
Green Building: Retrofit Working Group
Sustainable Cleveland 2019

POST SUMMIT REPORT

September 16, 2010

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EXECUTIVE SUMMARY

About the Authors

The Green Building: Retrofit Working Group was formed at the *Sustainable Cleveland 2019 Summit* held in August of 2009. It is comprised of many leaders from some of Cleveland's most well-known nonprofit and private businesses and is coordinating its efforts and ideas with the City of Cleveland and its Sustainability Office. We are committed to the idea that environmental sustainability and residential and commercial energy retrofitting are critical new drivers for market competitiveness and economic development for our city and our region. Following the Summit, this Working Group has met routinely to research, envision, and create the following report.

Introduction

Energy efficiency is one of the most easily achievable solutions to the problems created by our much-maligned reliance on nonrenewable energy sources. Most of the nation, Cleveland included, suffers from problems of energy inefficiency – many fail to respond to the obvious problem, despite the fact that the most common examples of upgrades are often the most cost-effective, and elicit a high return on investment. A report on energy efficiency from the consulting firm McKinsey found that the United States could save \$1.2 trillion through 2020, by investing \$520 billion in improvements like sealing leaky building ducts and replacing inefficient household appliances with new, energy-saving models.¹

In many instances, the most basic of efficiency upgrades have been completed by homeowners themselves, or through programs sponsored by utility companies. However, a large percentage of buildings go untouched. Many are not covered by the utility companies' programs, and often the buildings' owners don't have enough capital to make such improvements. Thus, aging building stocks in Midwestern cities, like Cleveland, are the center of a significant opportunity to decrease the negative environmental impacts of our built environment. According to the U.S. Green Building Council, buildings in the United States alone account for 72% of electricity consumption, 39% of energy use, and 38% of all human-made carbon dioxide (CO₂) emissions.²

This report seeks to highlight the existing programs currently operating within the City, and emphasize the areas that still require attention. In response to these deficits, this report shall offer suggestions for various means by which the City may address the problem, through direct action or cooperative engagement with private and nonprofit partners. In the next few sections, this report shall be presented through a discussion of these suggestions.

¹ *Unlocking Energy Efficiency in the New Economy*, McKinsey Global Energy and Materials. Available at http://www.mckinsey.com/client-service/electric-power-natural-gas/downloads/US_energy_efficiency_full_report.pdf. Last accessed 9/5/2010.

² USGBC statistic.

Examining Current Efforts

The Cleveland area has been the focus for many organizations and programs which seek to spur energy efficiency. The city itself is estimated to have around 142,000 buildings, including both residential and commercial properties. However, most of the retrofit efforts so far have only been focused on low to moderate income single family homes and large commercial buildings, the former through federal and state funded HWAP programs and the latter through similarly funded grant programs – neither of which are funded at sufficient levels to meet current demand. This means that a large percentage of homes and businesses aren't currently eligible to receive financial or technical assistance.

Framework for Success

In order to best address the gap highlighted by the previous section, it is important to think of how a solution to the problem might be framed. Currently, the retrofit providers represent a fractured base. What Cleveland needs is a cohesive, comprehensive, unifying force that brings together all the talents, strengths and experience evident in the area. As has been demonstrated elsewhere in the U.S. (Cincinnati, Cambridge, MA, and the Southeast) the creation of an “energy alliance” has the potential to be the rallying point and platform on which to coalesce the resources necessary to build a sustainable, long term regional energy efficiency system.

Such a Greater Cleveland Energy Alliance (GCEAC) can be the entity to do this. GCEAC will serve as a regional collaborative charged with creating market demand and increased access to capital for energy efficiency and alternative energy services for the region's residential and commercial sectors. The Alliance will have a small, efficient staff with the mandate to conduct region-wide marketing and outreach in order to communicate the availability of programs available across sectors. These programs either currently exist, and will be made available throughout the region, or will be developed in specific sectors not being served. The Alliance will not duplicate existing efforts, but will work to increase resources and fill energy efficiency service delivery gaps where they exist.

Setting the Bar

Setting the Bar

The Working Group has examined the initial goals for green building generated at the Sustainability Summit and created a set of revised goals based on the research we conducted.

Initial Goals

- Retrofit 100% of buildings for 50% energy reductions,
 - Retrofit 50% of buildings to net zero,
 - Retrofit 25% of buildings to be energy producers, and
 - New construction to meet LEED standards or equivalent
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Proposed Current Goals for Cleveland

- **Retrofit 25% of buildings by 2019**
- **Achieve average 50% energy reductions in homes retrofitted**
- **Reduce carbon dioxide emissions in residential sector by 20%**
- **Develop a Green Workforce**

Energy efficiency improvements in our existing buildings will save residents money, reduce climate change impacts, and create green jobs. Using a combination of the expansion of existing, proven programs and new, innovative programs, this Working Group sees an attainable goal of 25% of the city's buildings being retrofitted by the year 2019.

If Cleveland were to retrofit 25% of its residential buildings at an average of 50% reduction in energy use, and accounting for differences in source energy carbon impacts, that would result in approximately a 13% reduction of total carbon dioxide (CO₂) emissions. Adding additional efforts, such as efficient light bulb distribution programs, changes in source energy, and increased efficiency requirements for new construction, we believe our total CO₂ emissions can be reduced 20% by 2019 in the residential sector. Existing housing accounts for 27% of carbon emissions in Northeast Ohio, according to the Green City Blue Lake Institute.

Green housing is not only energy efficient, it is healthy and has positive or minimal environmental impacts. Nationally, federal agencies, foundations, and advocacy groups are recognizing the need for an integrated approach to addressing the problems of deteriorated housing stock. In addition to being energy inefficient, Cleveland's housing stock is rife with housing-related health and safety hazards, including lead hazards, moisture problems, toxins, and pest problems. Housing-based illnesses, including asthma and lead poisoning, negatively affect child development and lifetime productivity. Energy efficiency improvements offer an opportunity to simultaneously address unhealthy housing. We recommend the development of retrofit programs that assess and address multiple aspects of green and healthy housing.

Developing a Green Workforce

This Working Group has developed a platform which will help ensure that the existing and new retrofit work in Cleveland create jobs that are adequately supportive, and long-lasting. The three components of this platform are projections, principles, and policy.

According to a recent study, there is no comprehensive data available on the number of people employed in the Home Performance industry. However, several models have attempted to calculate a figure for the number of jobs created per dollar spent. While each model has returned various results, an average of them indicates that an estimated average of 12-13 direct and indirect jobs are created for every \$1 million invested in the industry. With current investments in the area, this means that there will be 171 new jobs created in the next three years.

In order to ensure the quality of these projected jobs, this Working Group has suggested the adoption of principles highlighted most recently by the National Apollo Alliance and National Emerald Cities. Such principles include, aggregating individual retrofit jobs to create larger “bundled contracts” that allow responsible contractors to successfully bid, and raise wage and benefit levels; establishing high road standards for utility and city retrofit programs that enforce specific standards for wages and benefits; and working through established local/regional entities, such as the Greater Cleveland Energy Alliance.

Finally, in order to allow retrofit programs to flourish and create jobs, proper policies need to be in place.

Next Steps

In crafting this report, it has always been one the goal’s of this Working Group to include a set of practical next steps, which, if supported or implemented by the report’s audience, which enable Cleveland to attain the goals set forth in this report. The detailed list of next steps is included in a later section of this report. In summary, this Working Group sees the endorsement of this report and its suggestions as one of the topmost priorities. Having an endorsement by Mayor Frank Jackson at this year’s Sustainability Summit, and/or having individual members of the Cleveland City Council sign on to support this report’s suggestions, is critical to maintaining momentum as the plan to retrofit the city’s building stock reaches a critical head. Next, it is important that the Greater Cleveland Energy Alliance be formed, and have the support of community stakeholders. In order to achieve this, a planning charrette has been scheduled, during which such stakeholders from both the public and private realm will participate to craft the new entity. Finally, it is important for the currently proposed energy efficiency program pilots be implemented. These programs, such as the Cleveland EnergySaver program, are a vital part of this Group’s plan. Only after their initial implementation, can we begin to discuss the plan for their expansion.

EXAMINING CURRENT EFFORTS

Overview of Cleveland's Building/Housing Situation

According to the City Planning Commission, there are an estimated 142,000 “building footprints” in the City of Cleveland. This figure is not too far off data retrieved from the NEOCANDO database at Case Western Reserve University, which lists approximately 136,118 buildings in the city – with 117,923 of those being residential and 18,195 being nonresidential (just commercial and industrial, not institutional). Additionally, data from the U.S. Census Bureau's American Community Survey (ACS) results from 2006-2008 shows that there are 165,916 households in the City, with 47% of those located in an owner-occupied unit.

Existing Programs

Throughout the City of Cleveland, numerous programs currently exist that concentrate on the goal of energy efficiency. At this point, though, there has yet to be developed a plan which encompasses the entirety of Cleveland's building stock; most programs focus on specific individuals through their geographic location or economic factors, such as income level. While each of these programs are noteworthy in their own right, and many have been successful in achieving energy savings, it is the conclusion of this Working Group that a comprehensive plan for the retrofit of all residential and commercial structures in Cleveland is not only desirable, but necessary.

Awareness of all existing programs is not enough. The progress of these programs, including both accomplishments and pitfalls, must be analyzed in a manner that gives an accurate overall picture of how effectively the city is working towards achieving the goals outlined in the preceding section. This way, Cleveland is in the best position to adjust future efforts and programs to focus on areas most in need. The following represents a brief overview of the programs available for Cleveland residents. For a complete listing of all programs available, as well as additional details about each program, please see Addendum A.

- *Home Weatherization Assistance Program (HWAP)*

HWAP is a no-cost energy assistance program designed to increase the energy efficiency of dwellings owned or occupied by income-eligible Ohioans, reduce participants' household energy expenditures and improve participants' health and safety. It is federally funded by the U.S. Department of Energy and provided to Ohioans whose annual household income is at or below 200% of the federal poverty guidelines.

- *Housewarming Program (HW)*

Operated as a joint venture between the Cleveland Housing Network (CHN) and the Dominion East Ohio Gas Company, this program is designed to help specific Dominion customers reduce their gas bill and make their homes more energy efficient. All materials and services are free of charge for customers whose income is below 200% of Federal Poverty Guidelines (FPG). Products and services depend upon inspector recommendations, but generally include common efficiency measures like air leak sealing and furnace repair

- *Other Utility Programs*

In addition to the *Housewarming Program*, CHN also partners with Cleveland Public Power (CPP) and the Cleveland Water Department (CWD) to offer Cleveland residents a variety of additional services. The CPP program offers conservation services such as installation of fluorescent light bulbs and replacement of “energy hog” refrigerator units, while the CWD program will provide water saving devices (low flow showerheads, toilet dams and faucet aerators), minor plumbing repairs and emergency service line replacements (from curb to house) to owner occupied homes.

- *Residential Energy Efficiency Tax Credit*

This program takes the form of a credit on an individual’s taxes for efficiency improvements in a buildings envelope and for the purchase of high-efficiency heating, cooling and water-heating equipment. Efficiency improvements or equipment must serve a dwelling in the United States that is owned and used by the taxpayer as a primary residence. The maximum amount of homeowner credit for all improvements combined is \$1,500.

- *Cleveland Energy Saver*

The Cleveland Energy Saver program was devised in response to the U.S. Department of Energy’s call for submissions to its Energy Efficiency and Conservation Block Grant (EECBG) program. The program is a three year comprehensive approach to energy management, neighborhood revitalization, and wealth creation. It takes the unique approach of blending neighborhood based energy management with entrepreneurial and innovative wealth-building models. It is a market rate energy efficiency program, providing audits, low cost financing and energy efficiency retrofits to 100 households.

- *Ohio Dept. of Development Industrial Energy Efficiency Grant*

This grant initiative was part of a larger program called the State Energy Fund, ran by the State of Ohio. It used funds allocated from the American Recovery and Reinvest Act (ARRA) to enable manufacturers and industrial producers to realize significant energy savings and operate more efficiently, thereby making them more competitive. The only company in Cleveland to receive this grant was the Orlando Baking Co., which received \$486,807 to install energy efficient lighting and variable frequency drives on large equipment, and replace old steam boilers with more efficient, modular boilers and improve the

steam distribution system throughout the facility. The project is estimated to result in an annual energy savings of 837 megawatt-hours and 5,995 million BTUs along with the creation and retention of 10 jobs.

Identifying the Gap

While it should be noted again that the abovementioned programs, together with existing programs not fully discussed above, have been relatively successful at addressing the problem, it should be made known that there exists a significant gap in coverage. HWAP providers are currently retrofitting as many homes as they can do with current budgets. Additionally, though, many residents of Cleveland are not targeted by, or are unable to qualify for, these programs. For example, HWAP-based programs are aimed only at those individuals who are at or below 200% of Federal Poverty Guidelines, which for a four-person household in Cleveland equals \$ 44,100. While this income range covers a large percentage of Cleveland's population, it still leaves many individuals without the expertise or financial help to take on the cost of energy efficiency upgrades and/or retrofits.

In summary, the gap exists for the following reasons:

- **HWAP and HWAP eligible funding falls short of serving the full eligible population**
 - **Market rate programs for those above HWAP eligible income practically non-existent.**
 - **Programs for nonresidential structures, commercial, industrial, schools, etc. are in their infancy.**
-

FRAMEWORK FOR SUCCESS

Seizing the Opportunity

After decades of false starts with mainstream adoption of energy efficiency, there are new drivers that can tip the scale in favor of energy efficiency. Public and private investment in alternative energy, stress on public sector budgets, and climate change related legislation are all factors which make energy efficiency an attractive opportunity.

According to a report prepared for the United Nations Environment Programme's (UNEP) Sustainable Energy Finance Initiative by global information provider New Energy Finance, about \$155 billion was invested in 2008 in clean energy companies and projects worldwide.³ That is four times the 2004 investment. However, that growth decreased in 2009, due to global economic crises.⁴ In addition to the need to stretch new investment dollars, the public sector has sought ever larger cost savings to help address already thin budgets. While the desire for public and private investment in alternative energy technology continues to increase, pocketbooks remain guarded, it is clear that limited resources produce far faster payback through investment in energy efficiency.

Climate change related legislation appears to be on the agendas of the federal government and states, meaning that many regions won't be able to wait to deal with their growing carbon footprint from increased energy usage. Although a comprehensive climate bill failed to make it through negotiation in Congress, states have been quick to pass their own legislation addressing this part of the issue. In particular, there is a growing wave of new regulatory mandates within the utility sector and demand side management. Most recently, Ohio Senate Bill 221 changed Ohio law to mandate benchmarks for utility companies' generation of electricity from advanced energy resources. The Ohio Revised Code⁵ dictates a 0.5% energy from renewable sources mandate for the year 2010, increasing by 0.5 % through 2014, at which point it will begin increasing 1% annually.

But with all of these drivers, the great recession has generated more systematic risk aversion, credit shortages, and significantly declining property values. Within that context, how can wholesale new property investment be justified? The value proposition in energy efficiency has remained constant throughout - saving energy saves money – for all bottom lines. And a critical corollary can be argued - saving energy at scale requires a growing, skilled, and local “green” workforce that offers a continuum of opportunity beginning with pathway out of poverty jobs and leading to higher skilled, living wage new opportunities.

³ *Global Trends in Sustainable Energy Investment 2009*, prepared for the United Nations Environment Programme's (UNEP) Sustainable Energy Finance Initiative.

⁴ “UN says renewable energy investment down in 2009,” Reuters. 7 Oct. 2009.
<http://www.reuters.com/article/idUSTRE5965LQ20091007>

⁵ Ohio Revised Code § 4928.64 (B)(2).

Instead of leaving this opportunity behind, what if a public/private non-profit partnership were created and charged with being the “tip of the spear” in creating market demand. This partnership could be the independent incubator to market, educate, measure, report, and ultimately drive new energy efficiency demand. Additionally, it could vet new energy efficiency financing mechanisms and incentives, including spin-off investment on “public good” financing options.

A Different Model

As is evident from the selection of programs listed above, Cleveland has a strong base of organizations that provide energy retrofit services in the low and moderate-income residential sector. However, the needs of the area outstrip available resources. Even factoring in the great work completed by these programs, there are significant gaps in the market for some moderate residential income levels, higher residential income levels, market-rate housing, and the commercial sector.

Additionally, there is another major missing piece to the retrofit puzzle. The strong base of organizations represents a fractured response to a large, city-wide problem. In the opinion of this Working Group, what is needed is a comprehensive, unifying force that brings together all the talents, strengths and experience evident in the Cleveland area. This model has been demonstrated elsewhere in the United States. In 2007, the Cambridge Energy Alliance was formed in Cambridge, MA to assist thousands of Cambridge residents and businesses identify and arrange financing for all cost-effective energy efficiency improvements for their homes and businesses. More locally, stakeholders in Cincinnati successfully banded together in 2009 to form the Greater Cincinnati Energy Alliance. This Ohio-based nonprofit offers educational, project management and financial services to retrofit buildings with energy efficient and renewable technologies throughout Greater Cincinnati and Northern Kentucky. Recently, it was successful in securing funding from the highly competitive DOE block grant program.

Owing to such successes, this Working Group has determined that it is in the region’s best interest to develop its own, comprehensive approach to demand side energy efficiency services. Only by doing so, can this region embrace the new drivers, illustrated above, and take advantage of the multitude of experiences and strengths already present in the area.

The Greater Cleveland Energy Alliance

The Greater Cleveland Energy Alliance (GCEAC), similar to those identified above, will serve as a regional collaborative charged with creating market demand and increased access to capital for energy efficiency and alternative energy services for the region’s residential and commercial sectors. The Alliance will have a small, efficient staff with the mandate to conduct region-wide marketing and outreach in order to communicate the availability of programs available across sectors. These programs either currently exist, and will be made available throughout the region, or will be developed in specific sectors not being served. The Alliance will not duplicate existing efforts, but will work to increase resources and fill energy efficiency service delivery gaps where they exist.

The several electric and gas utility companies serving the Cleveland area will also be key resources to the degree they can provide demand side management (DSM) financial resources and subsidies to their

customers. Utility company involvement in the Alliance is important. They have a clear link to thousands of customers; they have funds; and the IOUs have regulatory mandates to implement demand side management (DSM) programs for their residential and commercial customers. Programs (such as the EnergySaver Pilot) and organizations (such as the Energy Alliance and its partners) can provide an effective and cost-efficient link to “behind the meter” behavior of their customers. Utility companies can contract with these entities to conduct marketing, outreach and retrofit implementation (audits and energy efficient installations) to specific market sectors in specific geographic areas. In addition, these utilities, through their subcontractors, can provide the actual materials (lighting, weather-stripping, hot water efficiency measures, etc.). They can pay for and/or provide the marketing/educational materials through mail inserts, public announcements and social media usage. And very importantly, they can provide significant financial incentives, rebates, and possibly future on-bill financing to customers who agree to implement measures.

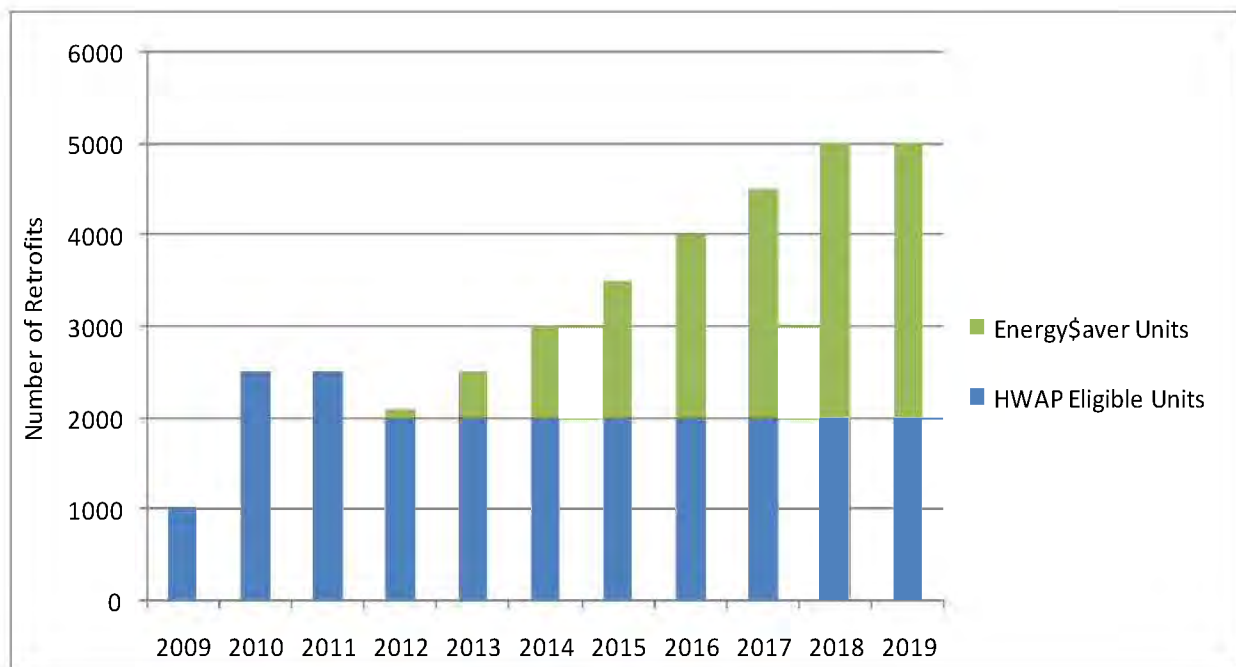
Two significant steps are already underway in the Cleveland area to move this process forward. First, the City of Cleveland has committed \$550,000 in DOE Energy Efficiency Block Grant funds to conduct the EnergySaver Pilot Program, a market rate energy efficiency program, providing audits, low cost financing and energy efficiency retrofits to 100 households. Second is the significant leadership that this Working Group is providing in presenting and discussing the alliance idea throughout the region. These two coordinated initiatives are the drivers in the creation and implementation of an effective regional energy alliance.

SETTING THE BAR

Retrofit Ramp-up

In looking at the best way to meet the Working Group’s larger goal of retrofitting the entirety of Cleveland building stock, the Goals Committee has looked at a variety of methods to achieve this goal. After much deliberation, the Committee decided that the best method of doing this would be to set a timeline for the ramp-up of the number of units retrofitted each year. This method will be the most straightforward, in that it is based on the known impact of existing and planned retrofit programs along with ambitious but achievable expansion of these programs.

Using income and household size data from the ACS, and the fact that a household must be at or below 200% of the federal poverty level to be HWAP eligible, this means that there is an estimated 86,832 households in Cleveland which could be retrofitted under this program. Since 2000, there have been 8,739 HWAP retrofits completed in Cleveland, leaving an estimated 78,093 potential HWAP eligible household not yet retrofitted. For 2010, the estimate is that 2,500 units will be completed in the City. While this number has been more than doubled from last year’s 1,000 units due to ARRA funding, the committee feels that an increase in private and public dollars would allow this growth to continue – rather than drop to pre-ARRA numbers, the HWAP eligible programs would hold steady at the current capacity of 2000 units a year. The majority of the ramp up would happen from the expansion of the EnergySaver program, into upper-low and moderate income households. The following chart represents the yearly unit goals for residential homes retrofitted.



As the above chart shows, the number of units being retrofitted each year is increased to a maximum of around 5,000 by 2017. After this point, they continue at that level. The committee thinks that this is an ambitious, but rational level for which to aim. With the continuation of the HWAP (and related Housewarming) program(s), along with the newly created EnergySaver program, these numbers become attainable. This equates to around 35,600 units completed between 2009 and 2019, which is approximately 22% of the households in Cleveland. Assuming that utilities, like First Energy and Dominion, would provide programs and dollars at the slow pace of 500 units a year, that puts the number of households retrofitted by 2019 at around 25% of the total.

Energy Reduction Goals

In addition to the goals for ramping up the number of residential units retrofitted each year, the committee has formalized goals for energy reduction per home. Similar to the proposed HOMESTAR program currently being discussed in Congress, there are two paths: Silver and Gold. However, the HOMESTAR goal is less ambitious than what this Working Group thinks is necessary. In HOMESTAR, the Silver path is prescriptive, offering direct-to-consumer rebates for the purchase of hot water heaters, insulation, appliances, etc. The Gold path is performance related, meaning that participants must obtain an energy audit through a certified auditor, which details how that household can achieve a particular percent reduction in energy use through the installation of specific measures tailored to that building or living space. The percent reduction begins at 20%, offering participants \$3,000 to cover the costs of the measures, and then offers additional rebates for each 5% decrease in energy use, up to 40%.

While the Working Group seeks to align itself with the HOMESTAR dual-track program model, it also seeks to posit the City's own programs and goals as a stable, long-term continuation of the same efforts. Eventually, the wellspring of Federal stimulus money and other funding for such programs will run dry, and the need for locally driven efforts will be more present than ever if cities and regions wish to continue retrofitting their building stock.

For the "Silver" path, the Working Group has determined that the goal needs to be a 30% reduction in heating, cooling, and hot water load. The average energy reduction that results from an HWAP retrofit is in the 25% range. Obviously, since this is an average some homes will receive more and some less. The typical HWAP retrofit costs on average \$5,000 per house. This cost is somewhat lower than might be expected because HWAP calls for the use of a building tightness limit so that mechanical ventilation does not have to be installed.

For the "Gold" or performance path our goal needs to be an average of 40-50% reduction in heating, cooling, and hot water load. Like with the "Silver" path, this is an average, so some homes will achieve this but some will achieve more. We should budget on average \$8000 per house, require installation of mechanical ventilation, and consider alternative basement and attic treatments. The Gold path goal is to make homes as energy efficient as possible using existing wall cavities and windows and investments with proven payback periods. The Gold path puts the homes on the right path to deeper energy reductions. At key opportunity points – when siding, roofing, or windows are being replaced, for

example, the house can be retrofitted with additional insulation and very efficient windows to achieve even greater energy savings of up to 70-90%. Renewable energy can be added to create zero energy homes. A future “Platinum” path may help to finance these deeper retrofits once sufficient demonstrations of their value have taken place.

We need to also address healthy housing issues when conducting energy retrofits. Housing health hazards include respiratory allergens and irritants (resulting from moisture and pest problems), lead poisoning, and fire and fall hazards. These hazards result in significant personal and city-wide economic impacts. The workgroup recognizes that energy retrofits are a critical opportunity to simultaneously address healthy housing. We seek to find ways to use some energy retrofit funding for addressing basic home health hazards, and to identify opportunities to align, blend, and coordinate additional funding sources. This thinking is in line with the National Green and Healthy Housing Initiative, a partnership between federal agencies including HUD, CDC, Labor, and DOE, foundations, and local community organizations across the country

Carbon Emission Reductions – Residential Sector

While it is important to consider the total number of homes retrofitted, it is also important to consider the environmental impact that retrofitting these homes will have. The Working Group believes that the city can achieve a 20% reduction in carbon emissions from Cleveland’s residential sector from 2010 levels by 2019. 13% of this reduction can be achieved through the proposed retrofit ramp-up and 7% through some low-hanging fruit (5% reduction can be met by light bulbs & currently-offered appliance rebates, as well as changes in the electricity source mix, and 2% can be met from all new housing meeting Architecture 2030 goals).

Using our above goals of 25% of households newly participating in either weatherization or EnergySaver by 2019, the 13% projected CO₂ reduction can only be achieved by an average of 52% reduction in gas bills for each newly participating home. Therefore, in order to reach our minimal CO₂ reduction goal, the overwhelming majority of homes need to meet the above outlined Gold standard.

These goals would be in line with other carbon reduction targets in cities and states. Some have chosen to go further. For example, the City of Chicago has set an overall carbon reduction goal of 25% reduction in carbon emissions below 1990 levels by 2020. Since 1990 levels are about 15% below 2010 levels, this is actually about a 40% reduction from 2010 levels by 2020. Chicago’s goals are in line with international goals of achieving no more than a 2 degree Celsius rise in temperature by 2050. Scientists believe that to limit climate change to 2 degrees Celsius we need to globally reduce carbon emissions by 80% from 1990 levels by 2050. President Obama has endorsed this goal. Carbon reduction goals for 2020 in the US vary widely – see the chart at this site for more examples:

http://www.pewclimate.org/what_s_being_done/targets

Commercial Programs

Since the passage of Senate Bill 221 in 2008, many businesses must take energy efficiency much more seriously. The bill calls for 12.5% of Ohio's electricity to come from clean, renewable sources of power and a 22% cumulative reduction in energy usage by 2025. The responsibility to deliver on these requirements falls on utility companies, who are in turn charging consumers. Businesses that do not prove an investment in energy efficiency efforts or take steps to create efficiencies will be subject to surcharges on electric bills beginning summer 2010. Surcharges will likely range from \$.005 per kWh to \$.01 per kWh. For larger users of power, these additional charges could prove significant and detrimental.

In response to this, COSE has begun working with local utilities to create programs for small and large businesses to increase their energy efficiency. So far, COSE has partnered with FirstEnergy, and signed up 60 businesses to participate in a program to bypass the utility's Demand Side Management and Energy Efficiency Rider (DSE2). COSE is also in the process of launching programs centered on lighting solutions, energy auditing, and grants for small businesses. Additionally, there have been 12 businesses in the Cleveland area signed up for the Green Plus sustainability education and certification program.

Looking to the future, the goal of this working group would undoubtedly be to expand the number of commercial entities – both large and small – participating in program's like COSE's. **Along the same lines as the residential goals stated above, a 25% participation rate would ensure that Cleveland is on track towards becoming a leader in energy efficiency.** According to the Council of Smaller Enterprises (COSE), in the City of Cleveland there are 2,916 total commercial electric accounts and 1,756 total commercial natural gas accounts. Thus, to achieve a 25% participation rate, approximately 439-729 businesses will need to participate in an energy efficiency program.

Financing the Goal

As stated above, 25% of households equal approximately 40,000 households. Assume 13,600 EnergySaver participants at \$8,000 per unit and 19,523 HWAP eligible units at an average cost of \$5,000 per unit. The ten-year residential budget then is approximately \$206.4 million: \$108.8 million for the EnergySaver program and \$97.6 million for HWAP and related programs. The commercial sector budget is more difficult to estimate. For sake of simplicity we place it at another \$200 million. **This puts the total capital need over 10 years at \$400 million. The GCEAC can fill the necessary coordination role in raising these dollars.**

DEVELOPING A GREEN WORKFORCE

In order to illustrate the current assets in our region with regards to job creation and job growth opportunities in a clean, green energy economy, the Retrofit Work Group proposes a platform containing the following components: *Projections, Principles and Policy*. Each of these components attempts to address how the regional plan is poised to promote high road employment and career pathway options for our community members and to respond proactively and collaboratively to opportunities in the green economy, in particular around energy efficiency applications in retrofitting.

Projections: Employment Growth

According to a recent study by the Home Performance *Green Jobs in the Residential Energy Efficiency Industry* there is no comprehensive data available on the number of people employed in the Home Performance industry, and no certainty about the level of investment that will go toward increasing residential energy efficiency in the years to come. Industry experts, researchers, advocates and federal agencies have attempted to develop an appropriate job creation formula.

While the methodologies differ from simple indirect and induced models to input-output models to more complex macroeconomic multiplier models, an average of these indicated that an estimated average of 12-13 direct and indirect jobs are created for every \$1 million invested in the industry. Another way to say this is that it will take 40,000 to 70,000 jobs annually to reduce residential energy consumption by 25% by 2025.

The Center for American Progress and the Political Economic Research Institute concluded that the potential market in residential energy efficiency alone is capable of generating \$400 billion based upon an average household retrofit investment of \$4,000. Using the formula of 12.6 jobs created annually per the \$1 million of investments then 1.3 million jobs would be created each year until 2050.

Researchers at the Lawrence Berkeley National Laboratory estimated that at least a third of the energy efficiency jobs already exist and will be focused on additional energy efficiency services and practices. Additional workforce can enter the energy efficiency sector through existing occupations that are related such as electricians, HVAC technicians, and other skilled construction trades and related project managers simply through minimal retraining in energy efficiency. Other routes of entry will be through emerging occupations that are related to energy efficiency sector such as home energy auditors, performance services, and the like. Statistics from the Conservation Services Group and the Northeast Energy Efficiency Council indicate that one million jobs translates to one third existing home remodeling/home performance industry workers; one third current building trades workforce moving into residential energy efficiency and one third new entrants. Given these parameters, along with estimated investments and opportunities through the Cleveland Energy Saver program and other local investments in energy efficiency, it is anticipated that 171 new jobs will be created over the next three

years. This projection will need to be reconciled with jobs created as a result of ARRA and the 2009 infusion of funds into HWAP in order to arrive at an actual number of new jobs.

Lastly, policy reforms and legislative initiatives such as Ohio Senate Bill 221, which requires a 22 percent reduction in energy demand by 2025, the recently passed Ohio Senate Bill 232, which provides incentives for renewable applications in solar through the expansion of Special Improvement Districts, provide a wider scope of energy efficiency improvements and customer-generated energy projects, which will hopefully provide a more fertile landscape for job creation and job growth both regionally and statewide in Ohio.

The following chart represents the estimated number of properties targeted for retrofitting and job creation potential based upon the Cleveland Energy Saver program.

Engagement Count	Weather	HVAC	Appliance	Solar	TOTAL
Residential	1400	1050	840	420	3710
Multi-Unit	240	180	120	96	636
Commercial	150	75	30	60	315
TOTAL	1790	1305	990	576	4661

Dollars Spent	Weather	HVAC	Appliance	Solar	TOTAL
Residential	\$ 3,920,000	\$ 3,150,000	\$ 2,520,000	\$ 8,675,520	\$ 18,265,520
Multi-Unit	\$ 2,400,000	\$ 3,600,000	\$ 2,400,000	\$ 8,985,600	\$ 17,385,600
Commercial / Industrial	\$ 1,950,000	\$ 975,000	\$ 600,000	\$ 14,040,000	\$ 17,565,000
TOTAL	\$ 8,270,000	\$ 7,725,000	\$ 5,520,000	\$ 31,701,120	\$ 53,216,120

Jobs Created	Installation	Audit	Engagement	TOTAL
Year 1	78.5	10.5	4.1	93
Year 2	30.2	3.9	1.5	36
Year 3	36.0	4.5	1.7	42

TOTAL	144.7	19.0	7.3	171
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- **Jobs in the New Economy**

As the energy efficiency industry matures, city wide retrofit programs around the country that are attracting investment are those that views its success not only by energy performance but also through its people by putting them at the center of the agenda. This Working Group plans on having the Greater Cleveland Energy Alliance share this view. Building energy efficiency retrofits also can, if well planned, provide good, entry-level jobs with the potential to connect to energy efficiency and related career pathways. Workers with less than a four-year college degree can be trained to retrofit a building and reduce its energy use by 30 percent or more.⁶

- **Regional Workforce Development Infrastructure**

The regional workforce development community is poised to provide the necessary skills, certifications, and career pathway development to ensure our local workforce, in particularly those historically underserved and under-represented in high road employment can participate and succeed. Critical support and engagement by and with the federally funded workforce system via the Cleveland/Cuyahoga County Workforce Investment Board and Employment Connections (One-Stop) is necessary to ensure alignment with employer demand, to maximize financial resources are available to job seekers and to ensure that green jobs training is complimented by access to key supportive services such as affordable childcare, reliable transportation, tuition assistance, stipends and other resources.

⁶ Center for American Progress, Center for Working Families, *Green Jobs/Green Homes New York: Expanding home energy efficiency and creating good jobs in a clean energy economy* (2009) at 5, 16; see also Green For All, *Green Collar Jobs Overview*, www.greenforall.org/resources/green-collar-jobs-overview

Training and Education Partner Organization	Role and Area of Expertise
Evergreen Fund, Ohio Cooperative Solar	<ul style="list-style-type: none"> • Provide on-the-job training opportunities in solar applications • Create jobs through worker ownership model
Cleveland Housing Network	<ul style="list-style-type: none"> • Provide expanded capacity for installation contracting in cooperation with Ohio Cooperative Solar
Cleveland/Cuyahoga County Workforce Investment Board – Employment Connection	<ul style="list-style-type: none"> • Serve as linkage for workforce to employer base • Provide job readiness training • Provide access to WIA Supportive Services for workforce • Provide OJT funds to employers as incentives for hard to employ workers • Support/fund local training programs
UCIP-ASAP	<ul style="list-style-type: none"> • Provide job readiness and career pathway training in the sector to Cleveland residents • Provide on-going supportive services/follow-up for marginalized workforce
Northern Ohio Weatherization Training Center (NOWTC)	<ul style="list-style-type: none"> • Provide Basic Weatherization Training and related energy efficiency applications training including BPI certification, OSHA, and others to workforce.
Cleveland Building and Construction Trades Council Joint Apprenticeship & Training Programs	<ul style="list-style-type: none"> • Registered apprenticeship programs (RAPs) in the skilled trades provide additional advanced training and career pathway model for workforce
Towards Employment	<ul style="list-style-type: none"> • Provides on-going extensive workforce supportive services which include a vast array of retention supports such as legal assistance, budgeting, childcare vouchers and others to hard to employ workforce
Hard Hatted Women	<ul style="list-style-type: none"> • Provide orientation and support to women candidates

- **Education and Training**

Cleveland has a strong job training infrastructure to which community colleges, community-based organizations, organized labor, and employers all contribute. These entities include Cuyahoga Community College, registered apprenticeship programs of the Cleveland Building and Construction Trades Council, the Northern Ohio Weatherization Training Center, the Union Construction Industry Partnership's Apprenticeship Skills Achievement Program (UCIP-ASAP) pre-apprenticeship program and many dedicated employers stand ready to respond to the anticipated expansion of residential and commercial energy efficiency markets.

Ohio's existing Low-Income Home Weatherization Assistance Program (LIHWAP) has strong regional participation and leadership from the Cleveland Housing Network (CHN) and provides an existing foundation from which to build. Additionally, the Northern Ohio Weatherization Training Center (NOWTC) of COAD provides packaged and custom training courses on state-of-the-art building diagnostic, weatherization and heating system services and procedures to community-based organizations, local governments and private contractors throughout Ohio to support the LIHWAP partners. To build capacity in this system, COAD is leading the Ohio Green Workforce Training Partnership.

Principles: Recommended Strategies

Adopting the Principles of the both the National Apollo Alliance and National Emerald Cities are recommended for the Retrofit Work Group Action plan to achieve a *high road model* to workforce development in the local energy efficiency sector. These principles include:

- *Aggregate Individual Retrofit Jobs* such as those outlined in the Cleveland Energy \$aver Program, HUD/CMHA initiatives, and others via community-based organizing, to create larger "bundled" contracts that allow responsible contractors to successfully bid, raise wage and benefit levels;
- *Incorporate Responsible Contractor/Employer Agreements* in utility and city retrofit programs to mandate compliance with workplace laws, fair wages and benefits, proper classification of workers, local hiring, comprehensive safety and health plans, and connection to training;
- *Support Local Contractors* particularly small women- and minority-owned businesses, to meet responsible employer requirements and qualify to participate in retrofit programs;

- *Establish High Road Specific Standards* for all utility and city retrofit programs that enforce specific standards for wages and benefits, health and safety, training and certification requirements, as well as local recruitment and hiring from communities of color and other low income communities utilizing such tools as a Community Workforce Agreement (CWA) as one example;
- *Work through established local/regional entities* such as the Retrofit Work Group, the Greater Cleveland Energy Alliance (TBD), the Emerald Cities Task Force or others to identify and ensure high road practices in the retrofit industry.

Policy: Implications and Opportunities

State, local and federal policies will each impact the retrofit program. There are four types of policy frameworks to which particular attention must be paid. These include: (1) policies that provide incentives or mandate retrofits; (2) policies that enable certain financial structures to pay for retrofitting; (3) policies that govern job quality; and (4) policies that include local and targeted hire requirements.

- Through the aforementioned Senate Bill 221, Ohio and Cleveland are properly incentivized by an aggressive Advanced Energy Portfolio Standards that has energy efficiency goals at its core.

A critical policy component is legislation that enables the desired financial structure for retrofit programs. In Cleveland, the Cleveland Energy Saver is one example that provide the desired and projected outcomes related to job growth. Another important component are policies covering job quality, such as prevailing or living wage laws, and policies requiring local hire, targeted hire, and first source hiring. These may be accomplished through such tools as community workforce agreements which can be used to ensure that the jobs created by retrofitting are high road jobs which provide family-sustaining wages, benefits and access to employment for local communities.

NEXT STEPS

Based upon the previous sections, this Working Group has put forth the following steps which, if undertaken, would advance the goal of retrofitting a significant percentage of the City of Cleveland's residential and commercial building stock.

1. Endorsement of this Report by Mayor Jackson at the Sustainability Summit

It has always been the hope of this Working Group that Mayor Frank Jackson would publicly recognize this report at the 2010 Sustainability Summit, held on September 22-23. Such a statement would allow the effort to gain momentum right from the start, through subsequent press coverage in local and national media. It would also serve as an example of the incredible amount of work done by participants in last year's summit.

2. City Adoption of the Retrofit Goals Set Forth in This Report

- **By the Administration**
- **By City Council**

If Cleveland wants to be a national leader in the retrofit arena it is of the utmost imperative that City government formally adopt specific goals. We suggest that the goals set forth in this report be jointly adopted by the administration and city council. These goals include retrofitting 25% of all structures by 2019, setting a "gold" retrofit standard, reducing carbon emissions by 13% through this effort, and other goals listed in the report. The Working Group believes that such a public statement by the members of City Council can have the positive effect of legitimizing efforts that are proven to be worthy, but are largely unrecognized.

3. Formation of the Greater Cleveland Energy Alliance Corporation

- **Stakeholder Charrette**

As stated above, the Greater Cleveland Energy Alliance Corporation (GCEAC) will be the tip of the spear in terms of creating market demand for new, large scale retrofit programs like the Cleveland EnergySaver, and increasing demand for existing programs like the Federal and State HWAP programs and Cleveland Housing Network's Housewarming program.

The creation of this public/private nonprofit partnership is already underway. This Working Group has engaged a consultant, CESI, to assist in the planning and implementation of GCEAC primarily through an initial stakeholder charrette. The one and a half day event will bring to the table the many retrofit

players in the area, with the goal of finalizing the details of the new entity. CESI was instrumental in the creation of the first energy alliance in Cambridge, MA, in the creation of the Southeast Energy Efficiency Alliance, and in the creation and development of the Greater Cincinnati Energy Alliance. Both the Southeast and Cincinnati Alliances were (with CESI's technical support) successful in securing both Block grant funds and in recently winning \$20 million and \$17 million respectively in DOE competitive block grant funds. The DOE is supportive of both the concept of energy alliances, and in their ability to convene, coordinate and deliver multi-sector energy efficiency services on regional bases.

4. Implementation of the Cleveland EnergySaver Pilot

No program can meet the retrofit needs of the City of Cleveland better than the EnergySaver program. Currently in development, the program would offer moderate to upper income individuals the opportunity to retrofit their homes for energy efficiency. In addition, the pilot will provide us with a working model for ramping up EnergySaver for significant expansion in order to meet the larger goals of this effort. The City should move forward with the implementation of this pilot program with all haste.

5. Implementation of the Alternative Energy District Pilot

The Alternative Energy District pilot program provides for both a new way to finance energy improvements for commercial structures and to create a strong regional partnership between the City of Cleveland and the 1st Suburbs Consortium. This effort should receive the full support of the City in moving forward as quickly as possible.

6. Raising the Financing Needed for the Next Ten Years

This report projects the need for \$400 million in retrofit financing over the next ten years. This financing will of course come from a broad spectrum of sources. Some of it already exists and needs to be expanded. Some of it is in a pilot phase and needs to be proven out then expanded. Some of it needs to be new sources not currently on the table. The Energy Alliance can play a lead role in much of this work but will need to full support and sometimes direct participation of the City.

7. Adoption of the Working Group's Policy Recommendations

To establish Cleveland as a national leader on the retrofit front, we believe that certain public policies need to be strongly considered and adopted in some fashion over the next year. The Working Group is very willing to work with the City in coming to specific details on the general policies listed below.

- Establish a standard for homes that are retrofitted to the "Gold" level as described earlier. Engage the realtor sector in working with us to place value on this standard in the sale of homes.
- Eventually establish a point of sale Residential Energy Conservation Ordinance (RECO) that would require each home in the city to be rated as to its energy efficiency upon sale.

- Have the State of Ohio adopt the 2009 International Energy Conservation Code.
 - Workforce policies: State, local and federal policies will each impact the retrofit program. There are four types of policy frameworks to which particular attention must be paid. These include:
 - (1) policies that provide incentives or mandate retrofits;
 - 2) policies that enable certain financial structures to pay for retrofitting;
 - (3) policies that govern job quality such as prevailing or living wage laws, and policies requiring local hire, targeted hire, and first source hiring. These may be accomplished through such tools as community workforce agreements which can be used to ensure that the jobs created by retrofitting are high road jobs which provide family-sustaining wages, benefits and access to employment for local communities;
 - (4) policies that include local and targeted hire requirements.
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ADDENDUM

List of Current Retrofit Programs

Program	Federal	State	Local / Municipal	Private / Non- Profit	Funding Mechanism	Income Eligibility	Total Funds	Funds/Unit (avg.)	Details
Residential									
Home Weatherization Assistance Program (HWAP)					No cost to homeowners with eligible incomes	200% Federal Poverty Guidelines	\$25,174,465 (Ohio, 2009)	\$3,250	Eligible households include: those with incomes below 200% Federal Poverty Guidelines, those receiving Supplemental Security Income (SSI), and households partaking in the (non-emergency) Home Energy Assistance Program (HEAP). The per-unit grant is approximately \$3,250 (per City of Cleveland)
Housewarming (CHN / Dominion East Ohio Customers)					No cost to homeowners with eligible incomes	200% Federal Poverty Guidelines			Eligible households include those with incomes below 200% Federal Poverty Guidelines that are also Dominion East Ohio Gas customers
Cleveland Public Power (CPP)					No cost to homeowners with eligible incomes	200% Federal Poverty Guidelines (HWAP requirement)			Eligible CPP customers (those having applied for HWAP) receive CFL bulbs, 'energy-hog' appliance replacement assistance
Water Conservation Program					No cost to homeowners with eligible incomes	175% Federal Poverty Guidelines (HEAP requirement)			Serves Cleveland Water Department owner-occupants who meet HEAP income guidelines; eligible for minor plumbing improvements and water conservation measures

Electrical Partnership Program (EPP)				No cost to homeowners with eligible incomes	150% Federal Poverty Guidelines (PIPP requirement)			Program targets high electric users already participating in the Percentage of Income Payment Plan (PIPP). Participants are eligible for energy conservation measures and education
Energy Efficiency and Conservation Block Grant Program (EECBG)				Grant	N/A	\$4,544,400 (City of Cleveland); \$5,783,000 (County)	TBD	Funded by the stimulus bill, the EECBG can be used to fund community improvements aimed at increasing energy efficiency
Neighborhood Stabilization Program (NSP)				Grant	120% of Area Median Income for 75% of funds; housing for people with incomes of 50% of AMI for 25% of funds	\$25,550,000 (\$8,000,000 rehab, \$17,000,000 demolition)	TBD	Program targeting communities with high-foreclosure rates, provides financing for rehabilitation / demolition of foreclosed units
ECO-Link (State Treasurer / KeyBank)				3% reduction in interest rate for first five years on qualified loans (up to \$25,000)	Owner-occupants			The Energy Conservation for Ohioans Program (ECO-Link) provides reduced-rate financing for energy-efficient retrofits undertaken in owner-occupied properties
Enterprise Community Partners Green Retrofit Program								The Green Retrofit Program provides multifamily owners and sponsors with financing for energy reduction capital purchases as boilers, hot water heaters and improved insulation. The Ohio Housing Finance Agency committed \$600,000 to the program in 2009

Environmental Health Watch Deep Energy Reduction (DER)					Educational Support (no funding allocated)	N/A		Participating Households spend approx. \$25 psf	DER targets residential structures that are either undergoing a total gut and rehab, or significant component replacement
FHA Energy-Efficient Mortgage					Cost of improvements rolled into mortgage				Federal program which allows otherwise potentially ineligible homeowners the opportunity to use a secure loan for energy-efficient improvements. Loans are available for amounts not exceeding the lesser 5% of the value of the property, 115% of the area median home value, or 150% of the Freddie Mac conforming loan limit
Residential Energy Efficiency Tax Credit					Tax credit	N/A	\$1,500 maximum credit		The credit applies to energy efficiency improvements in the building envelope of existing homes and for the purchase of high-efficiency heating, cooling and water-heating equipment. Efficiency improvements or equipment must serve a dwelling in the United States that is owned and used by the taxpayer as a primary residence. The maximum amount of homeowner credit for all improvements combined is \$1,500
Non-Residential									
Council of Smaller Enterprises (COSE) Green Plus Sustainability					N/A				The GreenPlus program offers small business owners the ability to analyze current business practices with regard to current sustainability goals

Initiative									
Ohio Department of Development Industrial Energy Efficiency Grant					Grant (Advanced Energy Fund)		\$50,000 per location (max); \$150,000 per corporate entity (max)		The Ohio Energy Office (OEO) is offering grants on a first-come, first-served basis to support the implementation of certain energy-efficiency projects. Projects must be installed in Ohio, and in the service territory of one of the state's four investor-owned utilities: American Electric Power, Dayton Power & Light, Duke Energy (formerly Cinergy) or FirstEnergy.
Energy-Efficient Commercial Buildings Tax Deduction					Tax Deduction		Maximum deduction of \$1.80 psf		Enacted with the Energy Policy Act of 2005, the Energy-Efficient Commercial Building Tax Deduction allows commercial building owners the ability to deduct costs associated with completed energy improvements