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WEATHERIZATION

Description:

The primary goal of all "weatherization" efforts is to modify a home or building to reduce its energy consumption and optimize its energy efficiency. In particular, publicly supported weatherization programs are designed to assist needy householders (including older adults, individuals of all ages with disabilities, and families with children) reduce their energy bills and achieve both economic and environmental savings. While publicly supported programs assist low-income householders, weatherizing homes and other types of buildings has rapidly become attractive to people of all income levels because, if done properly, it will permanently reduce energy bills by making existing homes and buildings more energy-efficient. According to the United States Department of Energy,¹ weatherization reduces heating bills by an average of 32 per cent and overall energy bills by about \$350 per year at current (2009) prices.

Across the United States, existing buildings use one-third of all energy consumed in the country and two-thirds of all electricity. Due to their high energy usage, existing buildings are a major source of the pollution that causes air quality problems; and they supply pollutants that directly contribute to climate change. The practice of weatherizing a home or building offers a long-lasting solution to the many inefficient homes and buildings in country, as it directly addresses the cause through energy efficiency.

The movement to weatherize homes and buildings has grown over the years in conjunction with rising concerns about fuel costs and environmental issues. As weatherization has evolved, there has been increasing emphasis on looking at how each individual building performs as a whole system. This more current approach extends traditional weatherization activities to also include the installation of recently developed, energy-saving heating and cooling equipment, as well as the repair of old, inefficient equipment.

Although weatherization packages vary to best suit each individual home or building, some common weatherization procedures include:

- Sealing—which is done using materials such as caulk, foam sealant, weather-stripping, window film, door sweeps, and electrical receptacle gaskets to reduce air infiltration:
 - Seal bypasses (cracks, gaps, holes), especially around doors, windows, pipes, and wiring that penetrate the ceiling and floor, and other areas with high potential for heat loss.
 - Seal air ducts, which can account for 20 per cent of heat loss, using fiber-reinforced mastic.

- Provide proper ventilation to unconditioned spaces to protect a building from the effects of condensation.
- Protect pipes from corrosion and freezing.
- Weather-strip doors and windows.
- Clean and tune existing heating mechanical systems.
- Install:
 - Storm doors and storm windows.
 - Low-flow showerheads and faucet aerators.
 - High-efficiency water heaters.
 - Insulation in walls, floors, and ceilings; around ducts, pipes and water heaters; and near the foundation and sill.
- Replace:
 - Old drafty doors with tightly sealed, foam-core doors.
 - Older windows with low-energy, double-glazed windows.
 - Older, inefficient heating systems.
 - Older, inefficient refrigerators.
- Install/replace dampers in exhaust ducts to prevent outside air from entering the house when the exhaust fan or clothes dryer is not in use.

Federal Weatherization Assistance Program (WAP)—

Through a nationwide weatherization network of 900 agencies, the U. S. Department of Energy's (DOE) Federal Weatherization Assistance Program provides for the installation of energy efficiency measures in single-family and multiunit homes of income-qualifying homeowners. WAP is administered in each state by a state government agency. Since its inception in 1976, more than 6.2 million low-income families have been assisted with weatherization procedures that are long-lasting and effective, providing energy savings that pay for the upgrades within a few years. WAP's Technical Assistance Center provides guidance for program operations and fosters community partnerships to advance weatherization.

Through its Oak Ridge National Laboratory, DOE conducts regular evaluations of the WAP program to verify energy savings and to maximize service to weatherization clients. Evaluations have shown that each dollar of DOE investment in weatherization returns \$2.69 in energy and non-energy-related benefits. The WAP program was greatly expanded as part of the American Recovery and Reinvestment act (ARRA) of 2009, with eligibility qualification now raised to 200 per cent of the Federal poverty income guidelines. Many techniques that are currently standard procedure in the country's larger weatherization industry were first developed and tested under the Federal Weatherization Assistance Program; and, through this program, DOE continues to develop and test new advances in the field of home energy science.

Reference:

¹ Hawaii State Department of Labor and Industrial Relations, *U. S. Department of Energy—Energy Efficiency and Renewable Energy: Weatherization Assistance Program*”:

<http://hawaii.gov/labor/ocs/pdf/DOE%20Weatherization%20Assistance%20Program%20-%20Technologies.pdf>.

Benefits:

Economic impact—for the consumer:

- The energy savings from employing weatherization measures saves consumers money. For example, efforts through the Federal Weatherization Assistance Program bring a return of \$1.83 in direct energy savings to the homeowner for every \$1 spent on weatherization; and taking both energy-related benefits and non energy-related benefits together, the combined return per dollar spent is \$2.69.

Economic impact—for the community:

- Workers—
 - Across the country, both public and private weatherization efforts have helped spawn an energy-efficiency industry for residential housing. This industry today employs thousands of people who work in low-income weatherization alone, and many times that number who work in companies that help homeowners increase their energy efficiency through low-cost measures. For example, according to Weatherize.org,² 52 jobs are directly created for each million dollars invested into the Federal Weatherization Assistance Program.
- Local economy—
 - Weatherizing homes directly provides work for *local* contractors and revenue for the businesses that supply the materials necessary for weatherization procedures.
 - Through increased household spending on weatherization activities (generation of jobs and purchasing of materials), money is spent by families for goods and services *within the community*.
 - *housing stock*
- Upgrades and modifications made to homes and buildings through weatherization activities help maintain the community's housing and building stock and improve their value.

Environment:

- Weatherization measures—
 - Reduce carbon dioxide output by nearly a metric ton per weatherized home (carbon dioxide is often cited as a likely contributor to global climate change).
 - Reduce overall energy demand, which decreases power plant emissions and associated air pollution.

- Reduce energy consumption on a national scale and, therefore, reduce demand on the nation's electrical grid as well as dependency on imported oil.

Social:

- Weatherization measures—
 - Create safer living environments for those who inhabit a home or building by emphasizing the importance of measures such as installing smoke alarms and carbon monoxide detectors.
 - Create healthier, more comfortable living environments for inhabitants through reduced drafts and higher air quality.
 - Provide a long-term household-expense solution against rising energy prices for all householders (including older adults and younger individuals with disabilities), but particularly for low-income individuals and families. Lower-income families typically spend around 20 per cent of their total annual income on energy; during recessionary times, these families cut back on other necessities of life to cover the cost of energy.
 - Help stabilize a community's resident population by:
 - Supporting the ability of older adults and younger-aged people with disabilities to successfully age in place in their own homes and apartments.
 - Helping all families to affordably remain living in the community.
- Weatherization measures lead to community education and outreach, because residents and tenants are frequently encouraged to take part in the efforts.

Reference:

² Weatherize.org (2009). "Weatherization Works!" *Weatherization Program 2009*: <http://www.weatherize.org/roi.html>.

Impediments or barriers to development or implementation:

- Energy-efficient upgrades and modifications are costly and, too often, are unattainable for many low- and middle-income individuals and families.
- Funding through public weatherization programs for low-income households is inadequate to meet the need/demand.
- Many consumers resist weatherization upgrades because (1) they fear that they will be unable to use the new equipment, or (2) they are worried about false claims about the effectiveness of newer weatherization equipment that has not been in the market long-enough to have been proven.
- When not properly completed, weatherization practices may result in health problems (for example, if weatherization measures are installed by untrained workers, over-tightening of the building could occur, which would lead to health problems due to lack of proper ventilation and air flow).

Resource—written and web:

- Weatherize.org, 2009—provides extensive information about the U. S. Department of Energy's *Weatherization Assistance Program (WAP)*, including eligibility guidelines and updates, technical assistance information and resources, and a list of WAP agencies by state and county:
<http://www.weatherize.org/>.
For the list of county-based WAP agencies in New York State:
<http://www.weatherize.org/statelist/statelistNY.html>.
For a discussion of the economic and other benefits of employing weatherization measures: *Weatherization Works!*: <http://www.weatherize.org/roi.html>.
- U. S. Department of Energy, *Weatherization Assistance Program (WAP)*—provides extensive descriptive information about the program, weatherization technologies, and links to government agencies in each state that administer the Federal WAP program: <http://apps1.eere.energy.gov/weatherization/>.
- New York State Homes and Community Renewal, *Weatherization Assistance Program (WAP)*—extensive eligibility and descriptive information about the WAP program in New York State:
<http://www.nyshcr.org/Programs/WeatherizationAssistance/>.
- Ted Collins—New Technology Demonstration Program (September, 1998), *Technology Focus: Single-Family Residential Building Weatherization*. Washington, DC: U. S. Department of Energy; Oak Ridge, Tennessee: Oak Ridge National Laboratory.
<http://c0133311.cdn.cloudfiles.rackspacecloud.com/Report%20-%20DOE%20Single-Family%20Residential%20Building%20Weatherization%20Fact%20Sheet.pdf>.
- Larry Kinney, Tom Wilson, and Michael MacDonald (September/October, 1995), "Profiles of Multifamily Weatherization Projects: A Tale of Five Cities," *Home Energy Magazine Online*:
<http://www.homeenergy.org/archive/hem.dis.anl.gov/eehem/95/950915.html>.

Resource—technical assistance and contact names:

- Weatherization Program
Energy and Rehabilitation Services
New York Homes and Community Renewal
38-40 State Street
Hampton Plaza
Albany, NY 12207
Phone: 1-866-275-3427
Weatherization@nyshcr.org.