Fuel oil, kerosene, etc. . . . .	1,117	127	380	780	58
Coal or coke . . . . .	—	66	—	101	38
Wood . . . . .	66	22	182	—	—
Other fuel . . . . .	99	125	349	168	—
None . . . . .	510	1,046	654	257	454

SOURCE 1970 Census, *Detailed Housing Characteristics*