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# Portland Energy Office Multifamily Energy Savings Program Profile #104

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# Executive Summary

The City of Portland, Oregon is a mecca of energy and environmental responsibility. In 1979, Portland became the first U.S. city to forge a comprehensive energy policy. The same year it established the Portland Energy Office. In 1993, Portland became the first U.S. city to adopt a local carbon dioxide reduction strategy, committing to reduce its CO<sub>2</sub> emissions by 20% below 1988 baselines by the year 2010, far surpassing the levels specified as a result of the international Climate Convention that developed from the Earth Summit in Rio de Janeiro.

Portland's carbon dioxide emission reduction strategy reinforces the City's civic nature. It embodies broad efficiency gains through improvements in transportation and building efficiency; coupled with the promotion of renewable energy, cogeneration, and recycling; as well as tree planting in and outside of the City; and even lobbying at the Federal level to increase and institutionalize the wise use of energy. Clearly, Portland epitomizes the slogan "thinking globally and acting locally." Though the City does not have a municipal utility, it has worked cooperatively with private electric and gas utilities, and with the Oregon Department of Energy, to facilitate energy efficiency.

One of the most challenging building segments to address in any area is the multifamily sector, largely due to the split incentive between landlords and tenants. Since tenants generally pay the utility bills, landlords have little incentive to improve the efficiency of their buildings. In Portland, this quagmire has been amplified by the great demand for housing, further reducing landlords' incentives to invest in energy efficiency. Given this dilemma and the fact that nearly 50% of the housing in Portland is made up of rental units, the Portland Energy Office designed and implemented the Multifamily Energy Savings program in 1987.

The Multifamily Energy Savings program serves to encourage retrofits by marketing existing efficiency services – such as utility audits, rebates, and loans, plus state tax credits – to building owners. Through its facilitation of diverse incentives, building owners in Portland have been surprisingly receptive to investing in energy efficiency measures such as windows, insulation, common area lighting, water heaters, air sealing, and heating system improvements.

To date more than 11,050 apartment units have been weatherized as a result of the program, with savings of approximately 1,200 kWh annually per unit. Not only has the program been highly successful, but it has been coordinated at very little cost to the the City, at a cost of less than one cent per kilowatt-hour saved. Through its one-stop approach for apartment owners, the Portland Energy Office provides a model of collaboration for servicing a hard-to-reach market sector with a range of resource efficient strategies.

## **PORTLAND ENERGY OFFICE** **Multifamily Energy Savings Program**

**Sector:** Multifamily buildings

**Measures:** Storm windows, insulation, window treatments, thermal doors, weatherstripping and caulking, setback thermostats, and pipe wraps

**Mechanism:** Portland Energy Office facilitates energy efficiency by marketing utility audits, rebates, loans, and state tax credits to building owners

**History:** Initiated in 1987; recycling added in 1989; to date 11,050 apartment units weatherized; goal to complete 20,000 units by the year 2000

### **1993 PROGRAM DATA**

Energy savings: 1,412 MWh

Capacity savings: 275 kW

Lifecycle energy savings: 42,375 MWh

Cost: \$130,684

### **CUMULATIVE DATA**

Energy savings: 12,519 MWh

Lifecycle energy savings: 375,570 MWh

Capacity savings: 2.44 MW

Costs: \$975,485

### **CONVENTIONS**

For the entire 1994 profile series all dollar values have been adjusted to 1990 U.S. dollar levels unless otherwise specified. Inflation and exchange rates were derived from the U.S. Department of Labor's Consumer Price Index and the U.S. Federal Reserve's foreign exchange rates.

The Results Center uses three conventions for presenting program savings. **ANNUALSAVINGS** refer to the annualized value of increments of energy and capacity installed in a given year, or what might be best described as the first full-year effect of the measures installed in a given year. **CUMULATIVE SAVINGS** represent the savings in a given year for all measures installed to date. **LIFECYCLE SAVINGS** are calculated by multiplying the annual savings by the assumed average measure lifetime. **CAUTION:** cumulative and lifecycle savings are theoretical values that usually represent only the technical measure lifetimes and are not adjusted for attrition unless specifically stated.

The City of Portland, Oregon has a population of 471,000 and is the largest city in Oregon. The Metropolitan Portland area has a population of 1.8 million. In 1991 Portland was ranked "Best" in the Green Index, a rating of cities based upon pollution, public health, and environmental policy. Known for its environmental consciousness, Portland contains over 37,000 acres of park lands within its City limits, including the largest municipal park in the world, some 5,000 acres in size. As far back as 1979, Portland became the first major U.S. city to adopt an energy conservation policy.[R#10]

Founded in 1979, the Portland Energy Office (herein referred to as the "Energy Office") was originally created by the City of Portland to address short-term energy pricing issues and long-term energy scarcity issues facing the City. Presently the Energy Office has a far broader mandate with the goal of fostering a sustainable energy future. To spur such a broad-based initiative, the Energy Office hopes to increase energy efficiency by 10% in all sectors by the year 2000, including weatherizing 20,000 apartment units.[R#1,2,5]

The mission of the Portland Energy Office is to help local residents, governments, and businesses save money and use energy efficiently. The Energy Office plans and implements energy programs which promote energy efficiency in City-owned facilities, housing, and commercial property. It also helps promote the City Energy Policy which seeks a strong local economy, healthy environment, and sustainable energy resources. Promoting the 1993 Carbon Dioxide Reduction Strategy by facilitating action among various groups is another important task of the Energy Office. Specific services provided by the Energy Office include research, education, and on-site technical and financial services.[R#1,2]

The Energy Office also staffs the City's Energy and Environment Commission which provides advice to the City Council on Portland's environmental issues. It also participates in community energy planning networks such as the International Council for Local Environmental Initiatives (ICLEI), the Urban Consortium's Energy Task Force, the Solar Energy Association of Oregon, and League of Oregon Cities Energy Advisory Committee.[R#2]

The Office's current 1994-95 budget (based on a fiscal year that runs from July 1 - June 30) is \$600,000. Approximately 20% of the Energy Office budget comes from the City's General Fund while the remaining 80% is obtained through grants, utility contracts, and interagency agreements.[R#2]

## AGENCY DSM OVERVIEW

Currently the City of Portland implements five energy efficiency programs in addition to several other environmental programs.

Business for an Environmentally Sustainable Tomorrow (BEST) assists businesses in becoming more profitable while also being environmentally conscious. The program emphasizes energy efficiency, water conservation, waste reduction, recycling, and efficient transportation. Through this program, the Energy Office brokers services available to businesses including energy design analysis, business energy tax credits, water conservation options, waste reduction and recycling assistance, pollution control tax credits, alternative fuel vehicles, and transportation demand-management options. Since the start of the program information has been provided to over 400 businesses and direct technical assistance has been provided to more than 100 businesses, accounting for more than \$500,000 in annual savings. The Energy Office is also starting an outreach effort to assist other cities seeking to establish a similar assistance program. This will be facilitated by workbooks that are expected to be complete and available by July 1995; the Energy Office is also available to schedule workshops for other cities as requested.[R#2]

The Block by Block Weatherization program (BBB) is a neighborhood-focused program that provides free weatherization and educational services to low-income families. The program has been offered since 1987 and focuses on low-income customers who live in homes which have little or no insulation. Renters and homeowners of single-family residences meeting household income guidelines are eligible. In Portland, these number as many as 16,000 homes and 50,000 residents. Contractors are hired through a subcontract with the Multnomah County Community Action program to provide cost-effective insulation measures. Rebates and administrative reimbursements are collected from three investor-owned utilities and state weatherization incentive programs to leverage dollars for the program. By investing in low-income neighborhoods, Portland is able to reduce energy bills for some of its poorest residents, improve the housing stock, and help stabilize neighborhoods. ■

## Agency Overview (continued)

<b>DSM OVERVIEW FY 1993-94</b>	<b>ANNUAL DSM EXPENDITURE (x1,000)</b>	<b>ANNUAL ENERGY SAVINGS (GWh)</b>	<b>CUMULATIVE CAPACITY SAVINGS (MW)</b>
<b>BEST</b>	\$54	6.5	1.6
<b>Block by Block Weatherization</b>	\$24	3.3	0.7
<b>City Energy Challenge</b>	\$63	12.2	2.0
<b>Multifamily Energy Savings</b>	\$128	12.5	2.4
<b>Resource Efficient Washing Machines</b>	\$59	0.1	0.3
<b>Total</b>	\$328	34.6	7.0

To date more than 1,650 low-income families have received these weatherization services free of charge and 2,800 households have received free do-it-yourself weatherization kits. These services have resulted in annual energy savings of 3.3 GWh and cumulative capacity savings of 0.7 MW, as well as average home savings of up to \$100 per year on energy bills and at an average cost of \$900.[R#2]

The City Energy Challenge program has the goal to identify and implement energy efficiency projects by the year 1997 which will annually cut \$1 million from the City's \$9 million energy bill. This bill is comprised of \$5 million for buildings and facilities, \$2 million for street lighting, and \$2 million for fleet fuel. Savings of more than \$600,000 have already been achieved. The program focuses on City-owned buildings and facilities. It provides engineering studies and audits that analyze facility energy use including heating, cooling, lighting, water heating, motor loads, and any special process function. The studies specify cost-effective energy efficiency measures, including their estimated cost and savings. After the audits, the Energy Office staff helps acquire funding for implementation of measures for cost-effective projects as required.[R#2,6]

The Resource Efficient Washing Machines (REWMs) program provides education and exposure on efficient washers for consumers and appliance dealers. This is part of a larger market transformation effort aimed at greatly improving the efficiency of washing machines nationwide. Current promotional efforts may be augmented with a combined energy/water rebate in the future.[R#2]

The Multifamily Energy Savings program is the subject of this profile and provides comprehensive weatherization assistance

to owners and managers of multifamily dwellings occupied by low to moderate income tenants. This program has been offered by the Energy Office since 1987. More than 11,000 families to date have received weatherization services through the program. In addition to a low-income weatherization component, the program markets the Multifamily Recycling program that provides free recycling containers, and in targeted areas has assisted customers in conserving water by issuing free low flow showerheads and faucet aerators for Portland General Electric. [R#2]

In addition to these discrete program areas, the Energy Office has published several energy efficiency brochures and posters to educate employees on how to reduce energy costs at home and the office; it has organized an international conference on global warming attended by 400 representatives from 60 cities worldwide (see next section on the City's CO<sub>2</sub> Reduction Strategy); it has built a new database to track energy use and cost of all City buildings, vehicles, and equipment; it has established a new Energy and Environment Commission to advise City Council on programs and policies that protect the City's natural resources, use energy efficiently, and promote a sustainable future; it has leveraged four dollars in outside funding for every dollar of General Funding for energy efficiency.[R#11]

### **CITY OF PORTLAND CARBON DIOXIDE REDUCTION STRATEGY**

The City of Portland is a highly progressive community that has taken precedent-setting steps and commitments to reduce its urban CO<sub>2</sub> emissions. It was the first U.S. City to adopt a local strategy to reduce CO<sub>2</sub> emissions and the impacts of global warming by participating in the CO<sub>2</sub> Reduction Strategy Project.

In fact, Portland is one of only 14 city governments internationally taking the lead on developing local global warming solutions. Coordinated by the International Council for Local Environmental Initiatives, the carbon dioxide reduction project focuses on demonstrating to itself and to other local communities how they can have a major impact on slowing the atmospheric build-up of carbon-dioxide, which is the primary gas contributor to the threat of increased global warming. Along with the other international cities, Portland has formally established a goal of reducing its CO<sub>2</sub> emissions by 20 percent below 1988 baseline levels by the year 2010.

Note that Portland's goal dramatically surpasses the United States' overall commitment of stabilizing carbon dioxide at 1990 levels by the year 2000 as called for in the United Nations Framework Convention on Climate Change that followed the Earth Summit in Rio de Janeiro in 1992. However, according to the International Panel on Climate Change and general scientific consensus, only through far more aggressive reductions - which Portland has adopted - will climate change be averted. [R#8]

In 1988, CO<sub>2</sub> emissions in the Portland metropolitan area were calculated to be 10.1 million metric tonnes (MMT). The forecast for 2010 showed CO<sub>2</sub> emissions rising to 13.9 MMT. This increase would be primarily due to a dramatic increase in population: Portland expects an influx of some 500,000 persons by the 2010. Additional emissions are also expected from the increased use of natural gas for electric power production, as well as increased vehicle miles traveled in the transport sector. Reducing emissions to 20 percent below the 1988 level will require a reduction in emissions to 8.1 MMT, or about 42 percent below the 2010 forecast. The total reduction goal for 2010 is about 5.813 MMT. [R#8]

In the comprehensive carbon dioxide reduction strategy adopted by the Portland City Council in 1993, the 5.813 MMT in CO<sub>2</sub> reductions will be the result of actions in six areas, or what the Energy Office calls elements:

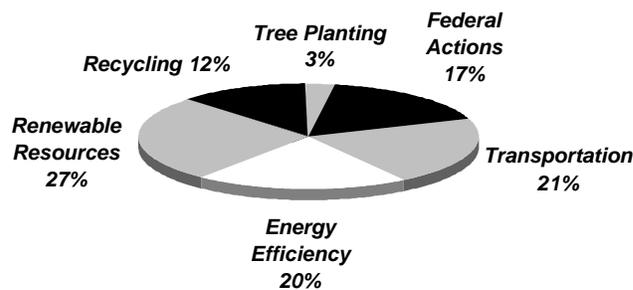
- **Element 1, Transportation:** The plan calls on reducing metropolitan area vehicle miles traveled per capita by 10% below 1995 levels. In addition, public and private sector purchases of 15,000 highly efficient vehicles and 15,000 alternative-fueled vehicles that emit low or no carbon dioxide will have to be made. The City's engineers will also optimize traffic signal timing on heavily traveled City streets. This element will result in a CO<sub>2</sub> reduction goal of 1.243 MMT.

- **Element 2, Energy Efficiency:** Another key strategy of the plan is to capture significant energy savings and to reduce carbon dioxide emissions from electricity, natural gas, and petroleum fuels used by homes, the public sector, businesses, and industry. The CO<sub>2</sub> reduction goal for this element is 1.169 MMT.

- **Element 3, Renewable Resources and Cogeneration:** The City plans to increase the capture of and use of methane from landfills and wastewater treatment plants as an energy source. It will also promote the use of renewable energy resources, district heating, and waste heat. The CO<sub>2</sub> reduction goal for this element is 1.548 MMT.

- **Element 4, Recycling:** Portland plans to increase solid waste recycling rates from the current rate of 26 percent to 60 percent of the total waste stream. It will also minimize its contribution to carbon dioxide emissions by purchasing paper products with a minimum 25 percent post-consumer waste content. Note that Portland has calculated its carbon dioxide contributions using a model that embodies the embedded energy - and thus carbon dioxide emissions - of products imported into and subsequently used in the City. Thus the carbon dioxide reduction planned by the City will not only be a function of actions taken within the City proper, but which also affect processes - such as paper making - for which the City is responsible but which occurs elsewhere. The CO<sub>2</sub> reduction goal for this element is 0.715 MMT.

PERCENT CO<sub>2</sub> REDUCTION BY ELEMENT



- **Element 5, Tree Planting:** With the goal of financially enabling 75,000 acres of new trees, Portland will promote extensive reforestation efforts in Oregon. Not only will these efforts create sinks for carbon dioxide, but they will support Oregon's

## Agency Overview (continued)

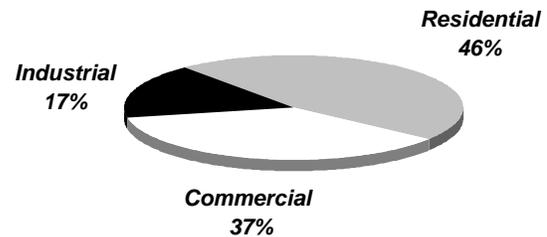
<b>EMISSION REDUCTIONS BY ELEMENT</b>	<b>EMISSION REDUCTIONS (MMT)</b>	<b>PERCENT CONTRIBUTION TO TARGET</b>
<b>Transportation</b>	1.243	21
<b>Energy Efficiency</b>	1.169	20
<b>Renewables</b>	1.548	27
<b>Recycling</b>	0.715	12
<b>Tree Planting</b>	0.156	3
<b>Federal Actions</b>	0.982	17
<b>Total</b>	5.813	100

economy through increased employment. Portland will also promote extensive urban area tree planting and expanded maintenance of existing trees (both of which will create shade – and thus less air conditioning – and mitigate the urban heat island effect), though the carbon sequestration from these efforts will only be a fraction of those anticipated from the reforestation efforts. For this element, the CO<sub>2</sub> reduction goal is 0.156 MMT.

• **Element Six, Federal Actions:** Portland’s actions will also contain policy elements far afield, in fact in the nation’s capitol in Washington, DC. Through aggressive lobbying and exerting its influence to the best of its ability, Portland will seek to raise Federal car and light truck fuel efficiency standards to 45 and 35 miles per gallon respectively by the year 2010. It will promote an increase to the proposed Federal “gas-guzzler” tax penalizing energy inefficient cars, and will urge the government to offer “gas-sipper” rebates for highly efficient cars and light trucks. For Federal actions, the CO<sub>2</sub> reduction goal is 0.982 MMT. [R#8]

As shown on the Percent CO<sub>2</sub> Reduction by Element pie chart, energy efficiency comprises 20% of the total CO<sub>2</sub> reduction goal. Of this 20%, as seen in the Percent CO<sub>2</sub> Reduction by Sector pie chart, the residential sector comprises the largest portion of potential CO<sub>2</sub> reduction at 46%, or 544,000 metric tonnes. Energy Office staff estimate that the savings from the Multifamily Energy Savings program has the potential to result in CO<sub>2</sub> savings of roughly 33% of the residential share, or 161,000 metric tonnes by 2010.

**PERCENT CO<sub>2</sub> REDUCTION BY SECTOR**



Also as part of the CO<sub>2</sub> Reduction Strategy, capacity savings of 76.1 aMW are projected to be reduced from the residential sector alone by 2010. Savings from the Multifamily Energy Savings program is projected to account for 25 aMW of this total. While much of the electricity supplied to Portland is hydroelectric, such a comprehensive strategy deployed in other regions of the country or parts of the world would result in dramatic carbon dioxide emissions reductions through such capacity savings from electrical generation. [R#7,8] ■

<b>EMISSION FORECASTS AND REDUCTION FROM ENERGY EFFICIENCY BY SECTOR</b>	<b>2010 CO<sub>2</sub> EMISSIONS (MT)</b>	<b>2010 CO<sub>2</sub> REDUCTIONS (MT)</b>	<b>PERCENT REDUCTION</b>
<b>Residential</b>	2,176,000	544,000	25
<b>Commercial</b>	2,145,000	429,000	20
<b>Industrial</b>	1,306,000	196,000	15
<b>Total</b>	5,627,000	1,169,000	21

Over 12 million dwelling units, nearly 15% of the U.S. total, are in multifamily buildings consisting of five or more units. These buildings consume 800 trillion Btus of energy annually, over 10% of total energy use for residential buildings nationwide. Furthermore, the average energy intensity based on energy use per unit area of multifamily buildings is estimated to be 40% higher than that of single family homes, and their energy intensity for space heating is in the same range as single-family homes despite lower surface-to-volume ratios that might be expected to lead to lower energy intensities. [R#9]

In Portland, fully 48% of housing is rental. Of these rentals, 42% heat with electricity, 28% with gas, and 22% with oil. Improving the efficiency of multifamily buildings can contribute to national energy efficiency and to housing affordability, an especially important outcome since multifamily buildings are a major source of housing for low-income households. Despite these opportunities, in the years since the energy crises of the 1970s both research activity and utility and government programs have focused much less attention on multifamily buildings than on single family homes. [R#5,9]

Multifamily buildings present many institutional challenges in terms of owners' very short investment horizons and strong aversion to financial risk. In Portland, demand for rental property is greater than supply and will continue to be the case in the future as population increases. While this would seem to result in an increased aversion by building owners to retrofit buildings for energy as well as aesthetic purposes, in actuality the opposite is occurring. The Multifamily Energy Savings program is actually facilitating what Energy Office Director, Susan Anderson, calls "curb appeal." Owners like to install new windows not just for the energy savings benefits, but also to show off their buildings. From the street, prospective tenants see quality, making owners more competitive even in an owner's rental market. Furthermore, if owners intend to sell their properties, windows add greatly to perceived value. [R#7]

The City of Portland has a unique history with weatherization of rental housing. In 1979, following a great deal of research and citizen input, Portland was the first major U.S. city to adopt an Energy Conservation Policy. A portion of the Policy called for mandating the weatherization of all residential properties including rentals at the time of sale. The provision was passed by City Council, but shortly thereafter an initiative petition was placed on the ballot to prohibit any mandatory weatherization. This subsequent initiative also passed and Portland was quickly back where it started in terms of weatherizing rental property.

Since the early 1980s utilities in the Portland area have provided rebates for multifamily building owners covering 25% of weatherization costs as well as low-interest loans. A State Business Energy Tax Credit (which allows apartment owners to take a 35% tax credit over five years for the cost of weatherization measures) became available at the same time, further mitigating the cost for rental property owners to invest in energy efficiency. [R#1,4]

Despite these direct financial incentives, research conducted by the Energy Office in 1986 indicated that approximately 60% of multifamily building owners surveyed were unfamiliar with the incentives available for weatherization. More optimistically, approximately 50% of the owners surveyed had performed some type of weatherization work, but only 10% had taken advantage of any incentives for which they were eligible. Prior to the Multifamily Energy Savings program created by the Energy Office, only about 2% of the estimated 72,400 rental units in the City of Portland at the time (54,400 of which were multifamily units) had been fully weatherized. Thus the need was clear for some sort of a more aggressive program to spur energy efficiency in Portland's multifamily building sector. [R#1,6]

## THE MULTIFAMILY ENERGY SAVINGS PROGRAM

In 1987, the Portland Energy Office decided to adopt an active marketing approach to further exploit both existing state incentives and utility audit capabilities to encourage weatherization of multifamily properties. Based on its earlier market research, the office developed a strategy for the ensuing weatherization program.

The goal of the program was first to determine what it takes to motivate owners of multifamily buildings to weatherize their units. Early research suggested that property owners fundamentally wanted two things: good financial incentives and personalized assistance. Owners wanted substantial rebates, what the Energy Office considered to be 30-50% of the project cost. They also wanted help in understanding the energy-saving potential of their buildings and in getting through the maze of paperwork to apply for tax credits, rebates, and loans. Clearly, the Energy Office, which could neither pay nor finance the retrofits itself, could facilitate landlords' processes.

With this background, the Multifamily Weatherization program, now called the the Multifamily Energy Savings program, began in 1987 strictly as a weatherization program, helping owners with insulation, windows, air sealing, and heating system improvements. ➡

## Implementation (continued)

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Then in 1989 the program's emphases were broadened in an interesting way to fulfill broader City objectives. The Energy Office joined with the City of Portland's solid waste division to market their recycling container program to owners/managers. The Multifamily Recycling program provides free recycling containers, training for owners and managers, site assessments, and educational flyers for tenants. Presently almost 75% of multifamily sites in Portland have on-site recycling systems. Despite the fact that the Multifamily Energy Savings program has a recycling component, this profile will focus on the weatherization aspects of the program only.[R#1,6]

In April 1990, a new Energy Policy was approved by the City reflecting economic, environmental, and energy resource conditions. The new policy called for a 10% improvement in energy efficiency for all sectors, and specified a goal of weatherizing 20,000 apartment units by the year 2000. With three-fourths of Portland's rental housing being multifamily and much of this sector not yet weatherized, the potential for savings was great and a greater focus on this sector was encouraged by City Council.[R#5]

The Multifamily Energy Savings program has now evolved into a comprehensive weatherization assistance program for owners and managers of multifamily buildings in Clackamas, Multnomah, and Washington counties in the Portland metropolitan area, reaching outside the City limits and into all of PGE's service territory. Facilitated by the Energy Office staff, the program services are described as embracing a "handholding approach," providing a one-stop shop for apartment owners. Energy Office staff members work with property owners and/or managers on a one-on-one basis. The Energy Office does not directly provide audits or financing, but instead uses existing state and utility programs, which are available for all fuel types, to facilitate the weatherization of multifamily buildings.

From 1987 through 1991 the program was funded by a grant from the Oregon Department of Energy (ODOE) using oil overcharge funds. As this funding ended, the Energy Office entered into individual contracts with each of the local utilities. The primary contract is with Portland General Electric (PGE), while much smaller contracts exist with Pacific Power and the Oregon Department of Energy (ODOE), the latter for oil-heated apartments only.[R#1]

### MARKETING

To market the program the Energy Office has used a number of strategies including direct mail, direct sales, telemarketing, and print advertising. Additionally, articles have been placed in

relevant journals, presentations have been given to various housing and property management organizations, and staff have participated in trade shows and apartment owner trade associations.[R#4]

In 1992, the Energy Office began a "whole house" marketing approach in collaboration with Portland General Electric. It consists of marketing and assisting Portland General Electric customers with all Portland General Electric multifamily property offerings including rebates for weatherization, efficient common area lighting, efficient water heaters, and free showerheads. Portland General Electric also runs a direct mail campaign for their entire list of rental property owners. [R#1]

### DELIVERY

With a basic knowledge of what Portland property owners want, the Energy Office's program stresses individual assistance and provides several direct services including information on the benefits of energy-efficient rental property; assistance in arranging for free energy audits; consultation and technical assistance on energy audit recommendations; assistance in soliciting contractor bids; financial counseling and analysis including information on utility and state tax credits and incentive programs; counseling and assistance in the use of other state and local government housing and energy savings assistance; referrals for buildings with a majority of low-income renters; and information on incentives for efficient showerheads, lighting, and appliances.[R#2]

For interested multifamily owners, the Energy Office staff arranges a free audit, confirms the audit, then gets the audit from the utility and presents it to the owner. The Energy Office staff basically ensures that the process runs smoothly for the property owner, handling implementation details as they come up. From the initial owner contact to the beginning of the weatherization work typically takes from three to six months.[R#4]

### OWNER INCENTIVE OPTIONS:

**Cash Rebates:** Participating customers with gas or electrically heated homes are eligible for rebates from their local utility. PGE customers can receive rebates of 25% of cost-effective project costs up to \$1,250 per living unit for weatherization measures. Pacific Power also offers rebates of 25% of cost-effective project costs up to \$1,250 per unit. Northwest Natural Gas offers 25% of cost-effective project costs for gas-heated properties, up to \$350 per unit. Rental properties with oil heat can receive a 25% cash rebate from the Oregon Department

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of Energy up to \$400 per unit. Cost-effectiveness criteria are determined by each individual utility.[R#1]

**The Business Energy Tax Credit (BETC):** Participating owners can also receive tax credits from the State of Oregon including a 35% Business Energy Tax Credit (BETC) for weatherization costs taken over five years, or a cash rebate instead of the five-year tax credit equal to the net present value of the BETC. A customer selecting the 28.87% tax credit pass-through receives the rebate from their local utility which in turn claims the 35% tax credit with the State over a five-year period.[R#1]

**Loans:** The ODOE's Small Scale Energy Loan program (SELP) provides ten-year fixed rate loans for all fuel types. For oil-heated properties the ODOE State Home Oil Weatherization program provides ten-year loans at 6.5% with a maximum loan amount of \$5,000 per unit. Local utilities provide loans for gas and electric properties ranging from 6.5% - 10.5% for up to ten years.[R#1]

**For buildings with low-income renters:** For buildings occupied by low-income renters, the Energy Office joined together with the electric utilities and the Multnomah County Community Action Agency in 1991 to provide the Low-Income Weatherization program, essentially a sub-program of the Multifamily Energy Savings program. Through this program Pacific Power and PGE offer a larger rebate to property owners where the majority of tenants at a given property are at or below 125% of the Federal poverty level. PGE's rebate offer is equivalent to 50% of the cost-effective project cost up to \$1,000 per unit. Pacific Power's rebate is for 100% of the project cost up to \$1,000 per unit. To receive such rebates, the owner is required to fully insulate the building, though window replacements are optional.[R#1]

This type of low-income rebate had historically been available to owners only if they worked through a Community Action Weatherization Agency which also had Federal funds to assist with the weatherization of very low-income properties. However, certain constraints within the Community Action Agency resulted in very few large multifamily low-income properties receiving weatherization. As such the Energy Office has been able to assist some of these properties by offering the low-income rebates through their program.[R#5,11]

## MEASURES INSTALLED

The frequency of installed measures for weatherization projects is as follows: window replacement or installation of storm windows, 75%; attic/ceiling insulation, 51%; underfloor

insulation, 45%; and wall insulation, 12%. The standard levels of insulation installed are R-38 for attics, R-21 for floors, R-13 for walls, and windows installed typically are 0.40 U value rating or storm windows.[R#1]

Other measures installed often include bath and kitchen fans; ground covers, pipe wraps, and foundation vents; heat anticipating thermostats or timed thermostats; water heater wraps; weatherstripping, caulking, and seal penetrations; window treatments; thermal doors; ducts; and high efficiency showerheads.[R#12]

## STAFFING REQUIREMENTS

Energy Office staff function very much like a project or construction manager for each individual consultation project. From requesting a utility energy audit at the start to a request for an inspection at the end, Energy Office staff are available to assist and facilitate work to completion.

Currently the Multifamily Energy Savings program is staffed by 2.6 full-time equivalent professionals (FTEs). Laura O'Keefe serves as the Program Manager, devoting all of her time to the program. She is responsible for maintaining program funding, managing funding contracts, supervising program staff, marketing, and assisting owners and managers with projects. Matthew Enlon, the Program Coordinator, also spends 100% of his time on the program, assisting apartment owners and managers, enrolling new participants, coordinating audit requests with utilities, coordinating recycling workshops, and managing the program database.[R#1]

Susan Anderson is the Director of the Energy Office and devotes 10% of her time to the Multifamily program, overseeing staff management, program policy, and funding. In addition, Program Assistants Bruk Adera and Sue Ferland are responsible for data entry, energy audit summary calculations, and owner/manager correspondence. They each devote 0.25 FTE to the program.[R#1]

The Energy Office has a total staff of eight people. These include the Director, five program staff, an accountant, and a secretary. As a small office whose staff work together closely, all staff have a hand in the program, suggesting enhancements and marketing the program as a part of the entire Energy Office's mission.[R#1] ■

# Monitoring and Evaluation

## MONITORING

Program participation figures are tracked by a Filemaker Pro database using a program designed in 1990 by the City of Portland Energy Office specifically for the Multifamily effort. No on-site monitoring of savings is currently performed. The Energy Office bases program savings on two estimates: First, Portland General Electric received Oregon Public Utilities Commission approval in 1991 to assign annual savings of 1,284 kWh per unit weatherized for electrically heated units. Then in 1992, an evaluation conducted by the Portland Energy Office revealed average annual electric saving per weatherized unit at 19% of pre-retrofit consumption, equal to 1,200 kWh. The Results Center has calculated annual program energy savings based on the number of units weatherized in a given year multiplied by 1,284 kWh average savings per unit agreed upon by the Oregon PUC and Portland General Electric. This calculation may overstate savings somewhat for early years because the annual participation figures include all fuel types. In recent years, however, nearly all participants have been electric units, while in the early years of the program up to 25% of participants used gas or oil. The evaluation, however, accounted for oil savings as a percentage of total savings by estimating a simple ratio of gallons used per degree day. Gas savings were estimated from a linear regression model.[R#1]

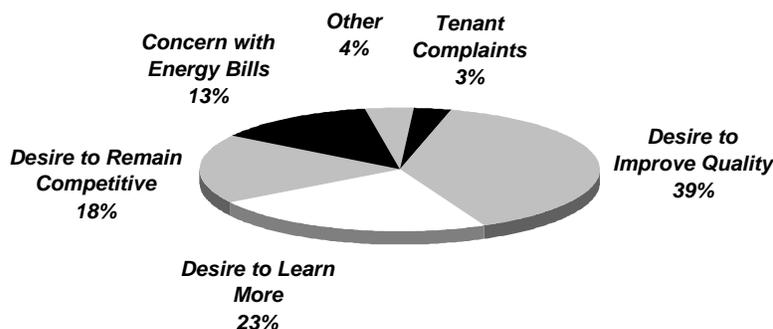
## EVALUATION

In August 1992, the City of Portland Energy Office commissioned a savings evaluation of the Multifamily Weatherization program, the previous name for the Multifamily Energy Savings program. The study sample included 16 buildings ranging from 3-41 units, comprising a total of 232 units. Six of the buildings were heated with gas, six with electricity, and four with oil. The buildings were weatherized between 1988 and 1990, and pre-and post-weatherization data was collected for each building. The electric and some of the gas-heated units were individually metered. Oil-heated units and the remaining gas units were heated by central boilers. Data was obtained for each electric meter, gas meter, or oil tank. This study looked only at space heating energy savings.

**Key evaluation findings:** Average space heating energy savings were found to be 26% annually. By fuel type, gas buildings had average savings of 24%, oil buildings averaged 35% savings, and electric buildings averaged 19% savings. The Energy Office estimates that 0.25 kW of capacity are saved for each apartment unit participating in the program.[R#3]

**The housing stock:** The Energy Office commissioned research on rental properties, tenants, and owners in Portland

### MOTIVATING FACTORS FOR WEATHERIZING MULTIFAMILY BUILDINGS



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prior to implementing the program. This research determined that 48% of Portland's housing is rental; 42% of rentals heat with electricity, 28% with gas, and 22% with oil; 22% of rental households were below the 100% of poverty level guidelines; and 6% of owners own 48% of rental units which are duplexes or larger; individual owners control 52% of rental units, corporations 27%, and partnerships 21%.[R#4]

**Motivating factors for weatherizing multifamily buildings:** The City of Portland Energy Office also performed a pre-program implementation survey in 1986 to identify key motivating factors for making energy efficiency improvements as well as a similar survey following one year of program implementation. Specifically, a total of 486 property owners were surveyed prior to implementation to identify barriers to energy-efficiency investments, identify perceived advantages of energy-efficient investments, and determine if investment attitudes and behaviors varied as a result of key factors. The follow-up survey after one year of program implementation examined the motivating factors that actually prompted property owners to make energy efficiency investments.[R#4]

Key findings: The survey of 486 property owners had the following findings [R#4]:

- Approximately half of the owners had performed some weatherization work, although only 10% had used a government or utility incentive program.
- Owners of rental properties exceeding 50 units were much more likely to have used existing weatherization incentives. Owners who participated in incentive programs spent 75% more per unit than those who financed their own projects.
- Approximately 40% to 60% of rental owners were unfamiliar with state and utility incentive programs.
- Approximately 1/3 of owners said that financial incentives would induce them to perform more weatherization, while another 1/3 said that nothing would make them perform more weatherization.

- Owners interested in weatherization identified the services most wanted which included finding and evaluating financial incentives, analyzing the cost-effectiveness of weatherization measures, and obtaining an energy audit. Attributes desired in providers of these services included: credibility, familiarity with the rental owner's perspective, efficiency, knowledge, and objectivity, access to financial incentives, and responsiveness.

The findings of this research were used along with lessons learned from other cities including Chicago, Minneapolis, St. Paul, and Boston in order to design the Multifamily Weatherization program.[R#4]

**Follow-up surveys:** Following the first year of the program, a total of 113 questionnaires were mailed to all property owners/managers who had proceeded to at least the audit stage of weatherization work. A total of 47 were returned. More than 90% of respondents felt the Portland Energy Office had successfully reached owners with information regarding weatherization. Property owners heard about the Energy Office's program through direct mail (23%), utility representatives (24%), or business contacts (16%), as well as trade shows (10%) and advertising (10%). Financial incentives were the primary motivator for participation, with 73% of respondents rating them "very important" and 11% rating them "important" to their weatherization decision. In terms of rating the services provided by the Energy Office, almost all property owners rated them as either "very helpful" or "somewhat helpful." The most favored services included: explaining the incentives and services (95% rated these attributes "very helpful"); scheduling audits (87% rated this "very helpful"); and helping with applications (88% rated this "very helpful").[R#4]

The follow-up surveys found that most property owners were motivated to call the Energy Office either because of their desire to improve or maintain a quality property (39%), their desire to remain competitive within the marketplace (18%), or to find out more about the program (23%). These motivations significantly outweighed the more direct concerns with high energy bills (13%) and even complaints from tenants (3%). Aside from curiosity, clearly general property enhancements and the marketplace were the strongest motivations. ■

# Program Savings

**DATA ALERT:** Program savings are based on engineering estimates discussed in the previous section. Participation is tracked on a calendar year basis versus the fiscal year basis used for tracking program costs. [R#1]

In 1993, savings for the Multifamily Energy Savings program were 1,412 MWh of electricity consumption and 275 kW of capacity. Annual energy savings for the program as well as capacity savings reached their highest level in 1988 with 3,467 MWh and 0.675 MW, respectively. From 1987 through 1993, the program has achieved total annual energy savings of 12,519 MWh and cumulative capacity savings of 2.4 MW. Based on a 25-year measure lifetime, the program will result in lifecycle energy savings of 312,975 MWh. [R#1]

## PARTICIPATION RATES

Participants are defined as the number of weatherized apartment units. A total of 1,300 apartment units were weatherized through the program in 1994, with a total of 11,050 apartments weatherized between 1987 and 1994. (In the spring of 1994, the Energy Office reached a milestone for the program as the 10,000th multifamily unit was weatherized!) The number of units weatherized has fluctuated throughout the course of the

<b>PARTICIPATION</b>	<b>NUMBER OF PARTICIPANTS</b>	<b>SAVINGS PER PARTICIPANT (kWh)</b>
<b>1987</b>	250	1,284
<b>1988</b>	2,700	1,284
<b>1989</b>	1,300	1,284
<b>1990</b>	1,300	1,284
<b>1991</b>	2,000	1,284
<b>1992</b>	1,100	1,284
<b>1993</b>	1,100	1,284
<b>1994</b>	1,300	1,284
<b>Total</b>	11,050	

program. In 1987, the first year of the program, 250 units were weatherized. In 1988, the total jumped to 2,700, the most ever for the program. Since then the number of units weatherized in a year has ranged from 1,100 to 2,000. [R#1,2]

Presently there are approximately 170,000 multifamily units in the Portland Tri-County area of which 120,000 were built prior to 1980. After 1979, the area's building codes were significantly upgraded resulting in much better insulated units. Thus the units built before 1980 continue to be the focus of the Multifamily program. Based on 11,050 weatherized units and 120,000 target eligible participants, the program currently has had a participation rate of 9.1%. [R#1]

## FREE RIDERSHIP

Free ridership for the program has not been formally evaluated by the Energy Office although it is believed to be quite low due to low levels of comprehensive weatherization activity prior to program implementation as documented by various market research and evaluations conducted and discussed earlier. For building owners that had performed some weatherization measures in the absence of the program, surveys have shown that their savings were significantly lower than those apartment savings from projects in the program. Thus, those owners that might be considered free riders were enticed by the program to dramatically increase their savings by implementing additional efficiency measures, negating any potential problems with free ridership. [R#1]

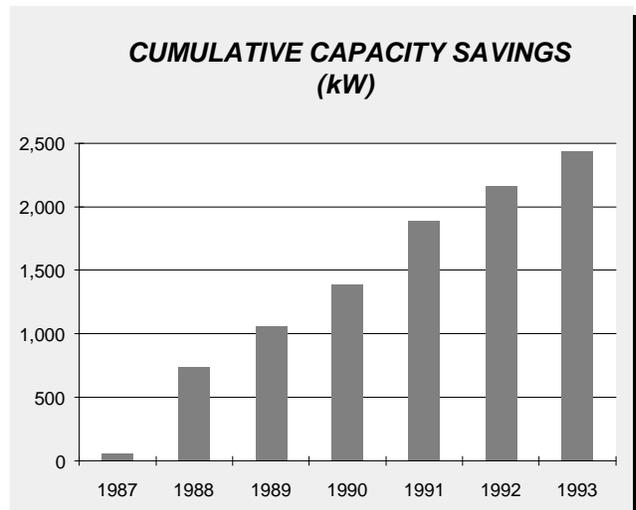
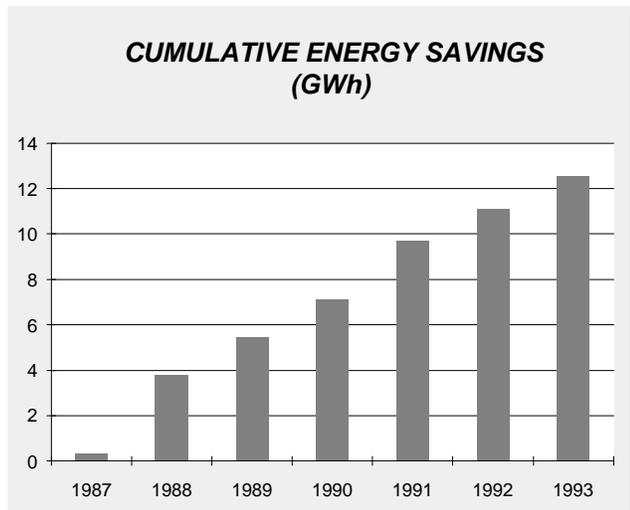
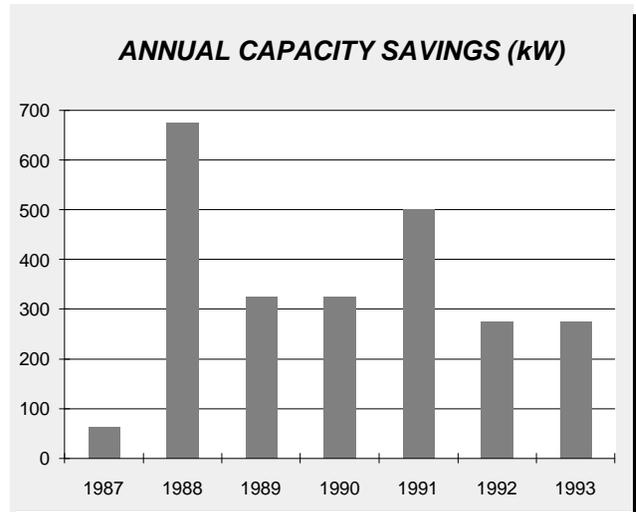
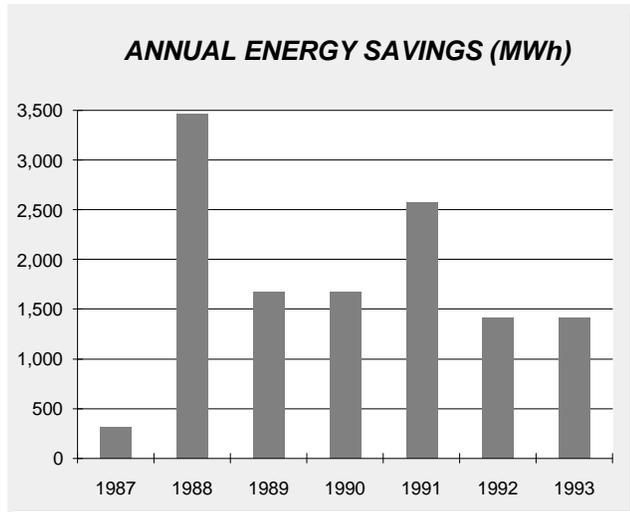
## MEASURE LIFETIME

The utilities involved with the Multifamily program typically assign an average measure lifetime of 30 years to insulation measures, 25 years for window replacements, and 15 years for storm windows. The Results Center has used an average measure life of 25 years to calculate lifecycle energy savings. [R#1]

## PROJECTED SAVINGS

The program's goal is to weatherize 20,000 units by the year 2000. If this is accomplished, using a savings per weatherized unit of 1,284 kWh, this would result in an annual savings of 25.68 GWh in the year 2000. This precipitates a lifecycle savings, using a 25-year average measure life, of 642 GWh. ■

<b>SAVINGS OVERVIEW</b>	<b>ANNUAL SAVINGS (MWh)</b>	<b>CUMULATIVE SAVINGS (MWh)</b>	<b>LIFECYCLE SAVINGS (MWh)</b>	<b>CAPACITY SAVINGS (MW)</b>	<b>CUMULATIVE CAPACITY SAVINGS (MW)</b>
<b>1987</b>	321	321	9,630	0.063	0.063
<b>1988</b>	3,467	3,788	104,004	0.675	0.738
<b>1989</b>	1,669	5,457	50,076	0.325	1.063
<b>1990</b>	1,669	7,126	50,076	0.325	1.388
<b>1991</b>	2,568	9,694	77,040	0.500	1.888
<b>1992</b>	1,412	11,107	42,372	0.275	2.163
<b>1993</b>	1,412	12,519	42,372	0.275	2.438
<b>Total</b>	12,519	50,012	375,570	2.438	



# Cost of the Program

<i>PEO PROGRAM COSTS</i>	<i>TOTAL COSTS</i>	<i>PEO COST PER COMPLETED UNIT</i>
<b>1986</b>	\$107,326.6	\$85.86
<b>1987</b>	\$166,826.6	\$61.79
<b>1988</b>	\$138,102.3	\$106.23
<b>1989</b>	\$134,916.1	\$103.78
<b>1990</b>	\$155,000.0	\$77.50
<b>1991</b>	\$124,529.5	\$113.21
<b>1992</b>	\$125,426.2	\$114.02
<b>1993</b>	\$130,684.1	\$100.53
<b>Total</b>	\$975,484.8	\$78.57

**DATA ALERT:** Program costs are based in fiscal years which run from July 1 through June 30. Dollar figures have been leveled based on the year in which the fiscal year begins, i.e. fiscal year 1991-92 dollars are leveled using the 1991 conversion factor. This is done in order to better compare costs, which are tracked on a fiscal year basis, and savings and participation, which are tracked on a calendar-year basis. For example, savings and participation figures for 1987 are compared to 1987-88 costs to calculate savings per participant and cost per participant.

Total costs to the Energy Office for the Multifamily Energy Savings program from 1986 to 1993 have totaled \$975,485. In 1993, the Energy Office spent \$130,684 on the program. In 1986, the first year of the program, \$107,327 was spent to facilitate the weatherization of only 250 units. This relatively high cost and low participation was a function of high start-up costs for market research and development coupled with the fact that the program didn't begin until November of 1986, result-

ing in only two months of participation. The greatest annual expenditure, \$166,826, occurred in 1987 when an ODOE contract enabled the Energy Office to retrofit 2,700 units.

## COST EFFECTIVENESS

The Energy Office has not performed any formal cost-effectiveness calculations for the program. The Results Center calculations of the annual utility cost of saved energy at various discount rates for various years are shown in the accompanying table. In 1993, when considering all costs involved in the program, including rebates, the Multifamily Energy Savings program had a cost of saved energy of 2.77 ¢/kWh at a 5% discount rate.

From the Energy Office's perspective, the cost of saved energy to facilitate the program is 0.66 ¢/kWh at a 5% discount rate. This cost of saved energy is significantly lower than the utility cost. It includes administration, marketing, staffing and all other costs to run the program while using the third party financiers (utilities and ODOE).

<i>COST OF SAVED ENERGY AT VARIOUS DISCOUNT RATES (¢/kWh)</i>	<b>3%</b>	<b>4%</b>	<b>5%</b>	<b>6%</b>	<b>7%</b>	<b>8%</b>	<b>9%</b>
<b>FY 1993 Utility</b>	2.24	2.50	2.77	3.05	3.35	3.65	3.97
<b>FY 1993 Energy Office</b>	0.53	0.59	0.66	0.72	0.79	0.87	0.94

TOTAL PROGRAM COSTS	LABOR (x1,000)	PEO MARKETING (x1,000)	PGE MARKETING (x1,000)	UTILITY REBATE (x1,000)	TOTAL PROGRAM COST (x1,000)	COST PER COMPLETED UNIT
1993	\$108.2	\$130.7	\$22.5	\$289.3	\$550.7	\$500.6

## COST PER PARTICIPANT

Apartment owners spent an average of \$1,100 (unlevelized) per unit in 1993-94 and received rebates and tax credits worth \$560 (unlevelized) per unit on average, resulting in a net customer cost of \$540 per unit. With all costs incurred, including utility rebates, administration, marketing, and labor, the total cost per completed unit for 1993 to deliver the program was \$501.

The Energy Office spent \$100.53 per completed unit in 1993-94, averaging \$800 per completed building. Since 1986, the program has been delivered to the multifamily sector of the Portland area at an average cost to PEO of \$78.57 per completed unit.[R#1]

## COST COMPONENTS

There are a variety of parties who share the costs of the program. In 1993-94, total costs to the utilities and parties involved was \$550,700. That same year, the City of Portland Energy Office's expenditure of \$130,684 went towards administering and marketing the program including direct sales to owners, direct mail, trade shows, articles, trade association participation, printing, and mailings. PGE labor costs including energy audits, inspections, and rebate administration totaled \$108,200. In addition, PGE spent \$22,500 on direct mail marketing for the program. Utility rebates for all participating utilities totaled \$289,300.[R#1] ■

## CASE STUDIES

The following are three examples of actual buildings that have been weatherized through the Multifamily Energy Savings Program. Each example derives its heat from a different energy source: gas, oil, and electricity:

- The Belmont House is a 12-unit single occupancy building with central gas heating. The building was weatherized with ceiling insulation, storm windows, caulking, and weather stripping. The project cost \$3,615 less a 25% cash rebate of \$903 from Northwest Natural Gas and a 29% Business Energy Tax Credit (BETC) of \$1,056. This resulted in a net cost to the building owner of \$1,656. With an estimated annual fuel savings of \$572, the owner received a simple 2.9-year payback.
- The Roger Apartment building consists of 14 units and is centrally oil heated. The contractor installed weatherization measures including ceiling and duct insulation, a flame retention burner, and storm windows. The project cost \$5,645 less a 50% rebate from the Oregon Department of Energy and a \$987 Business Energy Tax Credit taken over five years. A five-year loan at 6.5% interest rate was acquired. With \$55 per month payment for the loan coupled with \$65 per month in fuel savings, the project's payback was essentially immediate as positive cash flow resulted at once for the building's owner.
- The Providence Park Apartments consist of 26 units which are electrically heated. Contractors installed attic and floor insulation, caulking, and storm windows. The project cost \$23,883 less a 25% cash rebate from PGE of \$5,970 and a 29% BETC from PGE of \$6,981, resulting in a net cost of \$10,932 to the apartment owner. With a 15-year loan at 11% interest, the owner's monthly payments are \$125. Monthly energy savings on tenants' combined energy bills are \$236, indirectly providing the owner and directly providing the tenants with an immediate positive cash flow.[R#2,12]

# Environmental Benefit Statement

<b>AVOIDED EMISSIONS: Based on 50,012,000 kWh saved 1987 - 1993</b>						
<i>Marginal Power Plant</i>	<i>Heat Rate BTU/kWh</i>	<i>% Sulfur in Fuel</i>	<i>CO2 (lbs)</i>	<i>SO2 (lbs)</i>	<i>NOx (lbs)</i>	<i>TSP* (lbs)</i>
<b>Coal</b>						
<b>Uncontrolled Emissions</b>						
A	9,400	2.50%	107,826,000	2,558,000	517,000	52,000
B	10,000	1.20%	114,978,000	990,000	334,000	248,000
<b>Controlled Emissions</b>						
A	9,400	2.50%	107,826,000	256,000	517,000	4,000
B	10,000	1.20%	114,978,000	99,000	334,000	17,000
C	10,000		114,978,000	660,000	330,000	17,000
<b>Atmospheric Fluidized Bed Combustion</b>						
A	10,000	1.10%	114,978,000	303,000	165,000	83,000
B	9,400	2.50%	107,826,000	256,000	207,000	16,000
<b>Integrated Gasification Combined Cycle</b>						
A	10,000	0.45%	114,978,000	204,000	33,000	83,000
B	9,010		103,425,000	74,000	25,000	5,000
<b>Gas</b>						
<b>Steam</b>						
A	10,400		62,715,000	0	143,000	0
B	9,224		54,463,000	0	341,000	16,000
<b>Combined Cycle</b>						
1. Existing	9,000		54,463,000	0	209,000	0
2. NSPS*	9,000		54,463,000	0	99,000	0
3. BACT*	9,000		54,463,000	0	14,000	0
<b>Oil</b>						
<b>Steam--#6 Oil</b>						
A	9,840	2.00%	90,772,000	1,375,000	162,000	154,000
B	10,400	2.20%	96,273,000	1,364,000	204,000	99,000
C	10,400	1.00%	96,273,000	195,000	164,000	52,000
D	10,400	0.50%	96,273,000	572,000	204,000	31,000
<b>Combustion Turbine</b>						
#2 Diesel	13,600	0.30%	120,479,000	240,000	372,000	20,000
<b>Refuse Derived Fuel</b>						
Conventional	15,000	0.20%	143,034,000	369,000	485,000	108,000

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In addition to the traditional costs and benefits there are several hidden environmental costs of electricity use that are incurred when one considers the whole system of electrical generation from the mine-mouth to the wall outlet. These costs, which to date have been considered externalities, are real and have profound long term effects and are borne by society as a whole. Some environmental costs are beginning to be factored into utility resource planning. Because energy efficiency programs present the opportunity for utilities to avoid environmental damages, environmental considerations can be considered a benefit in addition to the direct dollar savings to customers from reduced electricity use.

The environmental benefits of energy efficiency programs can include avoided pollution of the air, the land, and the water. Because of immediate concerns about urban air quality, acid deposition, and global warming, the first step in calculating the environmental benefit of a particular DSM program focuses on avoided air pollution. Within this domain we have limited our presentation to the emission of carbon dioxide, sulfur dioxide, nitrous oxides, and particulates. (Dollar values for environmental benefits are not presented given the variety of values currently being used in various states.)

## HOW TO USE THE TABLE

1. The purpose of the accompanying page is to allow any user of this profile to apply the Portland Energy Office's level of avoided emissions saved through its Multifamily Energy Savings Program to a particular situation. Simply move down the left-hand column to your marginal power plant type, and then read across the page to determine the values for avoided emissions that you will accrue should you implement this DSM program. Note that several generic power plants (labelled A, B, C,...) are presented which reflect differences in heat rate and fuel sulfur content.

2. All of the values for avoided emissions presented in both tables include a 10% credit for DSM savings to reflect the avoided transmission and distribution losses associated with supply-side resources.

### \* Acronyms used in the table

TSP = Total Suspended Particulates

NSPS = New Source Performance Standards

BACT = Best Available Control Technology

3. Various forms of power generation create specific pollutants. Coal-fired generation, for example, creates bottom ash (a solid waste issue) and methane, while garbage-burning plants release toxic airborne emissions including dioxin and furans and solid wastes which contain an array of heavy metals. We recommend that when calculating the environmental benefit for a particular program that credit is taken for the air pollutants listed below, plus air pollutants unique to a form of marginal generation, plus key land and water pollutants for a particular form of marginal power generation.

4. All the values presented represent approximations and were drawn largely from "The Environmental Costs of Electricity" (Ottinger et al, Oceana Publications, 1990). The coefficients used in the formulas that determine the values in the tables presented are drawn from a variety of government and independent sources. ■

# Lessons Learned / Transferability

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## LESSONS LEARNED

A number of lessons have been learned throughout the past several years of implementation of the Multifamily Energy Savings program. Most hinge on what makes the program work, how to increase participation, and how to meet multifamily building owners' needs.

**Use window replacements as a 'carrot' to bring owners into the program:** The City of Portland Energy Office has found that window replacements are the favorite improvement of apartment owners/managers because they are a highly visible improvement that can be appreciated by tenants and also improve the appearance of the property. Window replacements are often the carrot to bring owners into the program, after which the Energy Office then recommends other insulation measures. The Energy Office believes that if window replacements were not part of the program that participation would drop significantly because tenants pay the energy bills in the majority of buildings.[R#1]

**Financial incentives in the range of 50% of the project cost are adequate to garner desired levels of participation, even in this difficult-to-reach customer segment:** The Energy Office also believes that having financial incentives available which when combined cover up to 50% of project costs is very important to achieve widespread weatherization of rental property. An early program evaluation found that 84% of respondents said that financial incentives were very important to their decision to weatherize. Offering a flexible package which includes loans was also found to be very important.[R#1]

**The program's one-stop-shop design for apartment owners facilitates participation:** Owners with any size building and with any fuel type can receive help to upgrade their properties through the Portland Energy Office. By making one phone call they can receive information about programs offered by the electric and gas utilities, the state oil program, tax credits, and loans. In addition they get help with the City recycling program, targeted water conservation, lighting, and other appliances.[R#5]

**Personalized assistance has also proven to be a key to participation:** Energy Office staff have found that property

managers and owners are businesspeople "with little time to waste." The Energy Office spends time on the telephone, pressing owners to decide to commit to a conservation project and then to make sure that all players (utility, contractors, on-site managers, and owner) are drawn into the project at the appropriate time. Approximately half of all owners who receive an energy audit through the Energy Office end up weatherizing their property. However, throughout the process, staff have to maintain a sensitivity to the perceived and real transaction costs (of both "time and treasury") that must be incurred by multifamily building owners. Sam Sadler of the Oregon Department of Energy agrees that the program's flexibility, meaning "doing whatever it takes to get the job done" is one of its salient assets. Suzanne Dillard, also of the ODOE, says that "the one-on-one process helps overcome barriers to energy efficiency improvements." [R#1,13,14]

**Building credibility through objectivity has also been a key to program success:** The Energy Office has realized success in part because of its non-utility status, thus offering third party objectivity. An rental property owner recognizes that the interest of the Energy Office is different from the utility whose business is to sell energy and different from a contractor who sells products. The Energy Office's motive is to save owners money, and this orientation has been well-received by building owners and managers. In addition, the Energy Office has been successful at building relationships with other City programs, such as recycling and water conservation in order to add value to the weatherization offer.[R#5]

**Looking for win-win opportunities where energy conservation solves owners' other problems has been another key attribute of success:** Approaching projects from the owner's point of view has also been important. Multifamily properties are generally owned by investors whose primary objective is to make money. Thus any capital expenditures need to be made in light of this objective, and energy projects are no different. The motivation for making an improvement often is not directly linked to saving energy. Many times it is the need to correct a maintenance problem (worn out windows is a prime example) or a desire to reduce tenant complaints related to discomfort (drafts, uninsulated floors, high bills), or the need to upgrade the property to increase value. Energy improvements can produce winning solutions to these needs and save energy simultaneously.[R#5]

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**Historically apartment owners have shown little interest in spending money to weatherize their properties.**

**This is usually a function of what is called the “split incentive”:** Typically utility bills are paid by the tenants while the landlord would have to pay for any capital improvements. The Portland Energy Office has found that owners will invest in weatherization, however, when motivated by other factors as discussed above. Owners are motivated to improve or maintain a quality property and thus remain competitive in the marketplace. Therefore, staff believe that similar programs may be best marketed by placing the primary emphasis on the business and rental benefits as opposed to energy savings. [R#1]

**A ongoing presence with the owner throughout the weatherization process is key to assuring customer satisfaction and thus word of mouth program marketing between building owners:**

Consistent, regular presence, and available staff is important. Decisions to weatherize often take months or even years to come to fruition. Program staff must be available and visible so that when a property owner is ready to upgrade or repair a property, energy needs are considered too. Furthermore, the greater the satisfaction of the building owner, the greater the likelihood that he or she will recommend program participation to other building owners. This “organic” marketing is key to the program and its ongoing success.

**Active participation in the apartment owner trade associations is a good investment of time:**

The Energy Office is a member in the three apartment owner trade associations in Portland. PEO staff believe it’s important to be active on program committees, regularly attend monthly dinner meetings, and participate in the annual trade shows and conferences so that they are a friendly familiar face there, not only to promote energy efficiency but also to help the association. By being active they are then often called upon to make presentations at meetings and conferences and to submit articles or event notices in their newsletters. It’s a benefit to them because they are offering help that will improve their property and save them money and also because it provides them a positive link to City government. The Energy Office also has helped to facilitate communication and special projects between the owner trade associations and other City bureaus.

## TRANSFERABILITY

The Energy Office believes there are several factors that should be kept in mind when designing similar programs. First, it is important to build institutional partnerships and establish credibility in order to have a successful marketing effort. Also, property owners have an investment perspective which requires tailoring services to meet their various needs related to cash flow, financial goals, technical opportunities, and ownership duration. Marketing approaches and technical services need to be diverse to reach similarly diverse owners’ needs. Finally, staff believe that there is no substitute for persistence in order to achieve program success. [R#4]

Utilities keen on working with city of local governments, or even simply addressing this customer segment independently, may find it most cost effective to install as many other energy-efficient measures as possible while addressing weatherization. Other measures to be considered include hot water heater wraps, high performance showerheads, and lighting. The Portland Energy Office is currently working towards complementing the Multifamily program with a wider range of measures, but it faces institutional barriers pursuant to this objective that other city agencies and utilities may not face. (The primary barrier in Portland to expanding the program has, ironically, been a key function to its own success: the fact that the Energy Office implements the Multifamily Energy Savings program with several different utilities, many of whom already have their own separate DSM programs which focus on a range of residential retrofit measures.) Although, the Energy Office has made great strides with PGE, offering weatherization, lighting, and water heater replacements, to date the Energy Office and the utilities have been unable to combine all of their residential retrofit efforts into a one-stop program. This remains a challenge, and an opportunity, for other city agencies and utilities which have a significant share of housing in the multifamily component, and which wish to address energy efficiency in this area. To this end, PEO is working to include as many energy services as possible and hopes the other utilities will follow their lead. [R#1] ■

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