

# **New Opportunities for a New Era: Building Green in Pittsburgh**



**Capstone Seminar in Green Building and Green Planning  
Graduate School of Public and International Affairs  
University of Pittsburgh  
April 2008**

**Dedicated to  
Southwestern Pennsylvania's Continued Progress to  
Sustainability**

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## Executive Summary

Green building is a hot topic these days. Green building improves the efficiency of buildings – its energy use and impacts on settlements – through environmentally responsible planning and construction.

This report precedes a highly anticipated report to be released to the Pittsburgh Council on greening the city's operations. The purpose of this report is to inform decision-makers in the city and the region of the importance of embracing green building and sustainable development practices to improve the image and status of the region, reduce energy costs, and improve the health and wellbeing of all residents.

There is ample potential for greater application of the practice of green building in Pittsburgh, in the government and non-profit sectors, as developed here. While green building has thrived in Pittsburgh, the non-profit sector has been a stronger leader than government.

The City of Pittsburgh should take a more aggressive approach to issues of sustainability by implementing policies that set standards for development as well as the activity and property of the government itself.

- Sustainability should be the standard for development in Pittsburgh and can be achieved through the use of combinations of existing development tools.
- The City of Pittsburgh should retrofit its own facilities to be as energy-efficient as possible and use such an effort to educate residents about the importance of the practice to their own homes.
- The City's zoning and building codes represent a means to promote further formalized green building in the City.
- Neighborhood-level greening efforts should be undertaken where strong organizations exist to provide the advocacy and implementation.
- Affordable housing, both owned and rented, should be green and consistent with community plans.
- Green building and other environmentally sensitive practices should be adopted by community development corporations who, in turn, should be supported in their efforts by a wider network of resource providers.
- Community involvement should be pursued as an essential piece of the greening process.
- The City of Pittsburgh should be more aggressive about stormwater management, including developing policies to encourage strategies like green roof retrofits and securing funding to implement them.
- There is ample opportunity for green jobs in Pittsburgh, particularly in manufacturing and alternative energy.
- The University of Pittsburgh should commit to LEED certification for all major construction and developing a greenhouse gas reduction plan for its campuses.

The overarching theme of this report is that there are many more opportunities for implementing green building in Pittsburgh than are currently being exploited. The tools and technologies exist; Pittsburgh institutions need to adopt them and adapt existing systems to them. Many concrete opportunities have been identified here that can be first steps in the implementation of larger policies or programs, which make a local commitment to the practice of green building reality. The City of Pittsburgh government, local community organizations, and the University of Pittsburgh have been drawn out here as examples of how all organizations involved in shaping the built environment can strengthen their commitment to improving local quality of life by improving the quality of local development.

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## Chapter I – Introduction

*“First say to yourself what you would be; and then do what you have to do.”*

*~ Epictetus*

Green building is a hot topic these days. Green building improves the efficiency of buildings – its energy use and impacts on settlements – through environmentally responsible planning and construction. The U.S. Environmental Protection Agency (EPA) defines Green building as “the practice of creating healthier and more resource-efficient models of construction, renovation, operation, maintenance, and demolition” (USEPA, 2007).

This report precedes a highly anticipated report to be released to the Pittsburgh Council on greening the city’s operations. The purpose of this report is to inform decision-makers in the city and the region of the importance of embracing green building and sustainable development practices to improve the image and status of the region, reduce energy costs, and improve the health and wellbeing of all residents.

This report has several objectives:

1. Expand local leaders understanding of green and sustainable
2. development
3. Articulate the need for sustainable development
4. Inform local leaders of emerging and existing opportunities to incubate local green programs and
5. Provide insight and examples on how local leaders can incorporate green buildings in their communities.

This report will provide: (1) Local, national and international case studies on green building; (2) A community engagement toolkit; (3) Locally targeted strategies for sustainable development; (4) Clearly defined benefits of green development; (5) Analysis and findings from interviews with public and civic leaders; and (6) Next steps and recommendations.

To achieve these objectives the Capstone Seminar met with national and local experts, interviewed local officials (elected and non-elected), studied local communities that are going green, and compiled research to determine the need to widen the scope of green developments in the region.

### **The State of Green Building in the Region**

Green building has been incorporated into city and county comprehensive plans and affordable housing design and construction. From green building plans in Pittsburgh to green building technology being developed and utilized in Vandergrift, to new jobs being created in green industries, sustainable development is gaining traction within the region.

Well into the 2000s, Pittsburgh was at the frontier of the green building movement. As of December, 2007, Pittsburgh ranked 5<sup>th</sup> among cities with ***Leadership in Energy and Environmental Design (LEED)*** certified buildings, one of the major

national ranking systems for green buildings. Our region's reputation as a green leader stems from support for green building and environmental initiatives from the Green Building Alliance, Sustainable Pittsburgh, and The Heinz Endowments. Support also comes from its educational institutions. For instance, the University of Pittsburgh has been working with communities to develop new technologies to incorporate into the region's development projects.

Today, communities nationwide are learning from the Pittsburgh experience. Between 2003 and 2007, green building programs in cities with a population above 50,000 rose more than 400 percent (Rainwater, 2007). In March of 2008, Pittsburgh's status as a green pioneer resulted in the city hosting both the GreenSense Conference and the Good Jobs, Green Jobs Conference.

However, while Pittsburgh has been at the forefront of the sustainability movement, more education of local leaders on sustainable development is needed. For example, we surveyed 20 town managers, planning directors, council presidents and zoning code officials in Allegheny County (and one community in Butler County). These officials represent about 250,000 residents in the region. Only 10 percent -- just two municipalities -- stated they had a green building program.

Furthermore, in our survey, we also asked whether these officials were familiar with the major ranking systems for environmental and energy building measures: Leadership in Energy and Environmental Design (LEED), EnergyStar and Green Globes. Only 45% had heard of LEED, half were familiar with EnergyStar; and only 15% knew about Green Globes. ***These results indicate the need to provide regional decision-makers with a practical and comprehensive overview of green and sustainable development.***

### **Why We Should be Green**

The benefits of going green are undeniable and are increasingly. The largest consumer of energy in America is buildings, which account for 43 percent of total energy consumption. Altogether, buildings in the U.S. produce more CO2 emissions than any other total country, with the exception of China (Kats, 2003). Over the next two decades, commercial building energy demand is expected to increase by 40 percent (Loper, Ungar, Weitz and Misuriello, 2005). However, cost savings are not the only benefits associated with green building. There are also jobs. The economic benefits of building green are real and substantial. For example, the green collar jobs sector is fifth largest sector in the American economy and growing.

### Our Home, Our Region: A Two Minute Environmental Review

**Brownfields :** Former industrial sites that are slow to attract investments, in part due to remediation costs.

**Threatened Waterways:** The region's major waterways are still at-risk. The region's aging stormwater system is worsening and leakage is an urgent concern (see below). Contaminated stormwater and sewer overflows are a leading contributor to the region's deteriorating water quality (Environmental News Service, 2005). Furthermore, some 500,000 southwestern Pennsylvania residents are at-risk of "unreliable or polluted drinking water" (Pennsylvania Economy League, 2002).

**Poor Air Quality:** Since the 1990s, Pennsylvania has reduced air pollution 22 percent; however this is 10 percent below the national average (Gazarik, 2002). Moreover, according to the American Lung Association, the air-quality in metropolitan Pittsburgh is the fifth worse in the U.S. (American Lung Association, 2004). According to the U.S. EPA, much of the Mon Valley area's air quality exceeds EPA pollution limits deemed necessary to protect human health. Part of the problem is the region's continued reliance on coal-burning power plants to generate electricity. Coal-fired generation contributes the majority of emissions from this sector, including 87 percent of the CO2 emissions (Wolfe, 2002). Purchasing power from sources of clean energy will potentially reduce the role of coal-fired power plants in Pennsylvania's energy future.

**Commercial and Residential Energy Efficiency:** Currently, Pennsylvania's track-record on energy efficiency is mixed. As of 2007 Pennsylvania ranked 7<sup>th</sup> in total square footage of LEED buildings (Green Building Alliance, 2007b). Pennsylvania has incorporated energy efficiency into the state's Uniform Construction Code. However, less than 3 percent of new homes in Pennsylvania are certified EnergyStar Homes, while the national average is 12 percent (EnergyStar, 2008). Improving the region's overall energy efficiency makes prudent economic sense.

According to a report by the American Solar Energy Society (ASES) renewable



Source: American Solar Energy Society

energy and energy efficient industries have created 8.5 million green collar jobs, which cannot be easily outsourced (Bezdek, 2007). The ASEA noted that "with the appropriate public policy, including . a renewable portfolio standard, renewable energy incentives, public education and research and development" as many as one in four workers could work in these fields by 2030. Therefore, in this report, we discuss the opportunity to turn blue collar jobs into green collar jobs.

While Greater Pittsburgh is among the most affordable regions in United States, more could be done to make the region more affordable for low-income households, including improving energy efficiency in the region's older housing stock. Since 1998, low-income families' energy bills increased 33 percent (Patton, 2007).

The rise in energy is (1) due to rising energy cost and (2) because lower-income households tend to be older and constructed with lower-quality materials (Energy Consortium, 2008). For example, a home built today uses 30 percent less energy per square foot than a home built prior to 1970 (Loper, et al., 2005). The median year built of housing in metropolitan Pittsburgh is before 1940. Half of homes in the City of Pittsburgh predate 1940 and over three-quarters of homes in Pittsburgh in 2000 predate 1960.

There are many other reasons for local governments, businesses and non-profits to go green. We discuss and analyze many of these in this report.

### **Context: Historic and Present Environmental Overview of Pittsburgh**

Changing Pittsburgh's energy future requires a look backward. During the mid to late 19<sup>th</sup> century, while Pittsburgh blossomed into America's industrial superpower, the region's air, water and land suffered. In 1934, 84 percent of Pennsylvania's waterways had some form of degradation. Pittsburgh earned the unflattering reputation of being "Hell with the Lid Off" and the "Smoky City."

There was also little action from the state to protect the region's fragile environment. For example, legislation passed in 1934 to protect the state's waterways state that waters already polluted could continue to be polluted (Tarr and Yossie, 2003). Thus, companies such as Duquesne Slag openly poured slag, an industrial byproduct of smelting iron, down the valley hillsides into Nine-Mile Run until the 1970s (Paul and Davidson-Welling, n.d.).

The region's industrial legacy and environmental issues have tended to overshadow its heritage and more recent environmental gains. Springdale native Rachel Carson's book, *Silent Spring*, pushed the environmental movement of the 1960s and 1970s. A key aspect of Pittsburgh's revitalization efforts during Renaissance I (1946-1973) was restoration of the region's air and water quality (Deitrick, 1999).

Nonetheless, greater environmental progress must be made to enhance our region's quality of life and economic attractiveness. Specifically, energy inefficiency, quality of housing stock, brownfields, and water and air quality remain problems. Continued advancement of the sustainability agenda, with the momentum of green building at the helm, are the imperative to the region's future.

### **Acknowledgements**

The Capstone Seminar would like to thank Rebecca Flora of the Green Building Alliance, Caren Glotfelty of The Heinz Endowments, and William Peduto of Pittsburgh City Council for the assistance with our project. They were wonderful resources for understanding the strength and growth of green building in Pittsburgh.

The Capstone would also like to thank Chris Siefert at the Children's Museum and Joyce Rothermel and Gail Collins at the Greater Pittsburgh Community Food Bank for discussing their green buildings with the class and allowing us to tour their facilities.

We also thank the following for their involvement with our class:

Ann Gerace, Jim Sloss, Joyce Valiquette, Nathan Wildflower, Gerry Okoko, Matt Smutts, Daniel Friedson, Marco Trobovich, Corey Layman, Janie French, John Schambert, Dan Sentz, Elly Fisher, Ryan Snow.

## Chapter II - Beyond the Building: Integrated Strategies for Sustainable Development in Pittsburgh

Before moving forward, we first need to step back and ask a bigger question: Is green building sufficient to get Pittsburgh where it needs to go? In other words, is green building a strategy for sustainable development? This chapter seeks to answer these questions by analyzing a number of planning tools' contribution to sustainable development. Our goal is to show how these tools, including green building, can be utilized to achieve a higher standard of responsibility in development.

The term green building generally refers to the principles embodied in the LEED system, which has become the industry standard. While LEED does establish high standards for healthy and environmentally responsible buildings, LEED does not go beyond the building to consider the larger implications of development decisions. It touches on the principles of sustainability, but we find that that green building as defined by LEED requires other considerations. Green building and sustainable development share some common features and underlying concepts, but they should not be considered to be one and the same. In the simplest terms: *green building is a practice, sustainability is a condition.*

Sustainability is commonly defined as meeting the needs of the present without compromising the needs of the future. This definition is derived from the work of the Brundtland Commission, which first outlined this concept in a report it completed on behalf of the United Nation's World Commission on Environment and Development. When it was convened in 1987, the commission was tasked with the unenviable position of creating a comprehensive approach to dealing with the array of issues facing developing countries. This overarching principle of sustainability that they defined can also be applied to the decision-making process surrounding development projects. However, the question of when and how that principle is applied is an important one. It should also be noted that the Brundtland Commission is not alone in attempting to define the principles surrounding sustainable development. Other efforts include the Natural Step (1989), the Hannover Principles (1992) and the Sanborn Principles (1994).

These four sets of sustainability principles roughly resemble each other and are connected by these concepts: equity, community, efficiency, conservation, diversity and long-term thinking. Furthermore, their basic criteria for sustainable development can be broken down into the following:

- Physically and economically accessible by all
- Provides healthy environments for all
- Provides benefits irrespective of income
- Seeks citizen participation and knowledge-sharing in processes
- Eliminates the impact of human behavior on natural systems
- Does not exploit natural resources
- Promotes diversity of populations and experience

- Conducted as a flexible process in which decisions are made consistent with future as well as present needs

These criteria provide a comprehensive view of sustainability that can be used to measure whether or not various types of development can be considered sustainable. We examine a set of planning tools against the sustainable development criteria to see how they fare. The analysis uses a three level scale:

- X = meets the criteria
- / = partially meets the criteria
- O = does not meet the criteria

The following planning tools are evaluated using this scale in Table II-1:

- Smart Growth
- New Urbanism (a.k.a. Traditional Neighborhood Development)
- Complete Streets
- Transit-Oriented Development
- LEED for Neighborhood Development
- neighborhood planning
- city-wide comprehensive planning
- Community Benefits Agreements

Relevant language from each tool's principles is included in its box when there is a connection between it and the criteria. Please see Appendix A for a complete outline of all the planning tools, their principles and resources.

As you can clearly see, there is no easy answer as each tool succeeds on some criteria and fails on others. At the same time, there is no magic combination that is better than the others, so each situation will call for a number of tools to be combined in order to meet the criteria for sustainable development. For example, LEED for Neighborhood Development, which is discussed in the next Chapter, meets or partially meets six of the 8 criteria set forward. City-wide comprehensive and community benefits agreements meet the missing two criteria. Thus, an integrated strategy that builds on all three tools can produce more sustainable development. Some criteria are not achieved by most tools, including "provides benefits irrespective of income," "eliminates the impact of human behavior on natural systems," and "carried out as a flexible process." These may be difficult to achieve, but do need to be considered in the development of these tools.

While an ideal scenario is difficult, the evaluation tools provided here do allow for modification should the project team want to meet sustainable development criteria in a limited number of categories. For example, a privately developed and owned project may choose to eliminate the community category. While we do not recommend using this piecemeal approach, we recognize that the concept of sustainability can be adapted accordingly to each project type.

Development Planning Tools

TOOLS:

	Smart Growth	New Urbanism (also, TND)	Complete Streets	Transit-Oriented Development	LEED for Neighborhood Development	neighborhood planning	city-wide comprehensive planning	Community Benefits Agreements
is physically and economically accessible by all	X - "create a range of housing opportunities and choices"; "provide a variety of transportation choices"; "make development decisions predictable, fair and cost effective"	O	O	/ - "development near transit facilities and high-quality walking environments"	/ - smart location and linkage; neighborhood pattern and design	O	/ - "plan to meet housing needs"	O
provides healthy environments for all	X - "create walkable neighborhoods"	O	/ - "designed and operated to enable safe access for all users"	O	X - neighborhood pattern and design (walkable streets)	O	O	O
provides benefits irrespective of income	O	O	O	O	O	O	O	/ - "setting forth a range of community benefits that the developer agrees to provide as part of a development project"
seeks citizen participation and knowledge sharing in processes	X - "encourage community and stakeholder collaboration in development decisions"	O	O	O	X - neighborhood pattern and design (community outreach and involvement)	X - "represents the views of all the stakeholders that make a up a community"	/ - planning body and governing body must each hold one hearing	/ - "result of a negotiation process between the developer and organized representatives of affected communities"
eliminates the impact of human behavior on natural systems	O	O	O	O	/ - smart location and linkage	O	O	O
does not exploit natural resources	/ - "take advantage of compact building design"; "preserve open space, farm land, natural beauty and critical environmental areas"; "strengthen and direct development toward existing communities"	/ - "support the restoration of existing urban centers and towns"; "the conservation of natural environments"	O	/ - "compact, mixed-use development near transit facilities"	/ - smart location and linkage; neighborhood pattern and design; green construction and technology	O	/ - "plan for protection of natural and historic resources"; "plan for the reliable supply of water"	O
is carried out as a flexible process in which decisions are made consistent with future as well as present needs	O	O	O	O	O	O	X - "short- and long-range implementation strategies"	O
promotes diversity of populations and experience	X - "mix land uses"; "foster distinctive, attractive communities with a strong sense of place"	/ - "reconfiguration of sprawling suburbs into communities of real neighborhoods and diverse districts"; "preservation of our built legacy"	O	/ - "mixed-use development"	X - neighborhood pattern and design	O	O	O

CRITERIA:

is physically and economically accessible by all
provides healthy environments for all
provides benefits irrespective of income
seeks citizen participation and knowledge sharing in processes
eliminates the impact of human behavior on natural systems
does not exploit natural resources
is carried out as a flexible process in which decisions are made consistent with future as well as present needs
promotes diversity of populations and experience



## **Sustainable development and green building in the City of Pittsburgh**

Though Pittsburgh is one of the nation's leaders in the field of green building, we ask: How is it doing in terms of sustainable development? And what barriers are preventing Pittsburgh from achieving a more sustainable approach to development?

Sustainable development can occur in Pittsburgh and, fortunately, it already has, but it is not pervasive. We can further examine sustainable development by examining the following:

- Perception of cost premium
- Public policy doesn't consider social and environmental capital
- Areas of need are not engaged
- Behavior and attitudes are hard to change (Flora, 2008).

First, let's take a quick look for the impact and importance of sustainable development for Pittsburgh. A search of the term on the City of Pittsburgh website returned 18 results covering just four items: two pieces of legislation promoting green building (both authored by Councilmember Bill Peduto), the results of a study by participants in the 2004 Guyasuta Fellowship (a program offer by Councilmember Peduto), and a study conducted for the rebuilding of the Frick Environmental Center.

From these results, we conclude that sustainable development is not pervasive in City government.

Expanding the search to "green building" improves the results -- 35 hits over a wider range of items. The mayor's "green building agenda" is an important part. The Urban Redevelopment Authority (URA) provides financial incentives for green projects (Urban, 2007) .

At the local level, by our measures, one barrier stands out -- "behavior and attitudes are hard to change." This speaks to the issue of political will. Clearly the current mayoral administration believes that there is some value in promoting the idea of green building, but whether comprehensive implementation will come to pass still remains unclear.

### ***Opportunities lost and found***

Two high profile projects currently under development in Pittsburgh offer significant opportunities for sustainable development, but unfortunately they are being missed. Both are large-scale complexes that will have an enduring impact on the economy, environment and people of Pittsburgh. They are the new hockey arena and the casino. In both cases green building practices will be used on the buildings, but neither has adequately addressed public concerns about design, site planning and community impact (Lord, 2008).

While the arena and casino projects stand out as potentially lost opportunities, two key projects are currently underway that do take a broader view of sustainable development -- the East Liberty Green Vision and the Northside Charm Bracelet

project. These two projects strive toward a community-based, environmentally sensitive, and economically sound model.

The East Liberty Green Vision is an overlay to the East Liberty neighborhood of Pittsburgh's community-wide plan. The vision was informed by a group of local experts in the environmental arena and then brought to the community for vetting. The vision provides a comprehensive view of environmental conditions in the neighborhood, which allowed the development organization to be sensitive to them when moving forward with the project. Sustainable pieces of the overall plan include green materials (e.g. porous pavement), a LEED for Neighborhood Development pilot project, reestablishing the street grid, creating parks and building bicycle paths. This project is discussed in further detail in chapter following this one.

The Charm Bracelet project, conceived by the Children's Museum of Pittsburgh, is an effort to link existing arts and cultural venues in the Northside area of the City. The Children's Museum has taken on a leadership role in the Northside community and initiated this project as much for its own benefit as that of the community in recognition of the fact that their interests are closely aligned. The Charm Bracelet project will reach beyond city-defined neighborhood boundaries to create connections between venues and provide a new type of cultural district. Ultimately, the idea is to frame the Northside as a family district by highlighting the long-time family-oriented institutions there. There are fifteen stakeholders participating in the planning and oversight of the project and a fund has been established among them to pay for the joint costs of promotion or programming. (Seifert, 2008).

Interestingly, both East Liberty and the Northside were ravaged by urban renewal in the mid-twentieth century and now they are embracing a more sustainable approach to development than almost any other area of the City. Perhaps having already been subject to the worst kind of redevelopment, they are now reacting in the strongest manner possible in order to achieve a truly livable result.

The opportunities for promoting and planning sustainable development exist in Pittsburgh. Existing planning tools can be combined to develop integrated strategies for sustainable development. Local government needs to start making sustainable development a priority in practice as much as in rhetoric. Every development in the City of Pittsburgh should be designed in the greater context of sustainability. Concerns about human impact on the environment have been validated. Community meetings are widely accepted and built into public processes. The economic benefits of strategies like green building have been established. No piece of the puzzle, be it the economy, the environment or the people, should be left out the process. In the end, a focus on sustainability will be central to the city's future viability, allow it to continue being competitive with other cities and, most importantly, safeguard the quality of life of its citizens.

## Chapter III - Neighborhood Greening

The growth of the green building movement is creating new challenges and opportunities for community development. Environmental issues may play a more central role in community development, but the pace of their infusion is slower than is preferable. In part this is due to the social democratic concerns which are at the root of community development: prioritizing jobs, housing, and economic development (Cannan, 2000, p. 366). In turn, there is often a perceived conflict between community development's ability to address community needs and the needs of the environment. *The needs of communities in transition, with issues related to poverty, underemployment, crime, and lack adequate, may appear to be at odds with the green building movement.* As we will see in this chapter, there are numerous examples of both communities and sustainability practices that serve to derail this perception. Ultimately, the needs of the community are intertwined with the needs of the environment in a sustainable manner, as was discussed in the previous chapter.

Neighborhood planners can create an integrated system of development that reflects a social justice framework by incorporating social, environmental and economic goals (Campbell, 1996, p. 289). For simplicity's sake, we will now refer to this new movement towards sustainable neighborhood and community development as neighborhood greening.

Presently, neighborhood greening is taking place in a diversity of communities across the United States, including Pittsburgh. We analyze them here.

The sustainability principles discussed in the previous chapter – Sanborn, Hannover, Brundtland, and Natural Step -- demonstrate diverse ways to approach neighborhood greening. While neighborhood greening is relatively new in practice, we have explored projects and communities where some of these principles are being employed. We focus primarily on LEED for Neighborhood Development (LEED-ND) projects and analyze what types of neighborhood developments LEED-ND is best suited.

### **LEED-ND**

LEED-ND was conceived in 2007 as a pilot program to expand LEED principles "beyond the building." Reducing the continuation of sprawl that plagues the nation while increasing air quality and pedestrian activity in neighborhoods are several of the many benefits LEED-ND can offer. LEED-ND covers a wide range of neighborhood shapes and sizes. Over 200 projects are registered as LEED-ND pilot projects, including three in Pittsburgh.

LEED-ND projects can obtain points towards certification in four categories:

- Smart Location and Linkage
- Neighborhood Pattern and Design
- Green Construction and Technology
- Innovation and Design Process.

We reviewed LEED-ND to determine the features most applicable to Pittsburgh (see Table III.1). Projects in Pittsburgh are not limited to the credit suggestions made in this report.

**Table III.1: LEED-ND Credits Most Applicable to Pittsburgh**

	<b>Credits Most Applicable to Pittsburgh</b>	<b>Description</b>
<b>Smart Location and Linkage</b>	<ul style="list-style-type: none"> <li>• Brownfields Redevelopment</li> <li>• Housing and Jobs Proximity</li> <li>• School Proximity</li> <li>• Reduced Automobile Use</li> </ul>	Encourages the reuse of industrial land. Reduces automobile dependence with alternative ways of transportation or a reduction in vehicle trip length.
<b>Neighborhood Pattern and Design</b>	<ul style="list-style-type: none"> <li>• Diversity of Uses</li> <li>• Affordable Rental and For Sale Housing</li> <li>• Reduced Parking Footprint</li> <li>• Walkable Streets</li> <li>• Transit Facilities</li> <li>• Community Outreach and Involvement</li> </ul>	Promotes livability of communities. Offers affordable housing to rent and buy. Promotes mixed income neighborhoods. Creates parking structures that pose minimal effects on the environment. Encourages walkable streets and easily accessible public transportation facilities. Involves community in the project planning and design.
<b>Green Construction and Technology</b>	<ul style="list-style-type: none"> <li>• Energy Efficiency in Buildings</li> <li>• Reduced Water Use</li> <li>• Building Reuse and Adaptive Reuse</li> <li>• Reuse of Historic Buildings</li> <li>• Minimize Site Disturbances</li> <li>• Stormwater Management</li> <li>• District Heating and Cooling</li> <li>• Waste Management</li> </ul>	Encourages design and construction of energy efficient buildings to reduce water usage. Uses existing building stock and conserves materials. Reuse historic buildings to preserve their appearance and character. Manages the flow of stormwater along with waste in the building to reduce damaging environmental impacts like erosion and flooding.
<b>Innovation and Design Process</b>	<ul style="list-style-type: none"> <li>• Innovation in Design</li> <li>• LEED Accredited Professional</li> </ul>	Receives points for exceptional performance in all of the other categories. Includes point given if at least one member of the project design team is a LEED Accredited Professional.

***Pittsburgh Based Projects***

Pittsburgh is home to three of the 238 LEED-ND pilot projects: Mellon’s Orchard South in East Liberty, Riverparc in Pittsburgh’s Cultural District, and Edgewater in Oakmont. East Liberty Development Incorporated (ELDI), the neighborhood’s community development corporation, is responsible for the planning and development of the Mellon’s Orchard South project. The Mellon’s Orchard Project is the only urban infill LEED-ND project in a distressed neighborhood. It will consist of about 70 to 85 single-family housing units constructed to be energy efficient and environmentally friendly, taking all green aspects into account. The three objectives of the Mellon’s Orchard South project: to reconnect the fabric of the neighborhood, to reconnect dysfunctional infrastructure by



*Photo courtesy of ELDI*

eliminating barriers, and to make this project part of the larger revitalization of East Liberty (Wildfire, 2008).

LEED-ND can accommodate a range of housing types and styles within green building. The housing units in Mellon's Orchard South will be based on ELDI's prototype house used for their neighborhood infill projects, which include four different homes. Among these four homes, there are eight different façades, creating a diverse appearance of the neighborhood. The homes are all proposed to be 100 percent market rate at this time with the possibility of mixed-income apartments constructed afterwards. Market-rate housing was chosen to subsidize a park for the development. The project is a pilot project and its growth is restricted. What its impact will be on the rest of East Liberty is not known. However, the Mellon's Orchard South project will be able to demonstrate that LEED-ND can be successful in distressed urban neighborhoods, which is beneficial to Pittsburgh economy and the environment.

The LEED-ND pilot project proposed for Pittsburgh's Cultural District, called Riverparc, takes a different approach to greening the city. The mixed-use development set along Fort Duquesne Boulevard, Penn Avenue and Seventh and Ninth Streets will incorporate the arts of the Cultural District with residential units, a hotel, new parking structures as well as retail spaces. Veronica Corpuz of the Pittsburgh Cultural Trust expresses that the LEED-ND development is an extension of the Trust's work to "revitalize downtown through the development of its cultural district, not only through the arts but also through real estate development...creating a 24-7 atmosphere where we have residents, visitors, workers, and students" (McGuigan, 2007).



*Photo courtesy of the Pittsburgh Cultural District*

An important aspect of the Riverparc project is that together with the Cultural District, the developer has held public meetings to open up the planning and development to the citizens of the Downtown neighborhood and throughout the city. The developer has stated that government officials have shown great support for the public-private project, which is essential to its success (McGuigan, 2007).

The third of the LEED-ND pilot projects in the Pittsburgh region is Oakmont and is really two registered pilot projects, Edgewater and the River's Edge. Oakmont is located 14 miles up the Allegheny River from downtown Pittsburgh. The community is a good candidate for LEED-ND, with historic buildings, post-industrial infill development, walkability, multi-use compact retail shopping, recreational use trails, abundant green space, stability, and a community interest in continuing to improve quality of life.

Both Oakmont projects will include developments along the Allegheny River. Edgewater, a residential community on 34 acres, is on part of the Edgewater Steel site (Edgewater, 2008). River's Edge will consist of 29 acres of new development, including housing and several retail outlets. River's Edge is further along in its project development plan than Edgewater.

### ***Special Issues related to LEED-ND***

The LEED-ND process requires formal evaluation to achieve LEED standards. Some fear that developers may try to achieve LEED-ND ratings for marketing value, while not being as concerned about overall neighborhood improvement and sustainable development. However, our respondents feel that this is not the goal of the Pittsburgh-area LEED-ND projects. The community-based organizations are committed to sustainable neighborhood development.

Unfortunately, other problems may arise with LEED-ND:

- Not all real estate development will be targeted towards people with lower-incomes. Mellon's Orchard South homes will be sold at market-rate values.
- Developers may want to continue the success they have had with selling homes at market rate value and not venture towards providing more affordable housing.

The proposed LEED-ND projects in both East Liberty and Downtown have focused on the community process regarding the development in the neighborhoods. East Liberty has a resident council that meets monthly and has actively participated in providing their input on what the residents would like to see out of the Mellon's Orchard South development. The Pittsburgh Cultural Trust along with Concord Eastridge has planned several community meetings for the Riverparc development project. Although these proposed projects have had successful community feedback that assisted in the planning process, that does not mean all future projects in Pittsburgh could follow the same pathway. A situation may arise where a developer thinks that they know what is right for the community. Without asking the neighborhood for planning advice, this may cause a backlash towards the developer and any organizations involved in the project. It is vital to all future neighborhood greening development in the City of Pittsburgh realize the importance of the community process in planning a project such as one that is LEED-ND.

### **Capacities Needed for Neighborhood Greening**

There are many measures that need to be taken in order for neighborhood greening to become successful in the City of Pittsburgh and the region. A balance between development projects and community building is necessary. True sustainability will not be achieved unless the process is inclusive: socially, environmentally, and economically.

What is needed for success:

- Green vision statement
- Neighborhood community plan

- Community task force that meets regularly
- An administrative organization with the capacity for program expansion

How organizations can administer green neighborhood development:

- Identify the key stakeholders in the development.
- Plan meetings with neighborhood residents to address the new greening initiative and its intentions.
- Create a vision statement that will articulate what the neighborhood wants. The vision statement could be as simple as “a cleaner, greener neighborhood;”
- Produce a community plan. This allows community development corporations to follow through with the residents’ desires by making changes and adjustments to their programmatic areas.
  - Include a section on green building in the community: What do the residents want to see and how will that fit with energy efficiency and environmentally friendly development? Do they want to see greener streetscapes? Are they interested in greening their homes with more efficient water heaters and faucets? In what ways do they want local businesses to take part in the green initiative?
- Establish a green vision experts’ task force to inform the efforts of community stakeholders. Establish a place to give updates to task force if they meet less regularly than community stakeholder groups.

To succeed, organizations need to develop new funding sources. One means is the Neighborhood Partnership Program (NPP) in Pennsylvania. Businesses that participate in the NPP will receive tax credits equal to 70% of the business’s contribution and provide the resources necessary to support the program. This can include a Pittsburgh neighborhood’s greening initiative. According to the Pennsylvania Department of Community and Economic Development, recipients of the NPP will receive at minimum \$100,000 per year over a five year period and there is a limit of three sponsors per project (2004). While this contribution is substantial, it may not be exhaustive in all situations. The organization will have to seek funding from other sources. Organizations, including non-profit community development corporations, and other community groups within a neighborhood can collaborate together to apply for this program and work towards a neighborhood greening initiative. Efforts to obtain the financial support outside of the NPP will need to be done by an experienced fundraiser, such as the executive or assistant director of the community development corporation who has had past success in securing funding in various programmatic areas.

### **Alternatives to LEED-ND: Noisette, South Carolina**

LEED-ND isn’t the only program putting sustainability at the heart of neighborhood planning. A great example of The Sanborn Principles at work is a community in the North Charleston, South Carolina called Noisette. Noisette is an evolving community that recently generated a masterplan for sustainable development. The Sanborn

Principles were integral to their project plans guiding visioning and goal setting, and now implementation strategies. Moreover, the vision recognizes “Values of Place,” which are “a set of precepts embodying the essence of timeless design, human-centered building and personal responsibility” (Noisette, 2008). There is a heady venture integrating environmental regeneration and restoration, and historical renovations and new construction into the master plan. Their approach stresses the importance of recognizing community history balanced against contemporary community needs. This link between past and future is indicative of the Sanborn approach, and has immense potential for Pittsburgh—with its evolving identity, yet rich and deeply felt history.

The Noisette plan is large in scale and scope. Notably, in evaluating it against other strategies for neighborhood greening, The Sanborn Principles allow for benchmarking and ongoing self-evaluation. Noisette has interpreted Sanborn’s habitat as “learning organism” as a way to “improve its performance as each decision is made and implemented” (Noisette, 2008). As such, benchmarking their master plan’s progress is an integral aspect of their neighborhood greening effort.

## **Conclusions and Recommendations**

- An effective organizational structure is needed to implement neighborhood greening strategies, including a green vision statement, a community plan, as well as a secure funding stream to support green programs. Without a strong community development corporation or other centralized organizational body to coordinate activities, create partnerships, and manage the projects, neighborhood greening is not a realistic goal.
- All neighborhood greening projects have the potential to achieve sustainability within the neighborhood, and it is important for organizations to be a part of the development for this reason.
- LEED certification and the recognition it brings are great accomplishments, but the long-term benefits of neighborhood greening are essential to a community’s vitality.
- A variety of interdisciplinary neighborhood greening models were presented in this chapter. Based on a community’s demographics and needs, it can be concluded that some of the examples are more sustainable than others.
- As the neighborhood greening movement continues to grow within the city, community organizations will be able to apply the successful practices of their neighbors, ultimately achieving a cleaner and greener Pittsburgh as a whole.

### *Greener to Preserve or to Build Anew: A Cleveland Case Study*

Conflicts can arise when green building confronts historic preservation. In Cleveland, Ohio, there is an ongoing debate between historic preservationists and green builders regarding whether the demolition of a historic building in the city's downtown commercial district is "greener" than reuse. The Cleveland Trust Rotunda, built in 1909, would remain in place while the neighboring Trust Tower will be demolished and replaced with a LEED-certified administrative center. Preservationists are outraged as they feel the Tower can be reused as a green building, keeping its 1971 Bauhaus architecture in place without disrupting surrounding buildings with the pains new construction can cause, including noise pollution and interruptions in the flow of pedestrian and automobile traffic.

The green building movement debate has posed a significant emphasis on new technologies and construction, rather than a building "stuck in the past" (Hughes 2008). A local preservationist states that the Cleveland Trust Tower has an embodied energy of roughly 10 to 15 gallons of gas per square foot. At 250,000 square feet, this is equally to roughly \$11 million in energy costs alone. With these levels of energy savings at stake, numerous opportunities are presented for green builders to consider the reuse of a structure while its interior mechanisms are redesigned to be more environmentally friendly. An increase in the amount of green building development throughout the Pittsburgh region could bring about a similar debate in which preservationists and green builders will have to decide which aspect is more beneficial.

## **CHAPTER IV -- THE PITTSBURGH MIRACLE: REALIZING THE GAINS OF ENERGY EFFICIENCY**

Pittsburgh can and should keep itself on the green building map by making strides to establish itself as the energy efficient capitol of America. A prospect for facilitating this process is on the horizon in the form of Energy Efficiency and Conservation Block Grants. They are designed to assist state and local governments in the implementation of energy efficiency strategies over the next five years. Their development marks the first time that Congress has made a truly concerted effort to promote energy efficiency since the oil shocks of the 1970s. If funding is appropriated for them, they would prove to be a real windfall for places like Pittsburgh that lag behind so many other areas in realizing the gains of energy efficiency. At the same time, Pittsburgh has so much cost-effective potential in this area that it need not wait for these grants to start making immediate and substantive progress. This chapter explores the rationale for exploiting energy efficiency opportunities in Pittsburgh, while demonstrating the policy mechanisms and strategies that should inform development of Pittsburgh's effort.

There exists a tremendous opportunity for this city to make large and rapid energy efficiency improvements in its aging structures, which can be seen in these three simple facts:

- The median age of a home in Pittsburgh dates to sometime before 1940.
- Over 80,000 residences in this city were built before 1939.
- Most of the city was built long before energy consumption and environmental concerns were factors to be considered.

Beyond the green building implications, efficiency improvements would have a significant positive impact on the city as a whole in terms of:

- Reduced energy costs to consumers
- Decreases in energy consumption
- Real economic gains for both low and middle income families
- Job creation
- Substantial reduction in our greenhouse gas emissions.

This will be no easy task to accomplish, but it is possible if Pittsburgh is willing to adopt the right policies and combine them with necessary civic engagement.

### **The case for investing in energy efficiency**

In an era of rising energy prices, Pittsburghers, and Americans in general, are becoming increasingly concerned about the amount of energy they consume and how much it is costing them. From the rising price of gasoline at the pump to climbing electricity bills at home, we are all increasingly forced to take stock of the amount of energy we each consume on a daily basis. Unfortunately a significant amount of the energy we consume is also wasted because we are not taking full

advantage of the productivity potential of existing technologies. This waste is happening in a variety of sectors ranging from industry to transportation, but none more so than the building sector.

The first and perhaps most obvious conclusion one might jump to as to why investments in energy efficiency are not happening is that these improvements are not cost effective. In fact, many studies have demonstrated that beyond being just *cost effective*, there actually exists a significant potential for substantial *economic gains* to be made.

- A recent study by McKinsey & Company, found that capturing the potential available in existing technologies with an internal rate of return (IRR) of 10 percent or more, the United States could cap both its energy demand and greenhouse gas emissions at current levels. (McKinsey, 2007)
- The US Department of Energy has estimated that the cost savings of installing a standard compact fluorescent light (CFL) is \$13 over the lifetime of the bulb. The economic gains achieved through this minor investment far exceed the cost of the bulb itself. (U.S. DOE, 2007)
- Congress' Joint Economic Committee examined the savings that are available through increasing household-level energy efficiency. It found that energy efficient households spend 40 percent less on their utility bills than non-efficient ones. (Joint Economic Committee, June 2007)

### ***Societal benefits***

Beyond gains to households, the societal benefits that can be found in energy efficiency improvements are actually quite diverse in both their scale and scope.

1. Less energy consumed results in less energy having to be produced, which means that fewer power plants will be needed in the long run.
2. Lowering production levels will also result in reductions in carbon emissions.
3. Fewer power plants will keep pollution levels in check and reduce environmental impact.
4. Reduced consumption will lower our dependence on foreign sources of energy and lead to increased energy security.

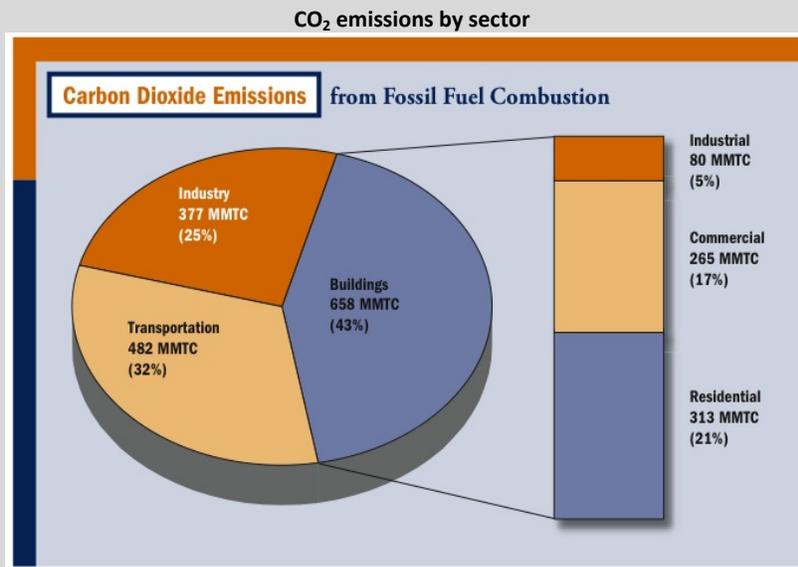
In other words, investing in energy efficiency projects, which have financial returns at levels similar or higher to historic stock market returns, can both reduce future energy consumption and curb pollution. Although it may difficult to put an exact price on these benefits, few would argue the fact that they do amount to a social good in their own right.

## The Role of Buildings in Climate Change

Increased investments in energy efficiency generate additional public goods through reductions in greenhouse gas emissions. Worldwide, buildings account for 30 to 40% of all primary energy consumption and, in turn, most of this energy is produced via the burning of fossil fuels (UNEP, 2007). This energy is consumed throughout the entire lifecycle of a building, which includes the manufacture of building materials, transportation of those materials to the building site, actual building process, the operations phase of a building and even the demolition of the building.

A wide range of opportunities for efficiency gains exists at every stage of the process, but none more so than the operations phase of a building. During this period almost all buildings consume energy in two forms, directly through onsite burning of fossil fuels like heating oil and indirectly through the consumption of electricity from offsite power plants. Improvements in energy efficiency can lead to reductions in energy use of both forms, which is why they play such an important role in any comprehensive emission reduction strategy.

In the United States, residential, commercial and industrial buildings combine to account for approximately 43% of all carbon dioxide emissions (Pew Center, 2006). They outpace both industry (25%) and transportation (32%) as the primary contributor to our domestic emissions. The chart below shows how the building sector itself can be further broken down.



Source: Pew Center for Global Climate Change (November 2006). Building Solutions to Climate Change. Arlington, VA: Pew Center. p. 1

As this chart demonstrates, if one is concerned with the carbon emissions associated with climate change, it is also critical for residential green building policies to be as encouraged as they are in the commercial sector. At the same time, climate initiatives, including the forthcoming one being designed for Pittsburgh, need to consider the broader implications of not aggressively targeting reductions of the building sectors' emissions. Dealing with transportation and public buildings emissions are undoubtedly important, but they will not be sufficient in achieving the level of reductions necessary to make progress on the issue of climate change.

## Three factors behind the market failures

Of course, if efficiency makes such economic sense, then why are people neglecting to take advantage of these opportunities? It turns out that many people are, but largely participation has been limited to the institutional and commercial sectors. This is because the scale of these projects allows investors to start seeing returns

relatively quickly. For example, an investor has recently teamed up with Virginia Tech to make a \$500 million investment in improvements in energy efficiency to large buildings in the Washington, DC area. (Fahrenheit, 2007) Virginia Tech will oversee the design and implementation of the projects, which are projected to create an amount of savings that will be significant enough for the investor to recoup costs and even turn a profit. However, three factors often combine to stop similar projects at the individual level.

1. *Capital*: A major obstacle is the issue of upfront capital and the fact that many individuals have difficulties in justifying these capital outlays. Unfortunately, current perceptions of what returns should be on these investments are quite skewed and many people want an IRR of over 50% before readily outlaying capital. (McKinsey, 2007)
2. *Split incentives*: From the homeowner's perspective, it does not make sense to make an investment that will take five years to recoup, if they do not plan on holding onto their building for at least that long. In the case of most landlords, there is usually no motivation at all to invest because energy cost reductions will be realized by whoever is the tenant.
3. *Financing*: Obtaining a third party loan from a bank to invest in an energy efficiency project can be difficult despite the fact that they often pay for themselves. This is because a major difference separates these loans from most traditional home loans, which is that they are almost impossible to collateralize. A bank will not be able to repossess windows once they've been installed in a house if payments begin to falter.

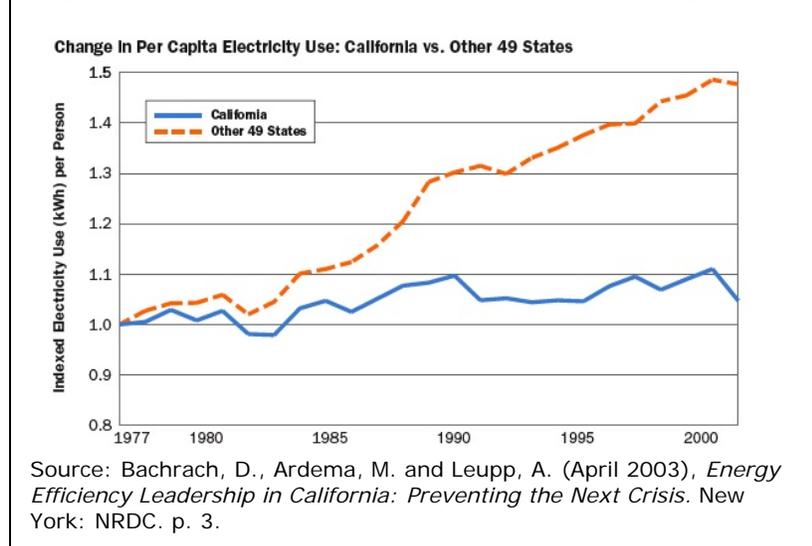
### **From the California miracle to Allegheny County**

A number of attempts have been made over the years at the policy level to correct for failures mentioned above and, in turn spur greater adoption of energy efficient measures. A variety of policymakers at the federal, state and local levels have long acknowledged the untapped potential that exists in energy efficiency. In fact, the oil shocks of the 1970s brought forth a large number of policy proposals that were adopted to a varying degree of success. By the 1990s, energy prices collapsed and many of these policies were sidelined. Today, however increased demand and instability have led to rapid price increases for energy in all its forms. Energy efficiency is again in the forefront. Recent federal policies that highlight its resurgence are the Energy Policy Acts of 2006 and 2007, which featured a number of tax credits designed to give an extra boost to homeowners considering an investment in an efficiency project. As important as these federal policies may be in pushing the adoption of more energy efficient technologies, from Pittsburgh's perspective it is perhaps more useful to look at state and local level approaches.

#### ***California***

An obvious starting point for this type of exploration must be California, as it has been the energy efficiency leader of America since the early 1980s. *This leadership role has led California to have flat levels of energy consumption since the late 1970s while the rest of the nation has seen per capita consumption levels increase by nearly 50 percent.* (Bachrach et al, 2003) This impressive statistic is often referred to as the “California Miracle” and it offers a strong argument for the gains

**Figure IV.1: California’s per capita energy use**



that can be made when energy is made a priority. The initial force behind these gains was the aforementioned oil shocks of the 1970s, but what distinguishes California from most other places is that they continued to emphasize efficiency throughout the energy price fluctuations of the ensuing years.

California was able to achieve this “miracle” through a combination of

policies and incentives that curbed consumption, while also dramatically altering the way that utilities were structured in the state. From the policy side, the state adopted much stricter building codes, which, in effect, mandated an energy efficiency standard for all new construction. A number of state and utility sponsored energy efficiency programs were also created, which targeted specific end-uses like lighting, insulation and retrofitting. Perhaps the most well known of these approaches is the “public goods charge” that, for decades, has been levied on every California’s utility bill. This charge amounts to less than 3 percent of one’s total bill and it has been credited with avoiding the need for 20 large power plants in the state since 1975 (Bachrach et al, April 2003). These funds have been used to create a variety of programs that help homeowners and business adopt more energy efficient technologies.

### **Cambridge Energy Associates**

Cambridge, MA, recently launched a very large energy efficiency program that is aimed at all of its energy users. Called the Cambridge Energy Alliance, their goal is to carry out a \$100+ million energy efficiency implementation effort. Several foundations supplied initial funding to start the Alliance, which will design, market, document, finance and manage the effort to implement energy efficiency citywide. A revolving fund will be created from a combination of public and private sources that will provide the initial financing for the projects. This financing will then be repaid via the cost savings that will be achieved after the efficiency measures are installed. Right now the hope is that 80 percent of this fund will be supplied by private sources, while the remaining 20 percent will come from a number of pre-existing local utility incentive programs. This financing scheme is a major selling

point of this program since it does not involve the imposition of any new taxes, while also removing the aforementioned market barrier of upfront capital. Ultimately, the Alliance hopes to reduce peak energy demand by 15 percent, annual electricity and water consumption by 10 percent and annual greenhouse gas emissions by 150,000 tons by 2011. (Cambridge Energy Alliance, 2007) If successful, a similar program could prove to be a viable option for Pittsburgh, if a similar coalition of private financing can be arranged.

### **ME2**

A similar program is currently being launched in Milwaukee, WI and has been dubbed ME2 (Milwaukee Energy Efficiency). The concept behind this program is the same as Cambridge, in that the cost savings garnered through the efficiency installations will be used to recoup the financing costs. However, it is a much more targeted plan that is aimed specifically at the residential sector. The initial phase of the program will focus on all rental properties and owner-occupied homes that were built before 1960, which will include an estimated 210,044 target properties. (COWS, 2007) An organization similar to the Cambridge Alliance will be established to market, administer and finance the ME2 program, but, in a slight departure they will contract out the design and implementation of the improvements. A much more substantial difference, on the other hand, is that they plan to provide the initial financing for the program through a city-issued bond. ME2 believes that this is a worthwhile risk for the city because of the direct income gains that will accrue to low and middle-income families and the large number of jobs they project the retrofits will ultimately create. However, if Pittsburgh were to eventually adopt a similar program it should ensure that the risk involved in the financing does not fall solely on the resident who is receiving the savings.

### **Allegheny County**

Allegheny County formed an Energy Task Force on the heels of the 1996 Guaranteed Energy Savings Act (GESA). The state GESA allows local governments to retrofit their facilities through guarantees on the capital that will accrue the energy savings measures. Local governments enter into an agreement with an ESCO, which is responsible for conducting the energy audit and guaranteeing the future savings. In Allegheny County's case they chose to work with NORESKO, which is an ESCO owned by Equitable Gas. NORESKO secured financing for the \$10.3 million dollar project and guaranteed that the capital and labor costs associated with the project would not exceed the savings in any given year. NORESKO guaranteed the county would save over \$14 million over the ten years on the project. As of now, the county is saving over \$1.7 million in operating costs per year. (NORESKO, n.d.) These savings have been achieved through a wide range of upgrades at a 100+ county-owned and operated buildings. A similar

#### **ESCOs**

Risk assumption drives the traditional private-sector model of energy efficiency investments being done by companies called Energy Service Companies or ESCOs. Broadly speaking, an ESCO is a company that designs, installs and finances energy efficiency projects and in return receives some or all of the cost savings achieved through their installation. A majority of ESCOs assume all of the risk associated with energy price fluctuations, which has, in turn, proven to be hugely profitable for them in the last few years.

program is a viable option for Pittsburgh's city-owned buildings, since it involves no upfront capital and has proven to be successful.

### **Policies in Pennsylvania**

A number of energy efficiency programs have existed in or are being considered for Pennsylvania and Pittsburgh, although they are all limited in both their size and scope.

1. In 1987, the Pennsylvania Public Utilities Commission (PUC) mandated the Low Income Usage Reduction Program (LIURP), which finances the adoption of energy efficiency measures in low-income households. In order to qualify for LIURP, a household's income must be at or below 150 percent of the federal policy guidelines. Utilities contribute about \$1 million per year to this program as per a state mandate. In Pittsburgh, the LIURP program is administered and run by Conservation Consultants Inc. (CCI), a South Side nonprofit. According to Ann Gerace, the Executive Director of CCI, they have served over 24,000 low-income customers in the Pittsburgh region since the program's inception.
2. The DOE Weatherization Program is locally administered in each state by the Department of Welfare and it also provides retrofit funding to low-income homeowners. However, it has often proven itself to be grossly under-funded and there is always a considerable waiting list for this program. President Bush recently zeroed out allocations in his most recent budget so it remains to be seen if this program will continue next year. (Lavelle, 2008)
3. A bill has passed through the State House of Representatives calling for the installation of smart meters statewide. Smart meters allow customers to see their energy usage and costs in real time, which allows them to make more informed decisions about their consumption. These meters have already proven to be effective in states like California, as well as countries like Italy. The PUC has estimated that these meters will cost consumers \$12 to \$24 annually, but it has also projected that they will save them \$46 annually. (PA DEP, 2007)
4. Governor Rendell has called for the creation of a program that will allow for utility customers to turn in their old and inefficient air conditioners and refrigerators in exchange for a rebate. This rebate program would be funded by the implementation of fee that would be very similar to California's aforementioned "public goods charge," but here it would be referred to as the "energy independence fund."

Pennsylvania still has a long way to go in improving its energy efficiency. In a recent report issued by PennFuture, it was estimated that the state could save between \$9 and \$12 billion dollars (after the reduction of \$5 to \$7 billion in program expenditures) through the adoption of robust energy efficiency programs (Plunkett, 2007). In fact, Pennsylvania could avoid all of its future energy growth

over the next decade just by implementing stringent efficiency measures. If, however, growth continues with a business as usual approach, then electricity sales will grow 1.5 percent annually. In order to meet this demand, the state will need to build twelve new 300-megawatt power plants along with hundreds of miles of new towers and wires. All told, this will cost the state over \$17 billion at today's net present worth, not including potential future costs associated with the additional

#### **Funding for Energy Efficiency and Green Building in Pennsylvania**

Perhaps the greatest challenge to the widespread adoption of green building and energy efficiency improvements is funding. Unfortunately, many organizations, governments, and developers are unaware of the financial support that is already available to them for these types of projects. Pennsylvania has a number of funding sources that can be used to support local greening and energy efficiency projects, which range from public and private grants to low-interest loan programs. For example, developers who plan to incorporate green design into new construction can apply to the Green Building Fund for assistance. On the other hand, a number of grants are available to those who want to implement energy efficiency upgrades, but are not necessarily concerned with pursuing LEED certification.

Various projects within the Pittsburgh region have received funding from a variety of sources and have utilized it in a wide array of greening improvements. Examples include:

- In 2007, the Pennsylvania Energy Development Authority and the Pennsylvania Department of Environmental Protection awarded \$250,000 to Phipps Conservatory and Pittsburgh Botanical Gardens through a Pennsylvania Energy Development Authority Grant to support the construction of a zero-net-energy center that will utilize solar and on-site wind energy technologies (Pennsylvania Office of the Governor, 2007).
- The Pennsylvania Energy Development Authority also awarded \$80,000 to Carnegie Mellon University in support of a prototype hybrid automated window opening system that will reduce energy consumption by at least 10 percent (Pennsylvania Office of the Governor, 2007).
- The Pennsylvania Department of Environmental Protection and the Pennsylvania Department of Agriculture recently awarded \$54,128 for a 1,700 square foot green roof for Conservation Consultants, Inc. through the Pennsylvania Energy Harvest Grant Program (Pennsylvania Office of the Governor, 2007).

In turn, these projects are just a few examples of how different funding sources can and have been utilized in the greening movement within the local Pittsburgh context. For a full listing of available Pennsylvania State funding, please refer to Table III.3: Available Pennsylvania State Funding for Local Energy Efficiency and Greening Initiatives.

carbon emissions these plants will produce. This reality is further underscored by the fact that in 2003, Pennsylvania ranked 45<sup>th</sup> in statewide energy savings as a percentage of energy sales. (Plunkett, 2007) Of course, this statistic could easily be viewed in the negative, but on the positive side it means that Pennsylvania as a whole has a tremendous amount of untapped potential.

**Table IV.1: Available Pennsylvania State Funding for Local Energy Efficiency and Greenbuilding**

<u>Grant, Loan, or Fund Name</u>	<u>Who is Eligible</u>	<u>Maximum Award</u>	<u>Project Eligibility</u>	<u>Funding Source</u>	<u>Website</u>
High Performance Green Schools Planning Grants	Schools	Varies: Average \$20,000	“Soft” costs of designing a green building including simulation and modeling costs, day lighting studies, energy modeling, additional consultancy fees, and costs of documentation required for LEED-NC certification.  The incentive is only for new construction of a LEED Silver, Gold, or Platinum project.	Governor’s Green Government Council of Pennsylvania	<a href="http://www.gggc.state.pa.us/gggc/cwp/view.asp?a=517&amp;q=157146">http://www.gggc.state.pa.us/gggc/cwp/view.asp?a=517&amp;q=157146</a>
Pennsylvania Energy Development Authority Grants (PEDA)	Nonprofit, Local Government, Commercial, Industrial, Schools, Agricultural	Varies: Previous maximums of \$1,000,000	Projects that support reusing or redeveloping brownfields and previously developed sites.  Supports advanced energy projects and businesses interested in locating or expanding their alternative-energy manufacturing or production operations.  Eligible efficiency technologies include heat recovery, photovoltaics, solar thermal electric (etc).	Pennsylvania Department of Environmental Protection, Pennsylvania Energy Development Authority	<a href="http://www.depweb.state.pa.us/enintech/cwp/view.asp?a=1415&amp;q=504241">http://www.depweb.state.pa.us/enintech/cwp/view.asp?a=1415&amp;q=504241</a>
Pennsylvania Energy Harvest Grant Program	Nonprofit, Local Government, Commercial, Schools, Agricultural	No maximum stated	Implementation of clean and renewable-energy technologies that have measurable benefits in terms of pollution reduction, environmental quality, and reduced energy use.  Eligible efficiency technologies include clean distributed generation infrastructure improvements, solar water and space heat, solar thermal electric (etc).	Pennsylvania Department of Environmental Protection, Pennsylvania Department of Agriculture	<a href="http://www.depweb.state.pa.us/energy/cwp/view.asp?a=1374&amp;q=483024">http://www.depweb.state.pa.us/energy/cwp/view.asp?a=1374&amp;q=483024</a>
Enterprise Greening Affordable Housing Grants	Nonprofit, Public Housing Authorities, For-profit entities	\$50,000	Eligible for both planning and implementation of affordable housing projects.  New construction or rehabilitation (Rental: Minimum 25 units for 60% below median income; Homeownership developments: Minimum 15 homes for 80% below median income).	Enterprise Community Partners	<a href="http://www.greencommunitiesonline.org/tools/funding/grants/">http://www.greencommunitiesonline.org/tools/funding/grants/</a>
Growing Greener Grants	Nonprofit, Local Government, Watershed Group, Conservation Districts	No maximum stated	Eligibility based on Growing Greener I or Growing Greener II status.  Watershed Protection Grants and Floor Protection Grants available.	Pennsylvania Department of Environmental Protection	<a href="http://www.depweb.state.pa.us/growinggreener/site/default.asp">http://www.depweb.state.pa.us/growinggreener/site/default.asp</a>
Sustainable Development Fund –Solar PV Grant (Southeastern PA)	Nonprofit, Commercial, Industrial, Schools, PECO Service Territory	\$25,000 on average	Eligible technologies include solar space and water heat, solar thermal electric, solar thermal heat (etc.)  Includes equipment upgrades, electricity energy savings improvements, and end-users of renewable energy.	Pennsylvania Public Utility Commission	<a href="http://www.trfund.com/sdf/grants.html">http://www.trfund.com/sdf/grants.html</a>
Energy Use Reduction Grants	Businesses, Institutions, Municipalities	\$1,000	Energy savings “Best Practices” workshop.  Eligibility contingent on participation in workshop and the reduction of energy consumption through the development and implementation of a project that applies these practices.	Pennsylvania Department of Environmental Protection	<a href="http://www.depweb.state.pa.us/enintech/cwp/view.asp?a=1380&amp;q=533921">http://www.depweb.state.pa.us/enintech/cwp/view.asp?a=1380&amp;q=533921</a>
Penelec Sustainable Energy Fund of the Community Foundation for the Alleghenies	Organizations located in FirstEnergy’s Penelec service territory or may participate with other sustainable energy funds in projects throughout PA.	Total assets of \$9.1 million	Eligibility for businesses that develop sustainable energy technology.  Provide grant support for energy conservation and environmental projects. Projects that generate electric power from renewable energy sources.  Provide grant support for feasibility studies.	Pennsylvania Electric Company	<a href="http://www.cfalleghenies.org/penelec.htm">http://www.cfalleghenies.org/penelec.htm</a>
West Penn Power Sustainable Energy Fund	Organizations and residents located in West Penn Power region of Pennsylvania	No maximum stated	Eligibility for promotion of use of renewable and clean energy, energy conservation and efficiency, and retention of sustainable energy businesses.	AFC First, West Penn Power	<a href="http://www.wppsef.org/">http://www.wppsef.org/</a>
Green Building Fund	Developers	\$400,000 loan maximum	Eligibility for qualified developers who plan to integrate green design into new construction or rehabilitation projects.	CL Fund, Green Building Alliance	<a href="http://www.gbapgh.org/WhatWeDo_GreenBuildingFund.asp">http://www.gbapgh.org/WhatWeDo_GreenBuildingFund.asp</a>
The Upstairs Fund	Building owners, Developers	\$500,000 OR \$75,000 per unit, OR 50% of Total Project Cost (whichever is least)	Eligibility for building owners or developers who intend to convert vacant upper floors of downtown buildings to residential uses.	Pittsburgh Downtown Partnership (funded by Heinz Endowments, McCune Foundation, URA, public/private investors)	<a href="http://www.downtownpittsburgh.com/cms/assets/documents/vuf%20guidelines%20final.pdf">http://www.downtownpittsburgh.com/cms/assets/documents/vuf%20guidelines%20final.pdf</a>
Keystone Home Energy Loan Program	Residential, Low-income residential	\$10,000 with possibility of higher amounts	Eligibility for homeowners interested in energy efficiency improvements for their homes. Includes heating/cooling systems, windows, doors, insulation, siding, lighting (etc). Includes purchase and installation of solar, wind, and geothermal systems.	AFC First (funded by PA Treasury Department)	<a href="http://www.keystonehelp.com">http://www.keystonehelp.com</a>
Small Business Pollution Prevention Assistance Account Loan Program	Commercial (small business: maximum 100 employees)	\$100,000	Eligibility to small business to implement energy efficiency and pollution prevention projects.	PA Department of Environmental Protection and PA Department of Community and Economic Development	<a href="http://www.depweb.state.pa.us/enintech/cwp/view.asp?a=1413&amp;q=503114">http://www.depweb.state.pa.us/enintech/cwp/view.asp?a=1413&amp;q=503114</a>

### **The current situation in Pittsburgh**

With the exception of work done at the individual level and by organizations like Conservation Consultants Inc, almost no real progress has been made in the city in terms of energy efficiency. That is not to say that options have not been considered. Under Mayor Tom Murphy an energy audit was done on the City-County Building in preparation for a retrofit, but nothing was ever actualized. Today, a retrofit would certainly make economic sense now considering the age of the building and the general lack of control over energy consumption within it. This fact also holds true for a majority of the other 330 buildings that the city owns with the exception of newer facilities like the police headquarters on the North Side. The Pittsburgh School District could also benefit from retrofits to its 95 facilities and they have been in discussions with NORESO to explore what possibilities might be available

Beyond the public sector there exists significant potential in the residential, institutional, commercial and industrial sectors. As previously mentioned, over half the homes in Pittsburgh were built before 1940 and most of them would likely benefit from some kind of retrofit. At the same time, over half of the 160,000 or so residences in the city are rental properties (U.S. Census, 2000), which means that it is very unlikely that efficiency investments will be made in them in the current policy environment (or lack thereof) because of the aforementioned split incentives issue. On the institutional front, one need only look at the amount of energy wasted at the University of Pittsburgh to see how much potential exists in that sector. Finally, the ever-aging commercial and industrial sectors of this city would perhaps be the biggest benefactors of energy savings due to the massive amounts of energy these buildings consume.

Despite the lack of progress on the efficiency front, the city has recently made progress on reducing its energy costs. Earlier this year Jim Sloss, who is the Energy and Utilities Manager for the city, organized an energy auction that will reduce its energy bills by over \$150,000. It has also started to embrace the potential for the adoption of alternative energies in the city and was recently awarded one of thirteen solar cities grants by the Department of Energy. This grant is helping the city put together a comprehensive solar plan, but unfortunately no funds are yet available for implementation. Finally, the Pittsburgh Climate Initiative will be releasing a report this May that will outline the impact that the city is having on climate change. It will also contain an action plan that will outline what the city should do to start reducing its emissions. Of course, all of this is in addition to the impressive progress that Pittsburgh has made on the green building front in recent years. Change is certainly afoot in Pittsburgh and embracing energy efficiency would be a great next step in this city's forward progress.

### **Future prospects & considerations**

One very important fact that needs to be emphasized in any future strategy is that capitalizing on Pittsburgh's energy efficiency will not require the

development of any new technologies. Rather, further investments in energy efficiency will create the conditions that are necessary for the maximum productivity of current technologies to be realized. These productivity improvements can be attained through straightforward projects like upgrading to newer and more efficient lighting systems, installing double or triple pane windows, insulating hot water heaters and insulating facades and attics. Of course, knowing that the technology exists is one thing, but the question for Pittsburgh is who will pay for its installation. Even if future savings will cover the costs associated with these projects, Pittsburgh will still need a substantial amount of capital to get these programs off the ground.

At this point, the city of Pittsburgh simply does not have the cash on hand to fund all of these projects and it seems very unlikely that it would be willing to issue a bond to do so. The city itself could turn to an ESCO like Allegheny County and utilize the provisions provided in the Guaranteed Energy Savings Act. While this would certainly be a step in the right direction, it would still leave a majority of the region's potential untapped. The city could also assist in the establishment of a program similar to those in Cambridge and Milwaukee, but it needs to be clear about who is going to bear the risks involved. Imagine the negative impact on the city if thousands of people invested in energy efficiency, only to have energy prices collapse and destroy the savings differential they were using to pay off their loans.

### ***Energy Efficiency and Conservation Block Grants***

The grants are meant to provide \$2 billion in funding per year over the next five years, 68 percent of which is reserved for counties and cities. First year funding can include a planning grant of up to \$200,000 and subsequent funding will be used to implement those plans that have been approved by the DOE. Projected uses of the funding for the DOE include residential and commercial energy audits, establishing financial incentive programs for energy efficiency improvements (i.e. Cambridge Energy Alliance and ME2), providing grants to nonprofits to perform retrofits (i.e. CCI) and developing public education programs. Pittsburgh has an almost endless list of needs that could be filled through funding received via these block grants. However, Pittsburgh will need to ensure that it is well represented in this process, since it will be competing with many other cities that have a proven record in implementing energy efficiency programs.

### **Short-term Recommendations**

#### ***1. Retrofit City-County Building***

An updated energy audit should be performed on this facility as soon as possible and a strategy needs to be created that can be moved forward quickly. The City needs to work with Allegheny County to secure financing for the project either through NORESKO or a similar entity and make it happen as soon as possible. However, the City must ensure that the upgrades are done within the confines of the

Guaranteed Energy Savings Act in order to defer the risk to a third party. There is no reason that the city should keep pouring money into the energy bills of an inefficient building, when there are straightforward solutions to this problem.

2. *Educate citizens about energy efficiency*

After the work has begun on the City-County Building, the city should use the work as an opportunity to educate residents about the benefits of investing in energy efficiency. Lack of knowledge and good information still remain major impediments to the further adoption of common efficient technologies like CFLs. A more creative and comprehensive approach will be necessary to take efficiency into mainstream consciousness. A good place to start would be through the education of community development groups through the use of energy efficiency toolkits.

3. *Target schools for energy efficiency improvements*

Educating kids also means educating their parents. A program could be launched in conjunction with the Board of Education that encourages reduced consumption in schools through the use of incentives and awards. Charlottesville, VA recently instituted a program along these lines and then shared the energy savings with the schools. Half of the savings went into further efficiency upgrades and the other half was given to the school to spend on any program they wished. In the first year, electricity consumption was down 10 percent, gas consumption was down 31 percent and \$45,337 in savings was distributed to the schools (Wagner, D., October 2007).

4. *Create an Energy Efficiency Task Force*

If funds do not become available under the block grants scheme the task force should examine the possibility of establishing something similar to "public goods charge" in Pittsburgh along the lines of California.

## **Long-term Recommendations**

1. *Perform energy audits on all city properties*

After these audits are performed, the requisite upgrades should be conducted.

2. *Create residential energy efficiency incentive program*

A program along the lines of those in Cambridge and Milwaukee should be created through the establishment of private and/or public funding sources. At the same time, the city should allow homeowners to receive a tax assessment freeze for some period of time so they will not be penalized for their upgrades. This is especially important for owners of rental properties, since they will not be gaining from the savings achieved. However, the gains for their tenants will be

substantial, which is very important in a city where over half of properties are rental units.

Ultimately, the city will reap a number of significant gains if it chooses to activate all of the economic potential available in energy efficiency. Investing in energy efficiency will act as economic stimulus for the region through job creation that will be necessary to perform all the retrofits. It will provide low and middle-income families with more disposable income, since they will be paying less for their energy bills. This fact will hold also true for the city itself, which will help relieve some of its current budgetary pressure. It will reduce the city's carbon footprint. It will reduce the need to build new power plants, which will reduce pollution in the region. It will do many things, but only if we take advantage of the possibilities. The time has come for Pittsburgh to take action on energy efficiency and start creating our own miracle.

## CHAPTER V – GREENING AFFORDABLE HOUSING

Another focus of community greening concerns affordable housing. Energy efficiency and green standards are becoming an important part of new affordable housing initiatives. Green affordable housing developments offer unique barriers and opportunities.

A recent study done by the nonprofit organization New Ecology demonstrated the following economic benefits of green affordable housing developments:

- Lowering the rate of energy costs.
- Reducing environmental risks for asthma, mold and pesticide exposure.
- Mitigating cost overrun through better planned and higher quality construction.
- Having a positive impact on the overall sense of community.

Affordable housing is not necessarily the same as public housing. Public housing is owned by a public agency, usually a housing authority. In Pittsburgh, the Housing Authority of the City of Pittsburgh manages publicly available housing for low-income persons.

### **Barriers**

One of the largest barriers to the implementation of green affordable housing projects is higher up-front costs (Bradshaw, 2003, 24). Without direct up-front subsidies, developers have few incentives to build green affordable housing, as it is often difficult to recapture the value of energy efficient technologies and green products in the initial sales transaction.

The cost increases for affordable housing are variable. One review of 16 green affordable housing projects found an average cost increase of 2.4 percent of total construction costs (Bradshaw et. al, 2003). In order to receive financial benefit, developers must be committed to longer-term interests.

The California Bay Area Local Initiative Support Corporation (LISC), which works to bring energy efficiency and renewable energy technology to multifamily affordable housing properties, identified several challenges to implementing energy efficiency in affordable housing (LISC Bay Area, 2006).

These include:

- Scarce financial resources
- Inadequate staff capacity
- Bureaucratic processes
- Lack of trained staff and familiarity with green technologies
- Split incentives because property owners do not pay utility bills

- Timeline of budget cycles does not correspond with tax year
- Residents' distrust of utility and third party programs
- Lack of reliable contractors to perform installations
- Verification challenges

There do not appear to be significant costs or technical barriers to obtaining a Home Energy Rating System (HERS) rating above 86 (the minimum Energy Star rating) in affordable housing (Bradshaw, 2003, 175). A requirement for this minimum score would reduce the operating costs of affordable housing, but must be implemented by local building officials trained and motivated to enforce the standard.

### **Development Specific Strategies**

While some aspects of affordable green housing may seem cost prohibitive, there are a variety of low-to no-cost construction strategies to increase energy efficiency in affordable housing, which include:

- Maximizing daylight
- Selecting a light-colored roof
- Using fluorescent lights with electronic ballasts
- Selecting EnergyStar appliances
- Installing water-efficient toilets and fixtures
- Incorporating "green" materials
- Using low-VOC paint

The Greening Affordable Housing Initiative developed steps to incorporate greening strategies into affordable housing (2006):

- Minimize additional costs through integrated design
- Work with contractor on cost estimates throughout design process
- Identify partnership opportunities with local government, utilities, state agencies, and non-profits
- Utilize technical support provided by utilities, federal, and/or state programs
- Apply to utility and state programs for rebates on energy and water components
- Include remaining unfunded green items in the final bid documents as specification alternatives
- Approach local governments and foundations to fund the green alternatives
- Use any residual construction contingency funds to upgrade finish materials to the green alternatives

### **Current Local Green Affordable Housing Projects**

*The Century Building:* This project will be downtown Pittsburgh's first mixed-income residential development and will seek LEED-Silver certification. The

Pittsburgh Cultural Trust teamed with Trek Development Group on this \$15 million project, which will create 61 affordable loft-style apartment units, ranging in monthly rent of \$550 to \$1,150 (DaParma, 2007). The building will incorporate a variety of green features, including a green roof and geothermal heating and cooling. Funding for this \$15 million project comes from sources such as the Pennsylvania Housing Finance Agency (PHFA), Pittsburgh Cultural Trust, the Strategic Investment Fund, Urban Redevelopment Authority of Pittsburgh (URA), and Allegheny County Economic Development (ACED) (DaParma, 2007).

Wood Street Commons: This building, located at 304 Wood Street downtown has been at the center of local controversy for many years. Of the total area, 55,000 square feet is residential space, with dormitory style units for low-income individuals living on social security benefit or other low income source (Law, 2007). The other 55,000 square feet of commercial space has been occupied by the Allegheny County Department of Human Services (DHS), who have provided subsidy for the low-income housing via a \$900,000 annual lease (Law, 2007). Because DHS is leaving the lease behind this year, ACED and the Urban Redevelopment Authority (URA) have joined together in an attempt to sustain the building. The project will incorporate greening initiatives and an energy efficiency assessment, and could serve as a reference for assessing cost estimates of greening for other aging Pittsburgh affordable housing developments and structures.

### **Energy Audit and Retrofit Programs**

Many other cities, states, and nations have devised innovative programs to promote green building and energy efficiency in affordable housing programs.

New York City: The Clinton Climate Initiative, HUD, Mayor Michael Bloomberg, the City of New York and the New York City Housing Authority have partnered to retrofit the city's public housing units with more energy efficient technologies. The Housing Authority's comprehensive plan includes building retrofits and boiler and heating system modernizations that will lead to a reduction in greenhouse gas emissions from the 2,600 buildings they own citywide (MikeBloomberg.com, 2007). So far, HUD has been able to replace aging hot water tanks and boilers and install energy efficient light bulbs in hundreds of buildings across the city (MikeBloomberg.com, 2007). Energy service companies, banks, product suppliers, and green building organizations have joined the partnership in order to perform the retrofits more efficiently, quickly, and cheaply. Agreements with banks provide necessary low-cost financing.

Maine: The Maine State Housing Authority (MaineHousing) has implemented several programs to create green affordable housing for residents. For instance, their Home Energy Loan Program (HELP) provides loans up to \$15,000 at interest rates as low as 1% (for those using an energy audit) or 3% (for those who do not) for a wide variety of energy improvements

(MaineHousing, 2008). Programs like this depend upon federal funding like the LIHTC and other grants, funds, and subsidies, but contribute substantially to the local economy through the programs each agency develops. A recent study indicated that MaineHousing stimulates over \$250 million in investment to Maine's economy every year through its housing initiatives (MaineHousing, 2008).

*Spain:* Spain recently announced a Green Home Plan to give € \$1 billion (US\$1.47 billion) in direct subsidies to renovate old, energy-inefficient homes and make them 35 to 60 percent more energy efficient. Another € \$2 billion will be given in credit each year to help Spaniards make these improvements (Harding, 2007). Homeowners will receive an energy certificate upon completion of the energy efficiency measures, boosting the property's value. The national government will also give €200 million to improve energy efficiency in schools and public buildings in towns and cities with populations over 50,000 (Harding, 2007).

*Canada -- EnerGuide:* Canada's EnerGuide program was similar to Energy Star in the U.S. in that it labeled appliances and had an energy audit program, centered around its EnerGuide for Homes division. Although extremely popular and with high levels of participation, the program was cut by the federal government in 2006, due to statements that it was too expensive. The program's core feature was its computerized energy audits, much like the Home Energy Rating System (HERS). The customized audits required a home's building envelope and heating system components to be entered into the program by a certified evaluator. At the program's inception, 50 evaluators were contracted from public, private, and non-profit agencies across the country and 11,000-17,000 evaluations per year were completed from 2000-2002 (Parker, 2007, 509).

*Lithuania:* The Lithuania Energy Efficiency/Housing Pilot Project makes almost \$15 million available to approximately 200 to 300 homeowner associations through commercial banks for energy efficiency investments (Martinot, 1998, 9). In this program the homeowner association acts as a liaison between the homeowner and the bank, through hired consultants. Commissioned consulting firm conduct energy audits, provide economic-cost and financial-return estimates to the homeowner, and develop an investment proposal that meets the collective needs of the building's households. The homeowner association then borrows capital from a commercial bank, in lieu of the homeowner, based on this proposal. The homeowner association also bids the work to construction contractors with assistance from the consultant and pays the contractors with the loan money. The homeowner realizes energy savings and pays lower energy bills, repaying the loan in monthly installments using their monthly energy-bill savings. In this way, homeowners who may not have access to credit or the ability to take on the risk of a loan can receive home improvements that reduce their utility costs and still pay for the improvements in a reasonable manner.

## **Overview of Urban Redevelopment Authority and Housing Authority Programs**

EnergyStar Standards: The Urban Redevelopment Authority of Pittsburgh has a new residential construction requirement that all construction done through their programs must meet Energy Star standards. Building to these standards often also meets the requirements under the Energy Policy Act of 2008, for which developers can receive a \$2000 tax credit per unit or house constructed.

Low-Income Housing Tax Credit: The federal Low-Income Housing Tax Credit (LIHTC) can be used to incorporate green design principles into affordable housing through Housing Credit Quality Allocation Plans (QAPs). By incorporating practical, sensible green elements into QAPs, states are driving innovative solutions to meet interconnected housing and community needs such as dealing with run-down and unhealthy homes, skyrocketing energy and transportation costs, and poorly planned, unsustainable development (Tassos, 2005, 27).

### ***Program Analysis***

The Table compares three of the URA's home improvement loan programs to other home improvement loan programs—one in Maine and two in Philadelphia.

URA: Although run by similar agencies, the URA does not have a specific program for energy efficient home improvements. The URA also has higher interest loan rates on average and fewer lenders to choose from. Additionally, it has higher credit qualifications for its program participants than other similar programs.

If the URA's current home improvement loan programs are an indication of how the proposed energy efficiency loan program would run, some modifications are necessary for it to be successful. Interest rates must be lower in order to create an incentive to implement energy saving measures. The lack of low rates may be partly attributed to URA having fewer banks offering loans than similar programs. Increasing the number of competing banks would likely bring down the price of loans.

Housing Authority: The Housing Authority has little control over the requirements for either the state QAP or the federal Housing Choice Voucher Program. To see changes in either of these standards would require lobbying of representatives at both the state and national levels. The 2008 QAP application (PHFA, 2008, 11) merely requires of new construction or rehabilitation.

## ***Proposed***

URA--Energy efficient home improvements: The URA is currently looking to implement programs centered on providing low-interest loans for energy efficient home improvements (Smuts, 2008). The standards and recommendations from this program would come from individual Home Energy Rating Systems (HERS) analyses. These HERS ratings look at existing homes to determine which improvements would be most cost-effective and give a variety of options, which the homeowner can choose from, depending on the loan amount they qualify for.

The process would begin by the homeowner contacting the URA and expressing interest in a home improvement loan. The URA would give the homeowner a list of HERS raters to choose from to perform the analysis, and the rater would give both the homeowner and the URA a copy of the report. The homeowner would be able to choose and implement the measures they think are best suited to their individual home and needs.

Although the interest rates for these loans have not yet been determined, they should be low enough to incentivize homeowners to participate in the program. Income limits and target areas have not been set, but low-income groups are seen as ideal candidates for this program, as they would benefit the most from reduced energy costs. The cost of the HERS rating may be rolled into the total loan amount to avoid out of pocket up-front expenses. Grants to fund these improvements are not likely, since the interest rates should be low and the savings direct. However, landlords of rental properties are currently not targeted participants; only individual homeowners.

The URA may also be interested in partnering with CCI. Implementing this program would increase the demand for HERS raters, as well as energy efficient products, contributing to job creation in the region.

Housing Authority--Energy audit: The Pittsburgh Housing Authority is currently undergoing an energy audit of all the properties in its portfolio to determine which retrofits or additions would realize energy and cost savings. The agency expected to receive results from their energy services company in 30 days. They will then evaluate the cost factors and priorities in determining retrofits (Okoko, 2008).

The Housing Authority receives funding to cover the costs of its energy utility bills; thus, it seems counterintuitive at first that reduced energy costs from energy efficient retrofits would mean reduced funding in return. However, the agency explained that they do not have an independent budget and are not a for-profit entity (Okoko, 2008). Therefore, reduced energy costs actually require less funding to be given. Over the past several years, many housing authorities have come to view energy efficient or green measures as a way to cope with shrinking budgets (Okoko, 2008).

**TABLE V.1: Home Improvement Loans**

	<b>URA: PHRP</b>	<b>URA: HILP</b>	<b>URA: R&amp;R</b>	<b>MaineHousing</b>	<b>Phila: PHIL</b>	<b>Phila: PHIL-Energy</b>
<i>Loan Type</i>	Home Improvement	Immediate home improvements	Home Improvement	Energy Efficient Home Improvement: State Program	Home Improvement	Energy Related Improvements
<i>Rate</i>	0%	5.99%	6.375-8.875%	1%: with energy audit 3%: without energy audit	3%: income limits apply 5%: no income limits	Fixed rate; N/A
<i>Amount</i>	Up to \$25,000	Up to \$15,000	\$2,500-\$35,000	Up to \$15,000	Up to \$25,000	Up to \$10,000
<i>Term</i>	Up to 20 years	10,15, 20 years	10,15,20 years	Up to 15 years	Up to 20 years	Up to 10 years
<i>Income Limits</i>	\$32,400: 1 person to \$53,700: 6 persons	\$57,900: 1-2 persons \$66,550: 3+ persons	Less than \$90,000 per household	\$55,400-\$73,400: 1-2 persons \$63,710-\$84,410: 3+ persons	\$58,075: 1 person to \$109,480: 8+ persons	N/A
<i>Lenders</i>	1	3	1	7	4	N/A
<i>Extra Requirements</i>	<ul style="list-style-type: none"> <li>•Own/occupy home</li> <li>•Creditworthy</li> <li>•Must be done by professional contractor</li> </ul>	<ul style="list-style-type: none"> <li>•Own/occupy home</li> <li>•Acceptable credit</li> <li>•Limits apply in program areas</li> <li>•No limits in "target areas"</li> </ul>	<ul style="list-style-type: none"> <li>•Own/occupy home</li> <li>• FICO score of 620</li> </ul>	<ul style="list-style-type: none"> <li>•Own/occupy home</li> <li>•Limits depend on county of residence</li> </ul>	<ul style="list-style-type: none"> <li>•Eligible improvements listed on website</li> <li>•Improvements include energy efficiency improvements</li> </ul>	<ul style="list-style-type: none"> <li>•Limited information available online</li> </ul>

Notes: URA: Urban Redevelopment Authority of Pittsburgh ([www.ura.org](http://www.ura.org)) -- PHRP: Pittsburgh Home Rehabilitation Program, HILP: Home Improvement Loan Program, R&R: Keystone Renovation and Repair Program  
MaineHousing ([www.mainehousing.org](http://www.mainehousing.org))  
Phila: City of Philadelphia Neighborhood Transformation Initiative ([www.phila.gov/nti/programs.htm](http://www.phila.gov/nti/programs.htm)) -- PHIL: Philadelphia Home Improvement Loan Program

## Policy Recommendations

1. ***The Housing Authority should implement as many retrofits of its existing buildings as its budget allows.*** Reduced energy cost savings is not the only benefit low-income households value- Comfort, health, and satisfaction with one's residence are often just as, if not more important than, cost savings. Additionally, criteria for the Quality Allocation Plans for the Low Income Housing Tax Credit must incorporate much more extensive green and energy efficiency measures. This must be done at the state level through the state legislature. Recognizing these benefits, the URA needs to implement its energy efficiency home improvement loan as a first step. It should have lower interest rates and more lenders involved. It should also include other green features beyond energy efficient measures to improve residents' comfort, health, and quality of life.
2. ***Measures should not be available only to homeowners-*** Landlords should be given incentives to improve their buildings, either through retrofits for existing construction or as part of new construction. Renters should be given the information and ability to implement the measures they can afford and believe will be most beneficial.
3. ***Greening RFP's-*** If housing authorities desire to incorporate greening into a project, this goal must be prioritized in the RFP requirements. Several guides for local authorities to procure green development services currently exist, such as the guide created by New Ecology, Inc. (2006). By greening an RFP, the URA and Housing Authority can request additional information related to green building, such as projected Life Cycle Cost Analysis' and documentation of prior experience with greening implementation and affordable housing.
4. ***Community wide strategy-*** Many of the basic principles of affordable housing construction are particularly important to the success of greening and energy efficiency in this market.
5. ***Green affordable housing developments should be consistent with community revitalization plans-*** not created in open spaces away from existing developments; encourage adaptive reuse, particularly in the local Pittsburgh region due to the large amount of existing and aging infrastructure; focus on redevelopment of brownfields, availability of public transit, and preservation of site ecology.

## CHAPTER VI – RIPE FOR GREENING: COMMUNITY DEVELOPMENT CORPORATIONS

Building on the previous two chapters, this chapter continues to focus on community initiatives in green building, specifically what other avenues community development corporations (CDCs) can pursue. We considered a few examples above, from LEED-ND with the East Liberty Development, Inc. and some examples of affordable housing.

This chapter aims to build a model for Pittsburgh CDCs in green building. CDCs aim to improve quality of life, empower residents, and revitalize distressed neighborhoods.

CDCs now can become an important means for promoting sustainable development. CDCs are already involved in affordable housing development and operations. They are rooted in their neighborhoods and already engage residents in community planning. Pittsburgh's network of CDCs has long been a driving force behind the character and ever-improving condition of this city (New Ecology, 2006). They have played a central role in creating Pittsburgh's status as one of America's most livable cities.

Incorporating sustainable principles can be challenging for CDCs, because they are rooted in bottom-up community organizing traditions. We find that professionalization and institutional capacity building are necessary for effective green project execution and management. We recommend that Pittsburgh generate a CDC green building network to assist the multitude of small yet passionate organizations that exist.

### **Green CDCs Initiative**

CDCs are well positioned to grow their roles in the sustainability through green building movement. One example is New Ecology Inc. (NEI) in Massachusetts. NEI, in collaboration with the Tellus Institute, Massachusetts Association of Community Development Corporations (MACDC) and the Local Initiative Support Corporation (LISC), launched the Green CDCs Initiative (the Initiative) to improve the state of the urban environment and spread sustainable consciousness throughout the community development realm. This collaborative model created a results-driven network that "engages and supports Massachusetts' community development corporations in green or environmentally-sound development planning and implementation" (NEI, n.d.).

The overarching goals of the Initiative are to:

- Help CDCs successfully advance and deliver green projects by providing access to technical assistance, financial resources, and academic programs
- Share sustainable development strategies and successes among CDCs and other stakeholders

- Establish CDCs as a bona fide environmental constituency, creating new partnerships and coalitions and bridging the divide between environmental protection and community development
- Assist in developing new policy and financial tools to help green CDCs
- Raise public awareness about the benefits and advantages of sustainable urban development
- Achieve greater purchasing power of CDCs through consumer aggregation when procuring green products and services

The Initiative provides CDCs with recommendations on how to significantly improve the quality and cost-effectiveness of their development projects through the following:

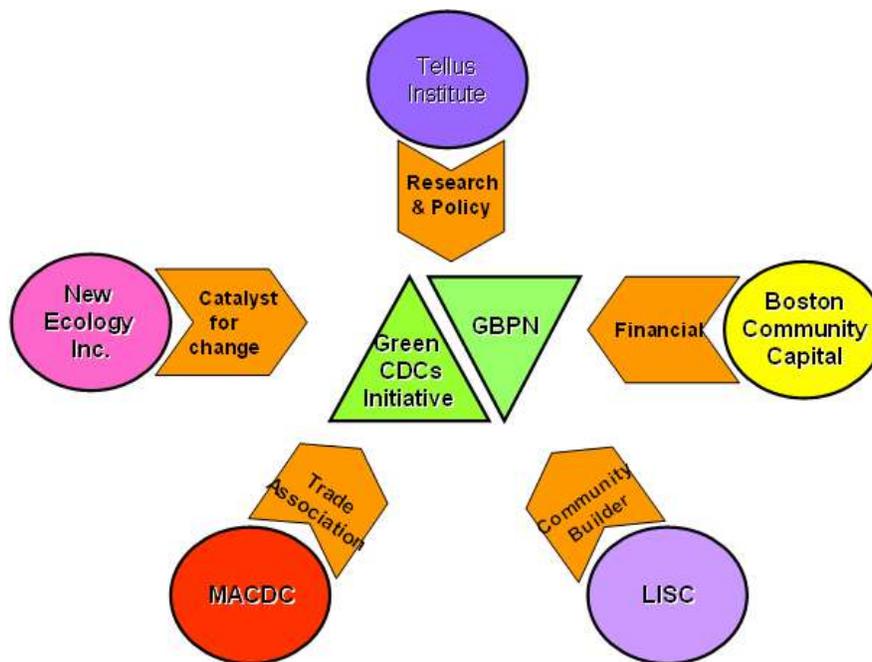
- Education for sustainable development and networking
- Direct technical assistance
- Access to loan financing, grants and other cost saving resources for CDCs
- Support and advocacy for green development strategies

**“Green Screen”**

NEI along with LISC-Boston created a “green screen” assessment tool for reviewing pre-development applications. This tool has since been utilized by over a dozen projects to maximize greening opportunities.

Since 1999, over a dozen CDCs have participated in the Initiative, which has been able to institute numerous projects in conjunction with private developers and universities. These demonstrate the viability of a neighborhood organization project in developing operational and technical assistance for CDCs.

**Figure VI.1**  
**Green CDCs Initiative and Green Building Production Network (GBPN)**



## **Green Building Production Network**

Improving sustainability of CDCs is challenging when the corporation lacks adequate funding to develop their capacities and technical performance (project and contract management, etc). One way to assist CDCs in a region in the process of embarking on green strategies is to ensure that they have an adequate assistance network. The Green Building Production Network (GBPN) is a Boston-based greening CDC initiative that was formed as a collaborative effort between Boston Community Capital, LISC, MACDC, NEI and the Tellus Institute. Their mission is to “improve the standards for green and sustainable affordable housing” by using “production network strategies to simplify development and lower costs, and provide financing that encourages lifecycle design and construction decisions” (2005, p.22). Ultimately they want to network solutions to be the foremost model for green development (2005, p. 22).

### **Jackson Square Redevelopment Project**

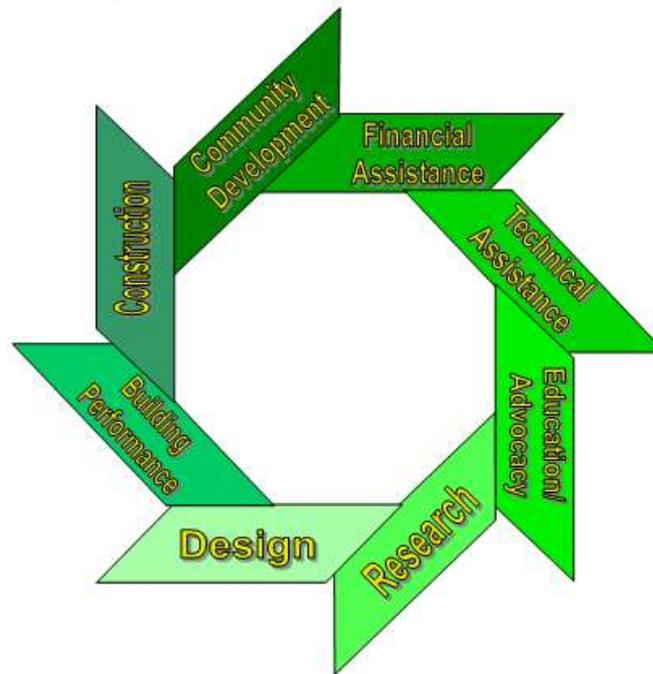
The Green Building Production Network's first project was Urban Edge's Jackson Square redevelopment, a 12-acre site located in the Jamaica Plain section of Boston, MA. In development since 1995, construction is expected to begin early 2008 on this \$250 million, 430-unit community of mixed-income housing, commercial, office space, which is all near public transportation. This project will utilize green building design principles and energy saving techniques including:

- Renewable energy sources (e.g., photovoltaic panels, wind turbines)
- Geo-thermal heating and cooling
- Green roofs
- Co-generation powered by bio-diesel fuel
- Grey water
- Environmentally friendly materials (e.g., wood and cork flooring, low VOC paints)
- Energy and water conservation measures
- Landscape ecology
- Storm water management

## **Pittsburgh's Network: Greening Our CDCs**

Pittsburgh can learn from the two Massachusetts examples above. We envision a network pictured below. It is built on Pittsburgh's most innovative and creative organizations that support the advancement of community development, environmental and equality justice, education (see Table). These organizations have a stake in the future of green affordable housing within Pittsburgh's CDCs. Each has a unique strength to share - whether its financial support, technical assistance, planning, education, design, or construction.

**Figure VI.2. Pittsburgh's Network Pinwheel**



**Close-up: Community Involvement**

The role that community involvement in greening communities is often not focused on but when do, can extensively change a community. For example, organization like Sustainable Lansing and the Hudson River Valley Greenway are amplifying ways and approach to take to encourage citizens' participation in its city planning efforts and communities.

The Union County Sustainable Communities Initiative gives a good example of community involvement. Union County Pennsylvania is primarily a rural county with a population of 41,626 in 2000. In 1997, they began the Sustainable Communities Program.

The County had recently adopted a new Comprehensive Plan which called for increased citizen involvement in planning efforts and was involved in a number of watershed and stormwater management issues. Flooding and surface water quality were being impacted by new development in the Watershed. Citizens had voiced concerns about maintaining "community character" or "sense of place" amid the rapid changes occurring due to housing and commercial growth.

The county was name by the EPA as the first "Green Community" in the U.S. They achieved the title of being the first green community by basing their program on, "sustainability", "preservation of sacred places," and by, "developing a community consensus."

**Table VI.1 Pittsburgh’s Network: Greening Our CDCs**

<b>Organization</b>	<b>Category</b>	<b>Potential Role</b>
<b>Affordable Comfort Inc. (ACI)</b>	Building Performance Research	Provide home performance services and best practices for affordable housing
<b>Community Design Center of Pittsburgh (CDCP)</b>	Design Education/Advocacy Technical Assistance	Encourage good design of affordable housing by connecting CDCs with “green” architects and planners creating a network
<b>Community Technical Assistance Center (CTAC)</b>	Community Development Education/Advocacy	Help implement the greening CDC process. A medium for collecting and disseminating affordable green housing information
<b>Conservation Consultants Inc. (CCI)</b>	Education/Advocacy	Educate CDCs and residents how to maintain their green home and how to conserve energy
<b>Construction Junction</b>	Construction	Supply reused building materials
<b>Construction Specifications institute (CSI) – Pittsburgh Chapter</b>	Construction	Create affordable housing standards and formats of construction documents and project delivery
<b>Energy and Environmental Solutions (E2)</b>	Design Education/Advocacy Technical Assistance	Provide CDCs with green building services; project planning, LEED certification, implementation, long-term measures and evaluations, and LEED education and training.
<b>Green Building Alliance (GBA)</b>	Education/Advocacy Technical Assistance Research	Provide education to green the CDCs as well as research and technical assistance for green projects
<b>Green Friends Development Company</b>	Construction Design	Design and construct green affordable housing
<b>Healthy Home Resources</b>	Education/Advocacy	Educate CDCs and residents on how to live healthy in their affordable green home
<b>Integrated Building and Construction Solutions (IBACOS)</b>	Building Performance Research	Provide green affordable housing builders with best practices
<b>Pittsburgh Community Development Collaborative</b>	Community Development	Facilitate the greening of Pittsburgh area CDCs. Coordinate assistance to create a green community development network.
<b>Pittsburgh Partnership for Neighborhood Development (PPND)</b>	Community Development Education/Advocacy Financial Assistance Research	Create a trade association of Pittsburgh area non-profits and CDCs. Be a model; green the organization and programs
<b>Sustainable Pittsburgh</b>	Community Development Education/Advocacy	Create a green affordable housing coalition. Educate CDCs in sustainable development. Assist in CDCs’ sustainable projects.
<b>The Heinz Endowments</b>	Community Development Financial Assistance	Expand current green building funding to target green affordable housing. Encourage other philanthropic entities to invest in the environment.

## **Conclusion**

Pittsburgh's CDCs should take lessons learned from these case studies to implement a more comprehensive neighborhood greening strategy. A valuable opportunity exists for to plan and implement sustainable development to lessen communities' ecological footprint *and* enhance residential quality of life. CDCs should be the choice providers of green affordable housing because they are already trusted organizations within the areas in which they serve. In return, CDCs will be able to provide their communities with cost effective and affordable housing, which delivers lower maintenance costs and improved health benefits.

From philanthropic entities to non-profits, to design and construction firms, the roots are already in place for Pittsburgh to begin greening its community development corporations.

## **Recommendations**

1. Expand the scope of the Community Development Collaborative to focus on sustainable community development, in particular, green affordable housing development
2. Encourage CDCs to consider green or eco-dynamic affordable housing
3. Include 'sustainable community development' in all CDC's mission and vision statements
4. Educate CDCs on how to write a 'green' Request for Proposals (RFPs)
5. Establish a trade association of Pittsburgh area non-profits and community-based organizations
6. Establish a clearinghouse of professionals that can assist CDCs in sustainable community development at pro bono or reduced fees
7. Offer financial commitment and support from philanthropic entities, banks, religious institutions, and corporations for greening both affordable housing development and CDCs
8. Develop a 'green' educational outreach program tailored especially to non-governmental organizations
9. Hold a green affordable housing workshop for southwestern, PA

## York, Pennsylvania: Community-Based Strategic Planning And Green Development

York, Pennsylvania like many U.S. cities went through an industrial decline and was in need of an updated strategic plan to lift the city from the high unemployment rate of 20 percent. In 1990, the leaders got together to figure out a plan that will get rid of York's abandoned former industrial properties and facilitate economic development initiatives to replace lost manufacturing job. However, they realized that the decision wouldn't be easy. But city leaders knew that they had to act quickly due to the fact that the population decreased from 60,000 in 1950 to 40,000 in the 1990s. City leaders embarked on comprehensive and holistic planning process that involved community involvement. The planning process focused on a community-wide visioning that involved public participation in a range issues; and the redevelopment efforts for brownfield and other sites.

In August of 1999, York's city council adopted the four year planning process. Before hand, the EPA region 3 recognized York's planning process and named it in its CBEP Program in 1997; York was the first city named in the EPA's CBEP Program. In recognizing York's efforts, the EPA Region 3 partnered with York in its strategic planning process. The EPA's role was to "make the necessary tools for sustainable planning and development accessible to communities as well as to integrate environmental goals into the economic planning process". The city wanted a comprehensive plan that involved the public and private partnership. Their approach to of getting the public in involved was interesting, such as:

- Publicizing in local newspaper and informational handouts of planning status and results;
- Assembling a community partnership advisory board, neighborhood committees, planning area committees and technical advisory committees to alert York city staff on planning processes such community services, land use, housing and historical preservation;
- Holding meetings to get feedback and inputs from community members;
- Surveying all the resident of York so as to give them a chance to voice their concerns/approval;
- Conducting review session to get the public to comment on the complete comprehensive plan.

The community outreach carried out by the city made EPA Region 3 go beyond by working with York only through its Green Community Program but to give the city technical assistance and an opportunity for the city to test EPA Green Communities Assistance Kit, which created a new partnership, a partnership that is more involve in a sense that it creates more information exchange, mainly from the EPA.

In sum, the city of York overall liked Region 3's Green Communities Program. Some staff members reported that "without EPA, they would never have been able to draw on the national expertise that was made available to them through the Green Development Workshop and that the technical assistance provided directly influenced the way they think about redevelopment issues."

Take Away Points:

- Active community participation is key.
- Diversity is important---engaging with different groups of people and partnering with different type of businesses, private and nonprofit organization is essential.
- A comprehensive assessment is imperative.

## **CHAPTER VII -- LEADING BY EXAMPLE: HOW THE CITY OF PITTSBURGH CAN GREEN THE URBAN LANDSCAPE FOR STORMWATER MANAGEMENT & LAND USE ISSUES**

Pittsburgh industrial legacy extends beyond its residential built environment to its infrastructure, particularly its water management system. Pittsburgh's policies and procedures for dealing with water management are akin to those that exist for managing the built environment: strategies are deeply rooted in tradition. Unfortunately, policies that the city has been pursuing in dealing with the aging built environment are somewhat archaic and draconian, preventing Pittsburgh from rebuilding and redeveloping in a sustainable way. By generating policies for stormwater management, and by changing zoning and building codes, Pittsburgh can enhance its sustainability and economic vitality in the short- and long-run.

This chapter explores and evaluates local-level public sector policy choices for stormwater management and zoning and building code. Notably, zoning ordinances and building codes must play a functional role in the enhancement of green building's presence in the Pittsburgh region. Green building practices and standards should be integrated into municipal codes, making their practice an integral part of regulation, much like requirements for fire safety (Shapiro, 2007). The need to adapt and update zoning and building code is glaringly apparent in light of Pittsburgh stormwater management problem—which negatively effects our economic, physical, and environment wellbeing.

### **The stormwater management problem**

Stormwater management is a distinctly pressing issue in southwestern Pennsylvania. The aging infrastructure of the region combined with the excess amount of “wet weather” that the system must bear has resulted in the need for “the largest, most costly Public Works project the city has ever seen” (Schombert, 2008). Fortunately, or unfortunately, the problem is not limited to Pittsburgh. The Allegheny County Health Department (ACHD) and the Pennsylvania Department of Environmental Protection (DEP) are charged with enforcing the Environmental Protection Agency's (EPA) consent orders for the 83 municipalities in the Allegheny County Sanitary Authority (ALCOSAN) service area which are currently non-compliant with the federal Clean Water Act (3RWW, 2008). The implementation of the required long-term control plans will impose \$2+ billion and \$1 billion price tags for municipalities and ALCOSAN, respectively.

Pittsburgh experiences frequent “wet weather” creates an overwhelming amount of runoff that enters combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs). The Pittsburgh metropolitan area has more than 300 combined sewer overflows that direct and carry wastewater to treatment plants, but during wet weather, runoff enters these pipes and overflows them,

causing a mixture of stormwater and wastewater to be released into the rivers (Calarusse & Kloss, 2006). Although CSOs are not illegal, they pose health risks and are in direct violation of the Clean Water Act. Newer communities (particularly subdivisions) construct sanitary sewer overflows (SSOs) which are separate pipes for sewage that often connect to CSOs in order to direct their wastewater to treatment plants. Overflows from sanitary sewer systems, such as backups in basements and overflowing manholes, are also illegal under the Clean Water Act.

### **Dealing with the problem**

There are several ways to better manage stormwater. These can include both incentives and mandates. One option is to fine municipalities for non-compliance, though, according to Allegheny County Health Department, many municipalities will not be able to comply due to high costs (2006). Additionally, "simply fining them...is probably not going to result in the remediation that we want" (ACHD, 2006).

On its own, Pittsburgh is trying to enforce some level of compliance applying penalties for violations of its stormwater management ordinance, approved stormwater management site plans, and stormwater management best management practices. The Ordinance amended Pittsburgh's zoning and building code to conform to stormwater management needs (Public Works & Environmental Services Committee, 2007). The most important aspect of the amendments accounts for low-impact development (LID) practices and Best Management Practices for stormwater management. Included in the best practice list is green infrastructure, or "source controls" that aim to reduce the amount of stormwater that enters the sewer systems in the first place, resulting in less stress on the aging infrastructure (Sentz, et al. 2008). *The primary mechanisms for source control are green roofs and rain gardens.*

### ***Green roofs as a source control solution***

Green roofs have been shown to significantly reduce stormwater runoff and its negative impact on our strained sewer infrastructure. Benefits include:

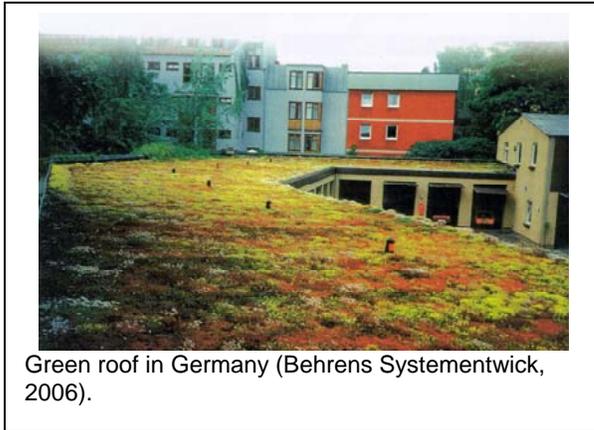
- Reducing a building's use energy, heating and cooling systems.
- Can easily be retrofitted to existing structures.
- Provide sound insulation and aesthetic value.
- Can be used for food production; creating secondary community benefits.
- Can double the usable life of the roof (Green Roofs, 2008).
- Reduce the urban heat island effect.
- Absorb greenhouse gases.
- Improve air quality by replacing traditional, heat-absorbing roof surfaces with vegetation that cools the air through evapo-transpiration.

### ***Green Roof Case Studies***

Green roofs have been used as source controls for stormwater management for decades. Germany, for example, started to use the technology in the 1980s when it realized the effect that stormwater runoff was having on their aging sewer infrastructure (National Renewal Energy Laboratory, 2004). In

Europe, new developments are required to have green roofs for stormwater management purposes, and new residential developments are incentivized to green their roofs with cuts in rain taxes.

Some U.S. cities use programs similar to Germany's "rain taxes", which are



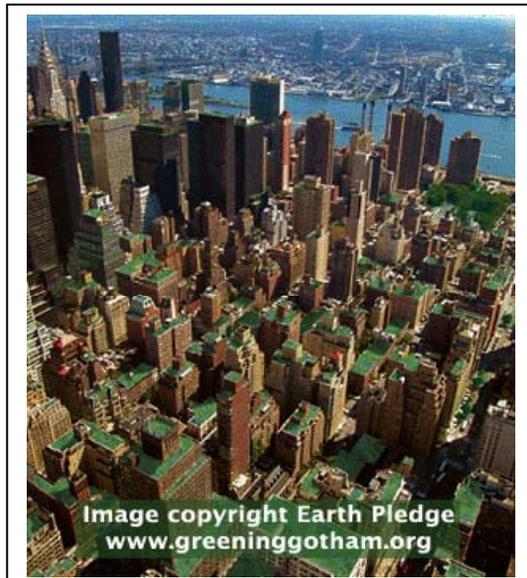
collected for the amount of surface on a property that is impervious, contributing to excess runoff. Baltimore collects fees for impervious surface cover in new developments close to the Inner Harbor (Scholz-Barth, 2001). Illinois provides a tax reduction of up to 5/6 of land value for vegetated filterstrips, which aid in improving water quality, prevent soil erosion, and provide habitat for grassland wildlife. (Scholz-Barth, 2001).

We compare five cities' current green roof and stormwater management policies, including Pittsburgh's (see Table). We include Seattle, Milwaukee, Chicago, and New York.

Seattle: Seattle has stormwater fees in place of \$11.14 per month, per household (Brenner, 2007). They currently have an impervious surface reduction tax credit that lists green roofs and roof gardens as acceptable strategies for receiving this credit, and they have been working to quantify the benefits of green roofs to give appropriate credit for them in the city stormwater code (Seattle Department of Planning and Development, 2007). The Partnership for Puget Sound has suggested low-impact redevelopment efforts in the city, beginning with low-impact development demonstration projects.

Milwaukee: The city is assessing 125 city-owned buildings with flat roofs, including schools and libraries, to determine whether they can be retrofitted with green roofs (Gould, 2004). Milwaukee also implemented a stormwater fee for impervious surfaces on commercial developments (Millard, 2006). It is also considering requiring LEED certification for all developments that receive money from the City. The city's Highland Gardens, a \$12 million public housing mid-rise that houses senior citizens and the disabled, features 114 affordable apartments and a 20,000-square-foot vegetational roof. The roof cost \$380,000, which made up 3% of the total cost of the project. The green roof will absorb 85 percent of a 2-inch rain, and it will protect the roof from ultraviolet sunrays, increasing its longevity by 50 percent and reducing cooling and heating costs by 20 percent (Gould, 2004).

New York: The city's "Sustainable Raindrops" report found that it needs to



Earth Pledge imagines a city covered with green roofs (Earth Pledge, 2007).

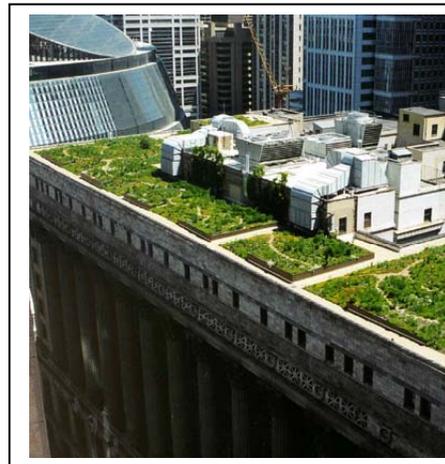
invest in source controls because of current strains on its sewer infrastructure (Plumb, 2008). In 2008, the city passed legislation pledging to follow through to develop a Sustainable Stormwater Management Plan. In addition, the Earth Pledge Green Roofs Initiative, the New York Ecological Infrastructure Study is in the process of providing policymakers with a set of analyses that will help determine the impacts, benefits and costs of green roof development in the New York metropolitan area. The effort has been dubbed "Greening Gotham", and has the support of Mayor Michael Bloomberg and Senator Hillary Clinton.

Chicago: Chicago has been a leader in green roof retrofits via a \$500,000 green improvement fund called the Green

Roof Grant Program. Through the program, grants are given to small business, or those with a "footprint" of less than 10,000 square feet, to install green roofs. To date more than 200 roofs covering 2.5 million square feet have been converted (City of Chicago, 2008).

Chicago's incentive structure also includes floor area bonuses and density bonuses to developers who cover 50% or 2,000 square feet (whichever is greater) of a roof with vegetation. In May 2006, the city began a pilot program entitled the "GRIF TIF" - Green Roof Improvement Fund Tax Increment Financing - offering matching funds up to

\$100,000 to put green roofs on downtown buildings, drawing \$500,000 from the Central Loop Tax Increment Financing District. "At \$10 per square foot, that's enough to fund five to 10 projects," said Michael Berkshire of the city's Department of Planning and Development (Wisby, 2006).



Pittsburgh: While not as extensive, Pittsburgh has some source controls are in place in the Pittsburgh area. For instance, the Children's Museum chose to install a green roof on their facilities after researching their benefits. Alcoa has a goal to meet a "near zero" stormwater discharge rate by the year 2015 by rejecting end-of-pipe treatments, and has spent \$25 million in the last decade for the collection and treatment of stormwater. The region's leader, however, is 3 Rivers Wet Weather (3RWW). They carry out their mission through public outreach, education campaigns and distribution of financial

grants. Grants come from the EPA, ALCOSAN, and Allegheny County Health Department. In particular, 3RWW funds Stormwater Best Management Practice (BMP) demonstration projects, focusing on lot-level or low-impact development (LID) projects to control stormwater runoff with source controls. Some demonstration projects that have been completed are: the rain barrel project with the Nine Mile Run Watershed Association in 2004; green roof demonstration projects on the Shadyside Giant Eagle and on Hammerschlag Hall at Carnegie Mellon University's main campus; and retrofitting a multi-level historic commercial/residential building in Homestead with a green roof.

3RWW is also underwriting monitoring projects by the engineering



Shadyside Giant Eagle Green Roof (Pop City, 2006).

departments at the University of Pittsburgh and Carnegie Mellon University (CMU). The roofs at the Giant Eagle and Hammerschlag Hall projects are the focus of these studies. Janie French, Watershed Programs Manager for 3RWW, explained that the Hammerschlag roof has been in the room that the roof sits above. Monitoring and evaluation is being done to examine green roof performance, including stormwater runoff effects and temperature reductions. This framework for monitoring and the

report will provide a useful model for examining green roof projects in the future.

### ***Zoning and building codes—changing policies will make a difference***

We now turn to another form of infrastructure-- green infrastructure. Green infrastructure consists of trees, vegetation, wetlands, open space, *and* buildings that can be preserved, or created in the built environment. As previously mentioned, Pittsburgh is making efforts to conserve and create green space in the city, but the bulk of activity is not government led. To realize future gains in green building and urban greening the public sector must take some initiative. Zoning ordinances and building codes must play a functional role in the enhancement of green building's presence in the Pittsburgh region. Green building practices and standards should be integrated into municipal codes, making their practice an integral part of regulation, much like requirements for fire safety (Shapiro, 2007).

**Green Roof and Stormwater Management Policies and Private Programs in Five U.S. Cities**

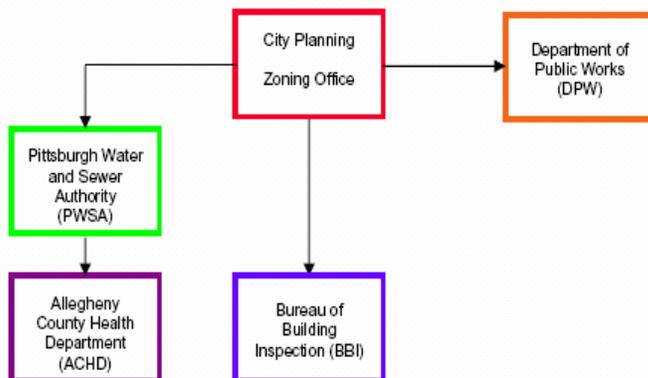
	<b>Seattle</b>	<b>Milwaukee</b>	<b>New York</b>	<b>Chicago</b>	<b>Pittsburgh</b>
<b>Stormwater fees</b>	Seattle has a monthly stormwater fee of \$11.14 per household.	In 2006 stormwater fees for impervious surfaces on commercial development were implemented	no	no	No
<b>Impervious surface reduction tax credit</b>	Green roofs and roof gardens are acceptable strategies for receiving credit.	Credits may be considered for parcels that either receive a reduced level of storm water management service.	New York State Green Building Tax Credit provides tax credits to owners and tenants of buildings and spaces which meet certain green standards.	Chicago offers a stormwater retention credit for green roofs.	No
<b>Stormwater Best Management Practices program</b>	The primary method to control stormwater discharges is through the use of best management practices, according to the EPA.	The primary method to control stormwater discharges is through the use of best management practices, according to the EPA.	The primary method to control stormwater discharges is through the use of best management practices, according to the EPA.	The primary method to control stormwater discharges is through the use of best management practices, according to the EPA.	The primary method to control stormwater discharges is through the use of best management practices, according to the EPA.
<b>LEED certification for new buildings</b>	LEED Silver certification is required of all city-owned projects larger than 5,000 gross square feet.	Considering LEED requirement for new buildings receiving city money.	Developed their own comprehensive guidelines. High Performance Building Guidelines.	All new city-funded construction and major renovation projects will earn LEED Silver certification at minimum.	Considering legislation to require new developments to have LEED certification.
<b>Grants for Green Roofs</b>	LEED grants to any King County project, outside Seattle for LEED-Silver above. Funding 10% upon award and 50% when completed.	Grants provided by The Milwaukee Metropolitan Sewerage District through their Storm Water Best Management Practices.	No- grants at the state level, but not the city level.	Green Roof Grant Program for Residential and Small Commercial Buildings for small business to build green roofs.	No- grants at the state level, but not the city level.
<b>Incentives such as density bonuses and TIFs</b>	To gain greater height or density, projects must achieve LEED Silver or higher and contribute to affordable housing/other public amenities. Zoning changes offer transferable development rights for historic structures.	Considering requiring stormwater management source controls like green roofs, permeable pavement, and rain gardens for city subsidies such as tax increment financing districts	The New York State Green Building Tax Credit provides tax credits to owners and tenants of eligible buildings and tenant spaces which meet certain green standards.	Floor area bonuses and density bonuses to developers who cover 50% of a roof with vegetation. Green Roof Improvement Fund Tax Increment Financing offers matching funds up to \$100,000 for green roofs.	Considering legislation to give density bonuses for green buildings
<b>Low-impact development demonstration projects</b>	Partnership for Puget Sound suggested low-impact redevelopment efforts, beginning with low-impact development demonstration projects. Seattle Green Roof Evaluation Project installed five test plots.	The city set an example in the Highland Gardens, a \$12 million public housing mid-rise that houses senior citizens and the disabled, which features affordable housing and a green roof.	The New York Ecological Infrastructure Study (NYEIS) research focuses on an extensive green roof demonstration project that serves as a research station for data collection.	One of five cities chosen by the EPA to be in the Urban Heat Island Pilot Project. Combined City Hall and Cook County building in Chicago was retrofitted with a green roof demonstration project.	3RWW and Alcoa have green roof demonstration projects, and 3RWW has plans to implement rain garden and green street demonstration projects.
<b>Evaluation of green roofs</b>	Seattle Green Roof Evaluation Project installed five test plots to record rainfall and runoff data.	To evaluate the effectiveness of the green roofs in temperature reduction, the Sewerage District will install temperature sensors below the insulation, in the soil, and at the plant level.	The NYEIS sees their demonstration project as an opportunity to evaluate the effectiveness of green roofs and to educate the public and business community.	The City Hall and Cook County building green roof is undergoing monitoring and evaluation to see if the roof reduces ambient air temperatures, which reduces the urban heat island effect.	3RWW has funded monitoring projects for their green roof demonstration projects done by Pitt and CMU students.



### Examples of funding sources for green roofs

- In Allegheny County, Conservation Consultants Inc. received \$54,128 through an Energy Harvest Grant for a 1,700-square-foot green roof, and Phipps Conservatory and Botanical Gardens received \$250,000 for an integrated water management system. This system is used for geothermal heating and cooling, but also treats and reuses wastewater. (PA Power, 2007).
- Growing Greener II Grants, which give “\$625 million to clean up rivers and streams; protect natural areas, open spaces and working farms” can be used for green roof demonstration projects and green infrastructure conservation projects (What is Growing Greener II? 2008).
- Pennsylvania also has Chapter 111, Stormwater Management Grants and Reimbursements awarded through the Stormwater Management Act where local governments can be reimbursed for 75% of the money they put into a watershed protection program (Storm Water Management Grants and Reimbursements, 2008).
- The EPA awards grants for green roof demonstration projects and other green infrastructure projects under its Nonpoint Source Management Program. “Under section 319, State, Territories, and Indian Tribes receive grant money which support a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects” (Nonpoint Source Management Program - Clean Water Section 319, 2008).
- Funding from the EPA can also be obtained through the Drinking Water State Revolving Fund; Source Reduction Assistance Grants; Surveys, Studies, Investigations, Demonstrations, and Special Purpose Grants ; and Air Quality Grants. This grant money can be received through PA’s Department of Environmental Protection (Green Roofs 101, 2007).

### Diagram of Permitting Agencies



Source: City of Pittsburgh Planning Department, 2008

In the City of Pittsburgh the permitting process requires applicants to submit forms and applications to five distinct agencies (shown here). Homeowner and developer applicants experience relatively similar permitting processes (City of Pittsburgh, 2007a). The process for homeowners making changes to one- or two family homes is intended to be shorter than the one experienced by developers, because the scope and scale of

homeowner projects are smaller. Applicants meet with five agencies/departments to get their project approved.

- Zoning staff review development applications to ensure they meet zoning requirements, and BBI reviews building and occupancy permits to regulate construction, demolition and occupancy to ensure safety.
- PWSA reviews requests for “tap-ins” to water and sewerage lines.
- The Department of Public Works evaluates projects as they relate to public right-of-ways.
- Allegheny County Health Department issues permits for a multitude of building and development practices, such as plumbing/water use, construction waste disposal and asbestos removal.

In Pittsburgh, though recent efforts have been made to expand the role of green building through adaptations to the zoning code, this excitement is generally restricted to an informal promotional level. Because the public sector plays a pivotal regulatory role in the development process, encouraging green building should include review and updating of existing zoning codes.

Zoning for Green Building: Research on the role of public, nonprofit, and private sector roles in growing green building in Pittsburgh has demonstrated that the public sector is not nearly as pro-active in leading the charge to promote green building as some other local governments with a strong green building presence in the United States. Rather, Pittsburgh has a substantial number of interested nonprofits, and some private sector developers driving green building projects in the region. As such, there are a number of legislative steps that the City of Pittsburgh might take to improve the climate for green building. Below is a review of the current status of zoning regulations in Pittsburgh as they apply to green building.

Pittsburgh City Council passed a Sustainable Development Bonus, which

**Zoning and Sustainability**

In the 1926 landmark case, *Village of Euclid v. Ambler Realty Co* the U.S. Supreme Court ruled that zoning ordinances were a legitimate way for local governments to control land uses (Cornell, 2008) This precedent has remained, but set off a long argument on the pros and cons of zoning (Guttenberg, 1987). While zoning can be a planning and land use tool that promotes sustainability, without clear articulation of sustainability requirements (like those of the USGBC’s LEED certification) the potential for zoning ordinance’s to drive sustainability is small—in fact without inducements, zoning will potentially have a negative impact on green building.

includes a height and floor area ratio (FAR) bonus for applicants achieving LEED certification (City of Pittsburgh, 2007b). With the recognition that “green buildings improve air and water quality, reduce solid waste, conserve natural resources, reduce operation costs, optimize life-cycle economic performance and minimize...strain on local infrastructure” three council members sponsored the Ordinance (City of Pittsburgh, 2007b). The Ordinance applies to buildings in non-residential

zoning districts that are LEED certified.

It is also important to note that legislative changes involving exceptions to base zoning standards, must also coalesce with the needs of stormwater management. As previously mentioned, the city's stormwater best practice amendments call for lower level density—principally enhanced greenspace in developments. The LEED rating system does give points in a way that generally favors increases in greenspace (or the very least not reducing existing open space); however, on its own it does not provide an adequate backstop against a lack of coordination between stormwater management and green building interests. With that said, it will be important to recognize the needs of stormwater management in any legislative change to promote green building.

Greening building code requirements: In December 2006, the City of Pittsburgh adopted the State of Pennsylvania's Uniform Construction Code, which was issued by the International Code Council (ICC) (City of Pittsburgh Bureau of Building Inspection, 2007). The Uniform Code includes model codes for building, construction, electrical, etc. and the city is permitted to make amendments. If Pittsburgh wishes to incentivize or mandate green building through building code, it must make changes to the code, rather than waiting for action from the ICC. Even with the understanding that Pittsburgh Building Codes likely do not inhibit green building, there are a number of ways that building code can be enhanced to promote it.

For example, conversations with City of Pittsburgh Zoning Staff highlighted that it would be useful to have a LEED accredited architect on staff who could review design standards so that they appropriately fill building, material and other important requirements. Other cities have created a green building specialist position. In terms of building materials and methods, there must be a proactive approach with a developed understanding of green building guidelines and building code in order to mitigate conflicts (Floyd, 2005). Because building code requires specific skills linked to systems engineering, design and construction, and architecture, and green building is a newly developing market, it is particularly important to have technical staff that can assist development applicants as they attempt to capture the benefits of green building in their building planning and development stages.

### ***Zoning and Building Code Case Studies***

There are numerous ways to improve the sustainability of development projects in a municipality. These include: expedited permitting programs, changes in zoning ordinances, training public officials who work with development applicants, supporting the private market for sustainable development with economic development strategy, and providing educational programming about sustainable development for all community stakeholders. While some communities—such as Pittsburgh—have chosen to incorporate LEED certification into new legislative requirements, others are opting for broader inducements for green building and sustainability standards.

The City of Chicago's Green Permit Program provides expedited permitting for projects that include green building strategy and approach -- green building elements into plans mean developers receive permits faster. Applicants must actively participate in development review and some level of coordination with the city, which hosts its own green building design team. Another approach is the City of Rohnert Park, California (in concert with eight other communities in Sonoma County), which adopted a Green Building Ordinance, which necessitates the use of green building for new projects and renovations to all community projects with few exceptions.

### Sample of Green Building Programs

Policy Options →	Incentives	Green Municipal Buildings	Regulations & Mandates	Comprehensive Sustainability Approach
Chicago, Illinois	Yes Green Permits	Yes LEED construction & renovation	No	Yes
City of Rohnert Park, CA	No	Yes	Yes Zoning Ordinance	Yes
City of Boulder, Colorado	Yes	Yes	Yes Building Code Ordinance	Yes
Seattle, Washington	Yes	Yes LEED Silver	No	Yes

Boulder, Colorado has passed similarly stringent standards. Rather than instituting a comprehensive zoning ordinance, they focused on a combination of optional programs, *and* specific requirements for building and demolition permits, primarily in material recycling and energy use. Waste management standards were adapted to include a materials recycling requirement. Energy efficiency standards were also enacted for building remodels and new construction. The requirements for new construction were developed by amending the Energy Conservation Code that Boulder follows. This is the same Code used by the City of Pittsburgh (it is part of the uniform code that was developed by the International Code Council). Ultimately, Boulder's program requires projects over 500 square feet to fulfill a certain number of "Green Points". The points are based on standards of building and energy

efficiency. If the originators of a project are pursuing LEED certification, they do not have to seek Boulder's Green Points.

The Seattle, Washington Department of Planning and Development offers a highly developed Green Building Program that began in 2000. Acting on the premise that the biggest deterrent to green building is a lack of information and resources, they employ experts to provide assistance services in the following categories: commercial, multifamily, residential, city projects, and sustainable communities. Included with their program is an exhaustive resource list—including funding mechanisms and incentive programs (Seattle DPD, 2008).

## **Recommendations for Pittsburgh**

### ***Stormwater***

1. *Adopt a mission statement*

Pittsburgh should adopt a mission statement similar to Chicago's Policies and Incentives Mission Statement, which states their intentions for implementing green building and green roof policies and incentives. Pittsburgh's mission statement could be related to building a sustainable city with a commitment to implementing green infrastructure such as green roofs for source controls of stormwater management, as well as improving energy efficiency and reducing the urban heat island effect.

2. *Seek outside funding*

Because much of the green infrastructure work is being done by the private and nonprofits sectors, the city of Pittsburgh and Allegheny County can show a commitment to building a sustainable city and region by acquiring funding for green infrastructure projects from the State and the EPA.

3. *Improve Enforcement*

Pittsburgh has a stormwater management plan as does Allegheny County, but local officials of other Allegheny County municipalities must be reminded that the state requires stormwater management plans and that it is their duty to enforce them and the consent orders (personal communication, February 14, 2008).

4. *Apply the State Integrated Water Management Act*

Allegheny County should follow the recommendations of the State Integrated Water Management Act, which is meant to encourage stormwater management planning on a regional watershed basis.

5. *Implement a stormwater management fee*

Pittsburgh does not have stormwater fees in place, or an impervious surface reduction tax credit. Implementing these regulations is a necessary approach to stormwater management and sustainable

development. The fee could be reduced as an incentive for the implementation of green infrastructure or impervious materials.

6. *Incentivize green roofs*

A grant program like Chicago's could be implemented; or green roofs could be subsidized to finance increased upfront costs. Tax incentives for new green roof projects and rehabilitation projects, green infrastructure preservation or creation, and impervious surface reductions can be offered.

7. *Conduct further studies on stormwater benefits*

Pittsburgh should conduct a study similar to Seattle's to quantify stormwater benefits, and should continue monitoring and evaluation of pilot green roofs projects and other kinds of green infrastructure.

Pittsburgh can apply the policies and incentives that have been applied in other cities and countries to implement green roofs and other source controls such as rain gardens and greens streets to address stormwater management, energy conservation, and urban ecology. A retrofitted green roof is a good option for sustainable rehabilitation and renovation of existing and historic buildings because it enables them to get on board with greening the urban environment and installing source controls without rebuilding and compromising the structural integrity of the existing buildings.

### **Case Study: Big Box Retail, Environmental Impacts, and WalMart in the East Hills**

A new development in the East Hills presents an opportunity to understand how municipalities, the county and region can begin to incorporate Green Building and Planning into development decisions. WalMart is building a new supercenter on the old East Hills shopping center. This case study reviews why this is an important development for understanding greening in our region.

**Big Box Stores:** Big box stores have environmental impacts. In 1980, there was five square feet of retail space per person in the U.S.; today, there is 20 square feet per person (Beaumont and Tucker, 2005). Much of this growth is driven by the growth big-box store development, and the super center phenomenon, which cover about 150,000 to 200,000 square feet. From 1992 to 2002, supercenters grew by an astounding 277 percent (Lee, Atkins, Park, 2005).

**How Big is the "Big Box":** Many communities seek big box stores because they generate sales tax revenues and provide jobs. They may also generate more retail development. However, there are significant environmental and social costs associated with big box developments.

- First, the environmental footprint for big box stores is driven by transportation, A 220,000-square-foot Walmart, on average, generates more than 10,000 car trips a day and has over 1,000 parking spaces (Walmart Watch, 2007).
- Second, the physical development and its design create problems with water runoff (see Chapter 8). As water collects in parking lots, the temperature of the water rises and then runoffs into nearby watersheds. Runoff pollution is the nation's leading threat to water quality, affecting about 40 percent of America's waterways (Benfield, Raimi, and Chen, 1999). Shopping centers' parking lots are generally 75 to 95 percent imperviousness surface (Ibid). However, when an impervious surface cover exceeds 10 percent stream degradation begins to occur. For every acre of parking surface 25,000 gallons of runoff are produced with 1-inch of rain (Walmart Watch, 2007).
- Third, big box developments are also major energy consumers. While, big box stores are generally not considered intensive users of energy, but their size of big box stores and their hours of operation results significant energy usage. While the EIA is forecasting that the total U.S. demand for energy will increase by 1.1 percent through 2030 (NGA, 2005), commercial energy use is expected increase 40 percent during the same time period (Loper et al., 2005, p.7).

### ***A Shiny New Big Box Atop the Watershed: Walmart in the East Hills***

A dilemma is raised for local communities seeking new development: How do local governments balance their need to promote local development while acting as prudent stewards of their environment, when that development has adverse environmental consequences? When should local officials walk away from the table?

The story of the East Gate Commerce Center is an unfortunate tale. East Gate Center, located in Penn Hill and Wilksburg -- with a small part in Pittsburgh -- opened in the early 1960s, but failed to garnish much traction in the market and has been sitting empty since 19XX. In 1997, a study by Carnegie Mellon University's Heinz School recommended that existing buildings be demolished and a big box development should go in its place.

In 2007, plans for a Walmart at the East Gate Commerce Center were finalized. The Walmart will open for business in 2009. The Walmart will cover 148,560 square feet and maintain 705 parking spaces (Miller, 2007). The plans for development were highly praised the local press and by local and state officials. (Miller, 2008). The site sits atop the Nine-Mile Run Watershed, a 6 1/2 square mile area with 48,000 people in the eastern neighborhoods of Squirrel Hill, Duck Hollow, Regent Square, South Homewood, Swisshelm Park in Pittsburgh, along with Edgewood, and Wilkinsburg (Weisbur, 2008).

The Walmart project began without the involvement of the Nine Mile Run Watershed Association, the organization representing the residents of the area. According to the Association, they were asked to be part of the development process only after talks of development began. Subsequently, Watershed officials met with Walmart officials and municipality officials. The association provided the municipalities with guidelines to promote green development.

In 2005, Walmart publicly committed itself to becoming a more eco-friendly corporation. Currently, Walmart has three eco-friendly stores nationwide. However, Walmart is not building an eco-friendly store in the East Hills. The corporation has agreed to add more rain gardens, change the size and structure of the tree islands in the parking lots, and to include native trees and plant species in their landscaping, but these are fairly minor. Local officials did not directly discuss the issue of green building with Walmart officials.

Despite Walmart's public commitment to the environment nationally and the few concessions noted above, it has not made an environmental commitment in the East Hills site. The planned development calls for only a 13% reduction in the impervious area from the old East Hills shopping (Nine Mile Run Watershed Association, 2008). The runoff from East Hills will be far more contaminated due to increased volume of parked automobiles, as well chemical runoffs from the site's operations.

This is more in line with Walmart practices than its press releases. Walmart has a questionable history of stormwater management practices. In 2004 Walmart was fined the largest ever EPA penalty for stormwater violations (Mitchell, 2006, p.118). Moreover, the Connecticut Department of Environmental Protection has fined Walmart \$1,550,000 for storm water violations occurring over seven years at 20 stores.

Furthermore, Lowes is also currently planning to locate adjacent to the Walmart. The Penn Hills planning department expects the Lowes center to have at a minimum of 621 parking spaces, according to a Penn Hills Planning Commission memorandum. Therefore, between Lowes and Walmart, 1326 new and activated parking spaces will sit atop of the Nine-Mile Run Watershed (Miller, 2007).

Given that since 2005, Walmart claims to be an environmentally friendly corporation, more should have been done to improve the environmental aspects of this development. Given the volume of visitors expected to shop at the Walmart and Lowes development, and location of the stores atop the Nine-Mile Run Watershed, a greater reduction in non-impervious space would be justified.

However, while local offices have acted responsibly, it seems that the concerns of getting new tenets may have been an overriding concern. It is easy for businesses to push through development when local communities desire new development. The politics of economic competition make it difficult negotiation for prudent development.

## Chapter VIII – Building Green and Building Dreams

The green economy has been gaining attention as of late for the prospects it may deliver in terms of new jobs. Corporations such as Spain's Gamesa, aim to increase the national capacity of wind power and create sustainable jobs. Since most green job focus on renewable energy, they are not at risk of being outsourced (Bezdek, R., 2007, 43). They are also growing -- the renewable energy (RE) industry employs 115,000 people in the U.S. where as the coal industry employs 83,000 (Burtis, P.R., Epstein, B., and Hwang, R.J.; 2004, 12).

### ***What are Green Jobs?***

Green jobs represent a wide range of industrial and service jobs in our economy. Some are highly specialized, such as wind technicians (or windsmiths), while most are traditional jobs such as electricians, truck drivers, and roofers (White and Walsh, 2008, 26). Currently there are 8.5 million green jobs in the U.S. and are projected to increase to 40 million by 2030 (Bezdek, 2007). Although this figure sounds promising, it will not be reached unless the correct steps are taken by a number of different stakeholders and policymakers.

### ***So what does it take to create green jobs?***

*Green-Collar Jobs in America's Cities* suggests that a bottom-up plan should be implemented (Green for All, 2008).

1. Start at the local level and begin by targeting environmental and economic goals. Analyze local resources such as pre-existing skill sets and assess whether the goals can be considered consistent with these resources. If not, then generate a plan to align them via a taskforce consisted of non-governmental stakeholders within the community.
2. Encourage public policies that attract investments to the green economy.
3. Train the region's workforce and supply them with the necessary skills.
4. Take a strengths-based approach and build a base, which will generate political support.

This bottom-up approach has worked successfully in cities like Milwaukee – which we've highlighted frequently in this report – and Washington, D.C., Oakland, CA, and the South Bronx (Apollo Alliance, 2008). In Milwaukee, as we discussed above, the Milwaukee Energy Efficiency (Me2) project is an aggressive job creation strategy. Washington, D.C. passed the Green Building Law, which requires that starting in 2012 all commercial development of 50,000 square feet or more must be LEED certified. This law applies to all new construction, as well as major renovation projects (Karush, 2006). In addition to this law, there are also new policies for stormwater management and green urban infrastructure, as well as ones that reduce

dependence on non-renewable energy sources while encouraging energy efficiency (Green-Collar Jobs in America's Cities, 2008, 6-13). These sorts of initiatives translate into green jobs.

### ***Green Jobs Act of 2007 (GJA)***

The GJA was first introduced by Congresswoman Hilda L. Solis of California and was implemented as Title X of the Energy and Security Act of 2007. It will be instituted as a joint project of the Department of Labor and the Department of Energy and it is also considered to be an amendment of the Workforce Investment Act (WIA). The GJA also inaugurates a pilot program – Energy Efficiency and Renewable Energy Worker Training Program. The Act ultimately aims to get people out of poverty through training workers for green jobs (Green for All, 2007).

The Act has allocated \$125 million for the creation of five green job-training programs, which target poor Americans.

The GJA is an acknowledgement of the growth of the green economy and the shortage of skilled workers to support it. However, in order to encourage the continued growth of the green economy in the US, significantly more than the \$125 million will likely be necessary.

### ***Partnerships***

The importance of green jobs has created new partnerships. In 2006, the United Steel Workers and the Sierra Club partnered up to form the Blue Green Alliance. Its goal is to address the multitude of issues that surround global warming and fair trade. When it was first formed the alliance focused its efforts on Michigan, Minnesota, Ohio, Pennsylvania, Washington and Wisconsin, but is now expanding to other states. This partnership makes sense because the two organizations have surprisingly similar goals to get citizens to be more engaged, businesses to be more responsible, and communities to be healthier.

### ***Gamesa in Pennsylvania***

Gamesa is a corporation from Spain that manufactures wind turbines. It built its first US factory in Ebensburg in 2005 and its second in Fairless Hills, near Philadelphia (White and Walsh, 2008). Their presence in Pennsylvania is largely due to the efforts of Governor Rendell and his administration, which created tax incentives and implemented a renewable portfolio standard that enticed the company to investing in the region. Gamesa's choice had much to do with the collaboration of workforce development, economic development and the local government. Johnstown Area Regional Industries (JARI) and PA CareerLink Cambria County were the key players of the collaboration (White and Walsh, 2008).

PA CareerLink Cambria is the major center in the area where people go for employment services such as job training. Gamesa was looking to fill 240 positions that paid between \$10 and \$12. Before Gamesa opened, CareerLink

and JARI assisted with the job placement and Gamesa has employed 276 Ebensburg residents.

Gamesa also built another factory in Fairless Hills near Philadelphia which manufactures rotor blades. However hiring a skilled workforce was not as easy as it was in Ebensburg. It had to depend on temporary employment agencies and did not receive qualified workers. There was no collaborative effort to train workers or bring skilled workers to Gamesa.

Gamesa also got the attention of the United Steel Workers (USW). Gamesa stated that it would stay impartial with its workers becoming unionized. Most of the employees from both plants signed cards which led to a contract; the upcoming contract will aim to include cross-training for employees so that they can move up the economic ladder.

### **California's Clean Tech Cluster**

California has potential for building a clean tech cluster because the industry is rapidly growing in the state (Burtis, Epstein, and Hwang, 2004). The state has begun to promote Clean Tech. A survey of 25 clean tech venture capitalists shows that 79 percent of those surveyed chose to invest in California due to its regulations, programs and incentives (Burtis, Epstein, and Hwang, 2004, 29 - 32). California also has a number of initiatives that attracts investment: The Green Wave Initiative, the Public Interest Energy Research Program, California's Renewable Portfolio Standard, Solar Photo-voltaic and Wind Incentive Programs, and Diesel Emissions Reduction Plan.

The survey conducted also asked the venture capitalists to recommend other policies that would encourage investment in clean tech in California (Burtis, Epstein, and Hwang, 2004, 32-35). The first suggestion was to create additional financial support through loans, tax breaks and grants. Their next suggestion is create more demand for cleantech products. For example, California can buy cleantech products for its buildings and thereby increasing the demand for clean tech. The government can also create incentives for businesses that buy cleantech products and California could also make their environmental policies more stringent. Venture capitalists also suggested that there be non-financial support for cleantech start-ups such as creating incubators for companies and from outreach such as seminars, conventions and workshops.

### **Conclusions**

Without any hesitation, greater Pittsburgh has the potential for creating thousands of green jobs. Pennsylvania has taken steps to green the state and Pittsburgh is also taking steps to revamp its economy.

Pittsburgh has taken the four strategies endorsed by the Apollo Alliance, et and implemented them in its plan to create green jobs. Pittsburgh has formed partnerships and initiatives such as the Green Building Products Initiatives an economic development program started by Pittsburgh's Green

Building Alliance (Green Building Alliance, 2007). This initiative will create a new market for green products and provide funding for startup green businesses, which will create jobs.

Launched in April 2007, a not-for-profit organization – GTECH, targeted marginalized communities of Pittsburgh for projects to revitalize their areas environmentally and economically. Lawrenceville, East Liberty, and the Almono brownfield in Hazelwood have been targeted areas for GTECH's goals to renew and educate (GTECH, 2007).

GTECH has developed the Green Job Corp (GJC) to help bridge the gap between the booming green economy and the shortage of skilled workers. GJC aims to train workers and prepare them for the new economy. "The Pittsburgh region is perhaps the most ideal place in the country to leverage this movement due to the history of leadership in new industries and a trained workforce coupled with the present bounty of organizations and individuals already underway within the Green Economy" (GTECH, 2007).

Another strategy was to focus on positive aspects of a community. Pittsburgh has many positive attributes that organizations and policy makers can build on to accelerate the green economy and ultimately a good number of green jobs in the city. In 2007, *Forbes* Magazine ranked Pittsburgh as the 10<sup>th</sup> cleanest city in the world. *Wired* Magazine also named the city as one of the top 10 technical cities.

The Advanced Energy Portfolio Standard of Pennsylvania estimated that the state could generate over 42,000 new manufacturing jobs in the renewable energy sector (PennFuture, 2007). Governor Rendell has also allocated \$21.2 million from the Pennsylvania Energy Development Agency and the Alternative Fuels Incentive Grant in October 2007 to disburse to 54 companies to develop and adopt cleantech products (Cleantech, 2007).

In essence, people like Governor Rendell, Councilman Bill Peduto, GTECH and the GBA have realized that Pittsburgh has great potential for the green economy. The creation of green jobs in greater Pittsburgh is without any doubt possible, if good planning and implementation continues and new partnerships and ideas emerge.

## Chapter IX – Starting at Home: Improving Energy Use in Universities

We now look inward, to the University of Pittsburgh. We feel an examination of this University is important because of its well-known role as a nationally recognized leader in research and education. It is also the city's second largest employer and a major engine for the local economy, having spent more than \$1.5 billion in the Pittsburgh area in 2005. Unfortunately, the University has shown very little local leadership and spent only a small fraction of this money in the areas that are central to this report, sustainability and greening.

As a member of the Commonwealth System of Higher Education, the University of Pittsburgh is state-related, meaning the University receives public funding from the Commonwealth of Pennsylvania while maintaining independent administrative control. This autonomy is important, as it allows the University of Pittsburgh to set its own individual policies. At the same time, it also means that the University of Pittsburgh is essentially a public institution, since a substantial amount of its funding comes from the taxpayers of Pennsylvania.

In this chapter we present the case as to why the University of Pittsburgh should embrace a much "greener" stance. The University needs to move the issues of environmental and energy sustainability to the forefront and start incorporating them fully into all current and future development projects.

### Why education should be green

Financial Benefits of Green Schools (\$/ft <sup>2</sup> )	
Energy	\$9
Emissions	\$1
Water and Wastewater	\$1
Increased Earnings	\$49
Asthma Reduction	\$3
Cold and Flu Reduction	\$5
Teacher Retention	\$4
Employment Impact	\$2
<b>Total</b>	<b>\$74</b>
<b>Cost of Greening</b>	<b>(\$3)</b>
<b>Net Financial Benefits</b>	<b>\$71</b>

Source: Kats, 2006

Universities must be leaders in the charge to promote the principles and knowledge of the day into their very fabric. *Therefore, there can be a no more pressing concern to be furthered by America's institutions of higher learning than sustainability.* At the same time, universities should strive to embody the concepts of sustainability not only because of this civic duty, but also because the principles of sustainability offer great value to them. Making sustainability a core principle of in both public and private universities is important because of one fundamental interest: cost. Put simply, "On average, green schools save \$100,000 per year – enough to hire two new teachers, buy 200 new computers or purchase 5,000 new textbooks"

(USGBC, 2007a). While that number is based on savings for a one building primary or secondary school, similar savings are also possible at a college or university building of a similar size. With an adjustment in design that, on average, adds less than \$3 per square foot of constructions costs, the

potential savings over lifetime (42 years on average) of the building, the long-term savings can be truly staggering (USGBC, 2007b).

Incorporating sustainable design principles into university construction and renovations also offers great potential for improved student and teacher performance. A key component of the LEED rating system is the quality of the indoor environment, which includes limiting Volatile Organic Compounds (VOCs), as well as guidelines for temperature control, natural lighting, and ventilation (USGBC, 2005). The principles of sustainable design embodied in the LEED rating system have been found to have a significant impact on the bettering of human capital development. Specifically it has been shown to improve the quality of work life, increase work satisfaction, enhance productivity, improve social and psychological well-being, further a company's ability to attract and retain high quality workers and deter absenteeism (Heerwagen, 2002). While these impacts may not translate exactly to an academic environment, they certainly do improve any sort of workplace in general.

Pacala and Socolow note (2004) that "more efficient buildings are one of fifteen 'wedges' that if widely implemented now could strongly mitigate the release of carbon emissions, cutting them by as much as one quarter for buildings and appliances." The Intergovernmental Panel on Climate Change has noted that "carbon dioxide (CO<sub>2</sub>) is the most important anthropogenic GHG" (greenhouse gas), and that "global increases of CO<sub>2</sub> concentrations are due primarily to fossil fuel use, with land-use change providing another significant but smaller contribution" (IGCC, 2007). Given the potential risks of unchecked climate change, limiting its contribution to the buildup of atmospheric carbon should be central to any university's core policies.

### **What the University of Pittsburgh is doing**

While the University still has a long road ahead of it, it has made some progress in the area of sustainability. For instance, the McGowan Institute for Regenerative Medicine of the University of Pittsburgh Medical Center earned a gold LEED rating in 2005. However, this is the only LEED rated building at either Pitt or UPMC. The McGowan project stands out for its location on a former industrial brownfield, its rainwater collection for toilet flushing and drip irrigation, its advanced heat recovery systems and its extensive use of locally sourced materials. In addition, the McGowan Institute promotes transportation alternatives, including public transit, bicycles, and preferred parking spaces for carpoolers (MIRM, 2008).

Currently, the University of Pittsburgh's Facilities Management has not applied for any additional LEED certification for new construction or renovations, but it is beginning to integrate sustainability concepts into new projects. The University of Pittsburgh's current efforts towards sustainability include:

- No incandescent light bulbs unless required for research
- Premium efficiency motors
- Occupancy sensors that turn lights off when rooms empty
- Standard carpeting including at least twenty-five percent recycled content
- Carpet adhesives with no VOCs

Additionally, the University of Pittsburgh's Biomedical Science Tower 3 is making progress towards sustainable construction. Their facilities include a Glycol Loop for heat recovery in laboratory exhaust, a return air system for office air and indoor air ventilation adjusted to ASHRAE 62-1999 standards. The building also allows for daylighting in three quarters of the rooms and includes passive solar Low-E™ glass units. The construction of the Biomedical Science Tower 3 was overseen by LEED accredited professionals and included locally sourced materials, recycled building materials and an erosion and sediment control plan. Interestingly, all of these steps put the building on the path towards a more energy efficiency and sustainable building, but a LEED rating was not sought for the project.

Other buildings within the University of Pittsburgh have incorporated some elements of sustainable design, but they have not made the more resolute commitment towards sustainability that LEED certification entails. Both Panther Hall and the Darragh Street housing utilize some principles of sustainable design, including the use of low VOC materials, the reduction of chlorofluorocarbons (CFCs) in the heating, ventilating and air conditioning (HVAC) system, implementing erosion control practices during construction, and utilizing building materials that contain recycled content.

There are also a handful of broader, university-wide steps being taken. In 2000, the University of Pittsburgh hired the consulting firm of Wiley & Wilson to assess the utility system of the University. Among the various recommendations that were made, some six million dollars worth of projects aimed at energy conservation were ultimately funded. At the same time, Facilities Management only chose to implement those projects with "economically viable paybacks" (PITT: FM, 2007). In addition, 59 buildings within the University of Pittsburgh have been metered so that ones with high-energy usage can be identified and further areas of energy conservation can be determined.

The University of Pittsburgh has also made some progress in reducing its air pollution emissions, including carbon dioxide. The Bellefield Boiler Plant, which provides the school and UPMC with steam heating, is set to be converted to use natural gas in place of coal (PITT:FM, 2007). However, it should also be noted that, in 2004, this plant was found to be in violation of Allegheny county limits on particulates and sulfur dioxide and, as a result, the University was forced to pay a fine of \$175,000 (Barlow, 2006).

Furthermore, the University is not necessarily choosing to do these upgrades, since federal regulations that took effect in 2007 would have required emissions controls (there were previously none) to be installed on the older boiler anyway (Barlow, 2006).

On an even more disturbing note, the University of Pittsburgh has flatly refused to become a signatory of the American College and University Presidents Climate Commitment. This is one of the broadest steps that American institutions have made toward confronting anthropogenic climate change, yet this University has publicly stated that "(it) will not be joining this organization" (Murray, 2007). The Commitment requires signatories to:

- Complete an emissions inventory
- Within two years, set a target date and interim milestones for becoming climate neutral
- Take immediate steps to reduce greenhouse gas emissions by choosing from a list of short-term actions
- Integrate sustainability into the curriculum and make it part of the educational experience
- Make the action plan, inventory and progress reports publicly available (ACUPCC: 2008)

The University of Pittsburgh reasoning behind this action is that there are already several green projects being undertaken on campus. This explanation is all the more puzzling in light of the fact that the president of the University of Pittsburgh's Titusville campus, William A. Shields, has signed the pledge.

The University of Pittsburgh has clearly made some isolated steps towards furthering the sustainability of the campus, but should be doing much more. When we compare Pitt to other universities in the region, we find it falls unfavorably behind.

### **Sustainability in other universities**

Without a doubt, many institutions of higher learning are centers of innovation and forward thinking on the issues of climate change and sustainability. While it is not surprising that traditionally progressive institutions like Oberlin College in Ohio, Middlebury College in Vermont, and Evergreen State College in Washington have taken a strong leadership positions on these issues, more traditional colleges and universities are also starting to make strong advances in creating more sustainable educational environments. In Pennsylvania, both Penn State University and Carnegie Mellon University have instituted strong programs that are geared towards furthering the sustainability of their respective campuses.

### ***Carnegie Mellon University***

Carnegie Mellon University began its efforts towards improving its sustainability in 1990, when it created a formal recycling policy for the campus. However, the process truly began in 1998 when the Green Practices

Committee was formed, which is comprised of student, faculty and staff. This committee has created a solid foundation for sustainability at Carnegie Mellon University, including reduced energy use, green building and construction and alternative transportation.

In terms of energy usage, Carnegie Mellon has shown itself to be a leader in energy conservation and efficiency. The University makes its recent energy usage data available on their website, which breaks down energy costs by building type and utility as well as listing energy use by square foot. Making such data readily available to both students and the community as a whole allows for greater accountability in energy policies.

Carnegie Mellon University has also worked to continually expand their commitment to renewable energy. In May of 2001, Carnegie Mellon purchased enough wind-generated electricity to cover five percent of the school's total usage. This action made Carnegie Mellon University the country's largest single purchaser of wind energy (CMU, 2007a). In the spring of 2006, Carnegie Mellon expanded this commitment even further and increased this amount to fifteen percent of their total energy usage. They plan to have it represent a full fifth by the end 2008 and this total will include not only wind but small-scale hydropower and landfill gas resources as well (Cribbs, 2006). An Energy Harvest grant from the Pennsylvania Department of Environmental Protection allowed Carnegie Mellon to install a photovoltaic solar array on the roof of 407 S. Craig Street, which produces roughly ten percent of its total electricity needs (Baronett, 2005).

In addition, Carnegie Mellon University has made a strong commitment to sustainability through its policies on new construction. After 2000, all new construction at the university committed has to be LEED certified, with a target of Silver (CMU, 2007b). To date, Carnegie Mellon now houses four Silver certified buildings, one Gold certified building, one LEED Certified building, and two LEED registered buildings (CMU, 2007b). This includes the 209,000 square foot, \$88 million Gates Center for Computer Science, which is currently under construction and hopes to receive a Silver rating (Gerson, 2006).

In 2003, Carnegie Mellon installed a green roof on Hamerschlag Hall, as discussed above (Gerson, 2005). This roof offers all the benefits of green roofs previously discussed in this report, but, more importantly, it is providing vital information about the functioning and specific benefits of green roofs. Sensors were installed to measure and collect data on water runoff, water quality, and heat loss and retention. Green roofs have since been installed on the Posner Center and Gallery and the Mellon Institute.

Carnegie Mellon University has also made a commitment to purchase non-traditional fuel vehicles whenever it is deemed practical. In turn, the University now owns two Neighborhood Electric Vehicles (NEVs) and six

natural gas vehicles (CMU, 2007c).

### **Penn State University**

Penn State University began its sustainability initiatives in 1995, which is also when it founded the Center for Sustainability. The Center for Sustainability's mission is to "integrate education, research, and outreach on issues of sustainability through innovative, interdisciplinary projects, facilities, and hands-on learning opportunities" (PSU:CFS, 2005). Beyond the Center for Sustainability, Penn State University has also forged several programs aimed at improving both the sustainability of its campus and its surrounding community. This high level of community outreach is demonstrated through projects like the aerial seeding of local farmland with a winter cover crop, which prevents soil runoff and helps to fix terrestrial carbon. (Mulhollem, 2007a).

In terms of construction, Penn State has committed to ensuring that all new buildings comply with LEED guidelines (PSU, 2007). To date, Penn State has one Silver and one Gold certified building, as well as two LEED Registered buildings. In addition, Penn State's Medlar Field is the first baseball park in the U.S. to be LEED certified (Powers, 2007). Green roofs have also become a common trend in new construction at Penn State, with two such roofs already completed, and three more in progress, giving the campus close to one acre of green roof coverage (Mulhollem, 2007b).

Energy efficiency and conservation has also become a core component of Penn State's approach to sustainability. Solar panels have been installed on several buildings, and the school currently uses wind energy for ten percent of its consumption (PSU, 2007). Lighting sensors have been installed in bathrooms to conserve energy when unoccupied and 'Exit' signs have been updated with low energy LED lights. Penn State has also retrofitted toilets and urinals to use less water per flush and has replaced showerheads and faucets with lower flow-through models (PSU, 2007).

Penn State University is also aggressively attempting to lower its greenhouse gas emissions. The university's current plan calls for a 17.5% cut in greenhouse gas emissions from a 2005-2006 baseline level through the year 2012. This would drop the total emissions below 1996-1997 levels and offset roughly two percent of annual emissions growth (Shockey & Mountz, 2007). It is also interesting to note that Penn State's main campus has also not signed the President's Climate Commitment, but the Berks branch campus has.

### **Conclusions**

The progress made by the University of Pittsburgh to promote sustainability cannot be ignored completely. The University of Pittsburgh has incorporated some elements of sustainable design into new building construction and renovations, such as energy saving light monitors and building metering

systems. However, when compared to other local universities, our progress as a whole is less than impressive. Both Carnegie Mellon University and Penn State University have made some impressive strides towards establishing sustainability as a central tenant in their respective policies. For example, they have made LEED certification a prerequisite condition of any new construction, with several LEED rated buildings already completed at both schools. In contrast, the University of Pittsburgh has completed construction on just one LEED rating building and has no plans to require a LEED rating for any further construction.

None of the schools discussed have signed the President's Climate Commitment, but both Carnegie Mellon University and Penn State University have made firm commitments to help reduce their emissions by both making their energy usage publicly available and through their commitments to increase their usage of electricity generated from renewable sources. In the case of Carnegie Mellon, they have even gone so far as beginning to replace existing vehicles with less carbon-intensive alternatives.

## **Recommendations**

The University of Pittsburgh needs to establish broader and more resolute measures on sustainability. Making it a core principle now will help to ensure that any gains will maintain their significance in the years to come. First, the university needs to make a commitment to make construction and major renovations LEED certified. The sustainable design instill a certain amount of accountability to a project, as those design aspects will be protected from budget cuts or other administrative decisions. Recertification of LEED buildings ensures that the sustainability principles incorporated into a building are there for the long-term.

The University should also make a commitment to a greenhouse gas reduction plan. The Presidents' Climate Commitment is the most prominent pledge towards reducing academic sources of greenhouse gas emissions, but any similar and equally binding commitment will be a step in the right direction. No matter how it is done, the critical issue is that this University needs to acknowledge that the time to take action on this issue is now.

Ultimately, the University of Pittsburgh needs to make a strong commitment to sustainability by adopting policies that enshrine the concepts of sustainability in the daily life of the University. A pledge to only build new buildings and complete new major renovations that meet LEED standards and a binding commitment to reducing carbon emissions would be excellent first steps on this path. There are countless other possibilities, some already implemented by other colleges and universities and others still being investigated, but in any event the time has certainly come for this University to become a part of these conversations. The University of Pittsburgh needs to start living up to the commitments it has as a pillar of the Pittsburgh community and as an institute of higher learning.

## Chapter X - Conclusion and Recommendations

There is ample potential for greater application of the practice of green building in Pittsburgh, in the government and non-profit sectors, as developed here. While green building has thrived in Pittsburgh, the non-profit sector has been a stronger leader than government.

The City of Pittsburgh should take a more aggressive approach to issues of sustainability by implementing policies that set standards for development as well as the activity and property of the government itself.

The non-profit sector in Pittsburgh will likely continue to exhibit leadership in promoting the practice of green building. However, there are many ways that organizations can improve the practice. Community organizations and universities have opportunities to be stronger advocates for green practices where they operate.

There are many ways in which such strengthening can be carried out. Policies could provide incentives, set mandates or provide capacity building, as outlined the chart below (Table 11.1). What has been set forth here is a call for more extensive action, though strategies (i.e. incentives or mandates) have not been prescribed. Several experts spoken to as research for this report seemed to favor incentives over mandates.

### ***Zoning and Building Code***

A number of proponents of green building contend that market forces must stimulate its profusion, adding that mandates will stymie, rather than encourage the growth of green building. On the other hand, some research on governmental mandates for green building suggest that both policy makers and builders are happy about the drive for green building practices, even when they are mandate driven (May and Koski, 2007). In general, the importance of generating appropriate mechanisms for stimulating green building cannot be understated. The case studies that have been provided here demonstrate a relatively diverse picture of legislative potential.

Pittsburgh is poised to make choices in the development of programs to support green building. To determine the most appropriate policy option(s), available choices must be weighed against—at the very least—the following criteria: sustainability, political feasibility, financial capacity, and ability to enhance and promote the local green building cluster.

In speaking with officials from the Zoning Department it became clear that the current height and density bonus does not really incentivize green building for those not already interested in it. This is because the program is extremely limited, offering little to no assistance in easing the development process or other arrays of incentives beyond the height and FAR bonus.

The city's financial situation may limit the ability to provide economic incentives in the form of tax breaks, technical assistance, or waiving permitting fees. An incentive such as tax increment financing may be preferred because it is often easier to gain approval for than direct taxation. Tax credits require approval from the State Legislature. The difficulty of acquiring state approval is not clearly determined.

Adaptations to the City's zoning codes do not require state approval unless they are in conflict with a state policy. Apart from the need for state approval, the level of public outcry that would result from a comprehensive zoning ordinance may make such a policy prohibitive.

It will be important to gauge the level of public support for green building to determine the feasibility of a comprehensive green building policy. Speaking with persons who are working to broaden the role of green building in the Pittsburgh region, it became clear that elected officials may be a larger barrier to a comprehensive green building mandate than the public.

Lack of political will for broad change is a continuing problem on environmental policy—namely stormwater management and water. In recent years, issues related to Pittsburgh's aging and water and sewer infrastructure have been studied extensively by non-governmental entities. Despite the level of economic impacts, quality of life *and* environmental issues created by this issue, action remains indeterminate. Granted, to fix the problem a large amount of upfront funding that Pittsburgh and Allegheny County does not have would be required. However, pervasive buy-in and acknowledgement of the issue by locally elected officials is an important step to leveraging state and federal financial support. This is true for water infrastructure, as well as impetuses for green building.

- The City needs to increase the role of technical assistance, which will require a combination of training and new hires.
- The City should develop partnerships with organizations that already focus on green building, such as the CCI and GBA.

On the surface it is not clear whether hiring in-house technical staff, collaborating, or a combination of both will be the preferred method. For instance, to increase encouragement for green building components in the early design stages of larger projects, having a green building skills base at CDAP, will allow applicants to get recommendations on how to incorporate green programming into their projects. For this to happen it will be important to have a LEED certified architect or other green building specialist on-hand to answer questions and provide input. Training existing employees, rather than hiring additional staff is another option.

Ultimately, decisions about growing Pittsburgh's public sector green building agenda must be derived from local governmental leadership—including the

Mayor and Council members—and include a careful weighing of: financial factors and current departmental staff demographics and needs.

Waiving and reducing permit fees, as well as expediting the permit process for development applicants does not require approval from a state governing body. Importantly, these facets of the development process generate relatively low levels of public and media scrutiny. As we have seen, when linked with green building there is likely to be little to no public outcry. To get a more developed picture of the revenue lost by waiving or reducing fees it will be important to review the short-term revenue losses, against the long-term gains of increasing green building projects in Pittsburgh.

These strategies involve a carrot and stick approach—incentivizing green building practices while requiring certain standards for new developments. While they are generally not politically sensitive policies, their passage is largely dependent on what policymakers, businesses, and constituents know, and are willing to learn and accept about green building and the sustainable city movement.

Table 11.1

<u>Incentives</u>	<u>Mandates</u>	<u>Capacity Building</u>
<ul style="list-style-type: none"> <li>▪ Expedited Project Plan Review</li> <li>▪ Reduced Fees</li> <li>▪ Promotional Assistance</li> <li>▪ Technical Assistance</li> <li>▪ Property Tax Abatement</li> <li>▪ Pre-review project qualification</li> <li>▪ Listing on the City's website or other promotional activity</li> <li>▪ Density and FAR bonuses for:               <ul style="list-style-type: none"> <li>○ LEED certified buildings*</li> <li>○ Rooftop Gardens</li> </ul> </li> <li>▪ Tax abatements for green buildings</li> </ul>	<ul style="list-style-type: none"> <li>▪ Comprehensive Zoning Legislation</li> <li>▪ LEED or other certification requirements for municipal buildings &amp; publicly funded projects</li> <li>▪ Energy Efficiency Standards for renovation of existing buildings</li> <li>▪ Waste Management/Recycling Ordinance (Building Code)</li> <li>▪ Conservation and Stormwater Management requirements for public buildings</li> <li>▪ Fossil Fuels reduction criteria for renovating, constructing, and operating buildings</li> </ul>	<ul style="list-style-type: none"> <li>▪ Technical Advisory Staff in               <ul style="list-style-type: none"> <li>○ Strategic Planning</li> <li>○ Zoning</li> <li>○ Building</li> </ul> </li> <li>▪ LEED Certified or Green Building Expertise in               <ul style="list-style-type: none"> <li>○ Architecture</li> <li>○ Design</li> <li>○ Engineering</li> </ul> </li> <li>▪ Training for Commission Members</li> <li>▪ Training for Relevant Permitting Officials               <ul style="list-style-type: none"> <li>○ Health Department</li> <li>○ Water and Sewer</li> </ul> </li> <li>▪ Develop Educational Resources               <ul style="list-style-type: none"> <li>○ Green Building Website</li> </ul> </li> <li>▪ Community Resources</li> </ul>

As a city with a declining population, Pittsburgh tends to value development as a precious commodity. This common attitude may be behind the inclination to provide incentives rather than mandates that might be seen by potential developers as obstacles not worth the trouble. By continuing to choose incentives, and few at that, over mandates, Pittsburgh is maintaining low standards for development. Pittsburgh's institutions, public and non-profit alike, need to ask themselves whether those low standards produce more development and what contributes more to resident quality of life: more or better development?

This report is call for higher standards. We agree that green building will improve the quality of life for affordable housing residents, City of Pittsburgh employees, individual homeowners, green manufacturing workers and University of Pittsburgh students alike. There is no turning back and our local institutions must realize this.

In review, the recommendations of this report are as follows:

- Sustainability should be the standard for development in Pittsburgh and can be achieve through the use of combinations of existing development tools.
- The City of Pittsburgh should retrofit its own facilities to be as energy-efficient as possible and use such an effort to educate residents about the importance of the practice to their own homes.
- Neighborhood-level greening efforts should be undertaken where strong organizations exist to provide the advocacy and implementation.
- Affordable housing, both owned and rented, should be green and consistent with community plans.
- Green building and other environmentally sensitive practices should be adopted by community development corporations who, in turn, should be supported in their efforts by a wider network of resource providers.
- Community involvement should be pursued an essential piece of the greening process.
- The City of Pittsburgh should be more aggressive about stormwater management, including developing policies to encourage strategies like green roof retrofits and securing funding to implement them.
- There is ample opportunity for green jobs in Pittsburgh, particularly in manufacturing and alternative energy.
- The University of Pittsburgh should commit to LEED certification for all major construction and developing a greenhouse gas reduction plan for its campuses.

The overarching theme of this report is that there are many more opportunities for implementing green building in Pittsburgh than are currently being exploited. The tools and technologies exist; Pittsburgh institutions need to adopt them and adapt existing systems to them. Many concrete opportunities have been identified here that can be first steps in the implementation of larger policies or programs, which make a local

commitment to the practice of green building reality. The City of Pittsburgh government, local community organizations, and the University of Pittsburgh have been drawn out here as examples of how all organizations involved in shaping the built environment can strengthen their commitment to improving local quality of life by improving the quality of local development.

## References

- 3 Rivers Wet Weather (3RWW). (2008). *Frequently Asked Questions*. Retrieved March 26, 2008 from [http://www.3riverswetweather.org/d\\_weather/d\\_faq.stm](http://www.3riverswetweather.org/d_weather/d_faq.stm)
- Allegheny County Health Department (September 6, 2006). Minutes from meeting on September 6, 2006 at Clack Health Center, 301 39<sup>th</sup> Street, Lawrenceville, PA. Retrieved April 1, 2008 from <http://www.achd.net/board/pdf/090606.pdf>
- American College & University Presidents Climate Commitment. (2008). *Presidents Climate Commitment: What We're All About*. Retrieved from <http://www.presidentsclimatecommitment.org/html/about.php>
- American Lung Association. *State of the Air 2004*. Retrieved February 21, 2008 from <http://www.lungusa.org/site/pp.asp?c=dvLUK900E&b=50752#graph1>
- Apollo Alliance. (2008). *Green Collar Jobs in America's Cities: Building pathways out of poverty and careers in the clean energy economy*. Retrieved on March 17, 2008 from <http://www.apolloalliance.org/downloads/greencollarjobs.pdf>
- Bachrach, D., Ardema, M. and Leupp, A. (April 2003). *Energy Efficiency Leadership in California*. New York: Natural Resources Defense Council. Retrieved on March 11, 2008 from <http://www.nrdc.org/air/energy/eecal/eecal.pdf>
- Barlow, K. K. (2006). *Bellefield Boiler Plant Fined for Pollution*. Retrieved from <http://mac10.umc.pitt.edu/u/FMPro?-db=ustory&-lay=a&-format=d.html&storyid=5315&-Find>
- Baronett, L. (2005). Solar Energy Helps Power Campus Facility. *Carnegie Mellon Today*.
- Beaumont, C. and Tucker, L. (2002, March/April). *Big Box Sprawl and How to Control It, Municipal Lawyer*. (43) 2
- Benfield F.K.; Raimi D.M.; and Chen, D.(1999). *Paving Paradise: Sprawl and Development*. Retrieved February 20, 2008, from Natural Resource Defense Fund. Website <http://www.nrdc.org/cities/smartGrowth/rpave.asp>
- Bezdek, R. (2007). *Renewable Energy and Energy Efficiency: Economic drivers for the 21<sup>st</sup> Century*. American Solar Energy Society. Retrieved on March 22, 2008 from <http://www.ases.org/ASES-JobsReport-Final.pdf>
- Boston Community Capital. (2005). *About us*. Retrieved March 7, 2008 from <http://www.bostoncommunitycapital.org/about/index.htm>
- Boston Community Capital. *Annual Report 2005-2006*. Retrieved March 7, 2008 from <http://www.bostoncommunitycapital.org/news/files/BCC%202005-2006%20Report.pdf>
- Bradshaw, W., Connelly, E. F., Cook, M. F., Goldstein, J. and Pauly, J. (2003). The Costs and Benefits of Green Affordable Housing. *New Ecology and the Green CDC's Initiative*.
- Brenner, K. (May 10, 2007). Stormwater fees may be expanded. *The Olympian*. Retrieved March 26, 2008 from [http://www.co.thurston.wa.us/wwm/Stormwater/Countywide/The%20Olympian\\_May%2011\\_2007.pdf](http://www.co.thurston.wa.us/wwm/Stormwater/Countywide/The%20Olympian_May%2011_2007.pdf)
- Burtis, P.R., Epstein, B. and Hwang, R.J. (2004). *Creating the California Cleantech Cluster: How innovation and investment can promote job growth and a healthy environment*.
- Calarusse, C. and Kloss, C. (June 2006). *Rooftops to Rivers: Green Strategies for Controlling Stormwater and Combined Sewer Overflows*. Natural Resources Defense Council. Retrieved March 26, 2008 from <http://www.lowimpactdevelopment.org/lid%20articles/rooftops.pdf>
- Cambridge Energy Alliance (March 29, 2007). *Governor Patrick Hails Cambridge Energy Efficiency Initiative as Model to Spread Across Commonwealth*. Retrieved on January 20, 2008 from <http://www.cambridgeenergyalliance.org/press/>
- Campell, S. (1996). Green Cities, Growing Cities, Just Cities. *Journal of the American Planning Association*, 63(3), 289.
- Cannan, C. (2000). The Environmental Crisis, Greens, and Community Development. *Community Development Journal*, 35(4), 365-376.
- Carnegie Mellon University. (2007). *Alternative Fuel Vehicles*. Retrieved from [http://www.cmu.edu/greenpractices/green\\_initiatives/alternative\\_fuel.html](http://www.cmu.edu/greenpractices/green_initiatives/alternative_fuel.html)
- Carnegie Mellon University. (2007). *History of Green Practices*. Retrieved April 4, 2008 from <http://www.cmu.edu/greenpractices/background/history.html>
- Carnegie Mellon University. (2007). *LEED Buildings at Carnegie Mellon*. Retrieved from [http://www.cmu.edu/greenpractices/green\\_initiatives/leed\\_buildings.html](http://www.cmu.edu/greenpractices/green_initiatives/leed_buildings.html)

- Center for Sustainability at Penn State. (2005). *Center for Sustainability at Penn State: Missions and Objectives*. Retrieved from <http://www.engr.psu.edu/cfs/mission.aspx>
- Center on Wisconsin Strategy (2007). *Milwaukee Retrofit: Capturing Home Energy Savings in Milwaukee*. Madison, WI: COWS. Retrieved on March 14, 2008 from [http://www.cows.org/about\\_publications\\_detail.asp?id=410](http://www.cows.org/about_publications_detail.asp?id=410)
- City of Austin. (2008). *Sustainable Building Sourcebook*. Retrieved March 1, 2008 from [http://www.austinenergy.com/energy%20efficiency/programs/green%20building/sourcebook/graywater\\_Systems.htm](http://www.austinenergy.com/energy%20efficiency/programs/green%20building/sourcebook/graywater_Systems.htm)
- City of Chicago. (2008). *Chicago Leading by Example: Accomplishments*. Retrieved March 26, 2008 from <http://egov.cityofchicago.org/city/>
- City of Pittsburgh Bureau of Building Inspection. (2007). Retrieved from [http://www.city.pittsburgh.pa.us/BBI/html/important\\_codes.html](http://www.city.pittsburgh.pa.us/BBI/html/important_codes.html)
- City of Pittsburgh. (2007). *Building Permits*. Retrieved March 23, 2008 from <http://www.city.pittsburgh.pa.us/permits/>
- Cleantech. (2007). *Pennsylvania Hands Out Cash for Alternative Energy*. (October 16, 2007). Retrieved April 6, 2008 from <http://media.cleantech.com/1936/pennsylvania-hands-out-cash-for-alternative-energy>
- Cornell University Law School Website. *Village of Euclid v. Ambler Realty Co.* (No. 31) 297 Fed. 307, reversed. Retrieved March 16, 2008 from [http://www.law.cornell.edu/supct/html/historics/USSC\\_CR\\_0272\\_0365\\_ZS.html](http://www.law.cornell.edu/supct/html/historics/USSC_CR_0272_0365_ZS.html)
- Cribbs, S. (2006). Carnegie Mellon Gives Renewable Energy the "Green" Light. *Carnegie Mellon Today*.
- DaParma, R. (March 1, 2007). *Trust to Offer Historic Residence Downtown*. *Pittsburgh Tribune-Review*. Retrieved March 1, 2008 from [http://www.pittsburghlive.com/x/pittsburghtrib/business/s\\_495478.html](http://www.pittsburghlive.com/x/pittsburghtrib/business/s_495478.html).
- Deitrick, S. (1999). The Post Industrial Revitalization of Pittsburgh: Myths and Evidence. *Community Development Journal*, 34(1), 6.
- Edgewater. (2008). *Welcome to Edgewater*. Retrieved March 29, 2008 from <http://www.liveatedgewater.com/neighborhood.php>
- Energy Consortium (February 2008). *Income Energy Efficiency and Emissions: The Critical Relationship*. Retrieved March 20, 2008 from <http://www.knowledgeplex.org/showdoc.html?id=1481251>
- Environmental News Service (January 7, 2005). *Cooperation Must Flow to Cleanse Pittsburgh Region's Water*. Retrieved March 13, 2007 from <http://www.ens-newswire.com/ens/jan2005/2005-01-07-03.asp>
- Fahrenthold, D. (October 16, 2007). *Va. Tech, Investor Aim to Cut Area Energy Use*. *The Washington Post*. Retrieved on December 8, 2007 from <http://www.washingtonpost.com/wp-dyn/content/article/2007/10/15/AR2007101501769.html?referrer=emailarticle>
- Flora, R. (January 11, 2008). Lecture on green building. Graduate School of Public and International Affairs, University of Pittsburgh. Pittsburgh, PA.
- Floyd, A. (2005). *Scottsdale's Progress in Integrating Green Building in the Building Regulatory Process*. AIA Safety Journal. Retrieved February 29, 2008 from <http://www.iccsafe.org/news/green/0605BSJ34.pdf>
- Gazarik, R. (November 20, 2002). Region's power plants rated big polluters. *Pittsburgh Tribune-Review*.
- Gerson, B. (2006). University Unveils Plans for New Gates Center for Computer Science. *Carnegie Mellon Today*, Vol. 3.
- Gould, W. (2004). *Sky's the limit for "green roof" advocate: Structures prevent runoff, save money, official says*. *The Milwaukee Journal Sentinel*. Retrieved January 21, 2008 from <http://www.jsonline.com/story/index.aspx?id=279426&format=print>
- Green Building Alliance (GBA). (2007). *Green Building Alliance Announces \$448,000 In Product Innovation Grants: Seven Pennsylvania recipients to develop and improve green building products*. Retrieved on April 6, 2008 from <http://www.gbapgh.org/Files/GrantAnnouncementRelease.pdf>
- Green Building Alliance (GBA). (December 2007). *LEED Benchmarking Data*. Retrieved February 28, 2008 from [http://www.gbapgh.org/PA\\_Green\\_Building\\_Stats.asp](http://www.gbapgh.org/PA_Green_Building_Stats.asp)
- Green For All. (2008). *Frequently Asked Questions about the Green Jobs Act*. Apollo Alliance, the Ella Baker Center for Human Rights, Green for All, and The Workforce Alliance. Retrieved on February 22, 2008 from <http://www.greenforall.org/files/fag-greenjobsact07.pdf/view>.
- Green Roofs. (2008). *Green Roofs for Healthy Cities*. Retrieved April 2, 2008 from [http://www.greenroofs.org/index.php?option=com\\_content&task=view&id=26&Itemid=40](http://www.greenroofs.org/index.php?option=com_content&task=view&id=26&Itemid=40)

- Greening Affordable Housing Initiative (GAHI). (2006). *Top 20 No or Low-Cost Green Building Strategies*. Global Green USA. Retrieved February 1, 2008 from [http://www.globalgreen.org/greenbuilding/GAHI\\_top20.html](http://www.globalgreen.org/greenbuilding/GAHI_top20.html).
- Gross, J. (2005). *Community Benefits Agreement: Making Good Jobs Accountable*. Washington, D.C.: Good Jobs First.
- GTECH. (2008). *Green Jobs Corp*. Retrieved on April 6, 2008 from <http://www.gtechstrategies.com/gjobs.php>.
- Guttenberg, A. (1987). *Journal of Planning and Education Research*, 7(1). Retrieved from <http://www.planning.org/pathways/default.htm>
- Harding, B. (December 10, 2007). *Spain's Green Home Plan*. Retrieved February 28, 2008 from <http://www.reuters.com/article/environmentNews/idUSL1028043520071210?feedType=RSS&feedName=environmentNews&pageNumber=2&virtualBrandChannel=0>
- Heerwagen, J. (July-August 2002). Sustainable Design Can Be an Asset to the Bottom Line. *Environmental Design + Construction*, 35-39. <http://icma.org/pm/8909/public/cover.cfm?author=Danielle Miller Wagner&title=Using Energy Efficiency to Create A More Sustainable Bottom Line>
- Intergovernmental Panel on Climate Change. (2007). *Climate Change 2007: Synthesis Report – Summary for Policymakers*. Retrieved from [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr\\_spm.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf)
- Joint Economic Committee (June 2007). *Energy Efficiency is a Bright Idea*. U.S. Congress Joint Economic Committee Report. Retrieved on March 8, 2008 from <http://jec.senate.gov/Documents/Reports/06.14.07EnergyEfficiency.pdf>
- Karush, S. (December 6, 2006). *The Washington Post*. Retrieved on March 18, 2008 from <http://www.washingtonpost.com/wp-dyn/content/article/2006/12/06/AR2006120600165.html>
- Klamon, Andrew. Personal Communication, March 25, 2008.
- Lavelle, M. (February 6, 2008). *Bush Budget Puts Weatherization Out in the Cold*. Beyond the Barrel Blog: U.S. News & World Report. Retrieved on March 8, 2008 from <http://www.usnews.com/blogs/beyond-the-barrel/2008/2/6/bush-budget-puts-weatherization-in-the-cold.html>
- Law, V. (2007). *Wood Street Commons Building Tenants Reassured on Buildings Future*. Pittsburgh City Paper. Retrieved February 14, 2008 from <http://www.pittsburghcitypaper.ws/gyrobase/Content?oid=36126>.
- Lee, Y.M.; Atkins, G, K.; Park, H,S. (2006). *Competitive Analyses between Regional Malls and Big-Box Retailers: A Correspondence Analysis for Segmentation and Positioning*. *Journal of Shopping Center Research* 13 (1)
- Loper, J., Ungar, L., Weitz, D. and Misuriello, H. (2005). *Building On Success, Policies to Reduce Energy Waste in Buildings: 7*.
- Lord, R. (2008). *City becomes battleground over what makes good design*. Pittsburgh Post-Gazette, February 18. Retrieved April 2, 2008 from <http://www.post-gazette.com/pg/08049/858309-53.stm>
- MaineHousing.org. (2008). *Making homes warmer and more energy efficient*. Retrieved February 28, 2008 from [www.mainehousing.org](http://www.mainehousing.org)
- Martinot, E. (1998). *Energy Efficiency and Housing-Sector Transitions in Russia*. *Perspectives in Energy*, 4(3), 295-310.
- May, P.J. and Koski, C. (January 2007). *State Environmental Policies: Analyzing Green Building Mandates*. *Review of Policy Research*, 49-65.
- McGowan Institute for Regenerative Medicine. (2008). *Institute Laboratory Building Awarded LEED™ Gold Rating*. Retrieved from <http://www.mirm.pitt.edu/news/article.asp?qEmpID=118>
- McGuiggan, J. (August 16, 2007). *Greening the Neighborhoods*. Retrieved February 20, 2008 from <http://www.popcitymedia.com/features/greenneighb0815.aspx>
- McKinsey Global Institute (2007). *Wasted Energy: How the US Can Reach its Energy Productivity Potential*. New York: McKinsey & Company. [http://www.mckinsey.com/mgi/publications/wasted\\_energy/index.asp](http://www.mckinsey.com/mgi/publications/wasted_energy/index.asp)
- MikeBloomberg.com. (December 7, 2007). *Mayor Bloomberg, Former President Clinton And Housing And Urban Development Secretary Jackson Announce First-Ever Sustainability Partnership With New York City Housing Authority*. Retrieved February 28, 2008 from [http://www.mikebloomberg.com/en/issues/environment\\_sustainability/](http://www.mikebloomberg.com/en/issues/environment_sustainability/)
- Millard, P. (May 19, 2006). *New stormwater fee to hit parking lot owners hard*. The Business Journal of Milwaukee. Retrieved March 26, 2008 from <http://www.bizjournals.com/milwaukee/stories/2006/05/22/story8.html>
- Miller, V. (November 7, 2007). *Lowe's on Plans with Wal-Mart at East Hills*. *Pittsburgh Tribune Review*.

- Mulhollem, J. (2007a). *Penn State Using Airplane to Plant Cover Crops This Fall*. Retrieved from <http://live.psu.edu/story/26106>
- Mulhollem, J. (2007b). *On Rooftops, It's Blue, White -- And Green*. Retrieved from <http://live.psu.edu/story/26107>
- Murray, G. (June 27, 2007). *Pitt Blows Off Carbon Pledge*. The Pitt News. Retrieved from <http://media.www.pittnews.com/media/storage/paper879/news/2007/06/27/News/Pitt-Blows.Off.Carbon.Pledge-2918754.shtml>
- National Renewable Energy Laboratory. (2004). *Federal Technology Alert: Green Roofs*. Produced for the U.S. Department of Energy, Energy Efficiency and Renewable Energy. Retrieved March 26, 2008 from <http://www.nrel.gov/docs/fy04osti/36060.pdf>
- New Ecology Inc. (NEI). (No date). *Green CDCs Initiative*. Retrieved March 6, 2008 from <http://www.newecology.org/GCDCI.htm>
- Noisette. (2008). *The Noisette Masterplan*. Retrieved March 27, 2008 from [http://www.noisettesc.com/res\\_keyproject.html](http://www.noisettesc.com/res_keyproject.html)
- NORESCO. (No date). *Allegheny County, PA*. Retrieved March 2, 2008 from [http://www.noresco.com/site/content/CaseStudy\\_169.asp](http://www.noresco.com/site/content/CaseStudy_169.asp)
- Okoko, J. (April 1, 2008). Interview with Jerry Okoko, Housing Authority City of Pittsburgh. Pittsburgh, PA.
- PA Power. (2007). *Governor Rendell Announces Energy Harvest Grants; Emphasizes Importance of Investing in Alternative, Renewable Energy Sources*. PA Power. Retrieved March 27, 2008 from <http://www.state.pa.us/papower/cwp/view.asp?A=11&Q=469234>
- Pacala, S. and Socolow, R. (August 13, 2004). Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies. *Science*, 305, 968-972.
- Parker, P. and Rowlands, I. H. (2007). City Partners Maintain Climate Change Action Despite National Cuts: Residential Energy Efficiency Programme Valued at Local Level. *Local Environment*, 12(5), 505-517.
- Patton, Z. (December 2007). *In the Green: When it Comes to Housing Affordable and Sustainable Can Go Together*. Retrieved January 20, 2008 from <http://www.governing.com/articles/12green.htm>
- Paul, J. and Davidson-Welling, M. (No date). *Case Study Site: Nine Mile Run*. Brownfield Development: The Implications of Urban Infrastructure. Retrieved March 1, 2008 from <http://www.ce.cmu.edu/Brownfields/NSF/Sites/nmr/study.htm>
- Peduto, B. (2008). Lecture presented for PIA 2096: Capstone Seminar in Economic Development and Planning: Green Building, Green Cities, Green Planning, January 25. University of Pittsburgh Graduate School of Public and International Affairs, Pittsburgh, PA.
- PennFuture. (2008). *Pennsylvania's Advanced Energy Portfolio Standard (AEPS): What Does It Really Mean?* Retrieved on April 6, 2008 from <http://www.pennfuture.org/UserFiles/AEPSFactSheetjfinal1215.pdf>
- Pennsylvania Department of Community and Economic Development. (2004). *Neighborhood Assistance/Neighborhood Partnership Program: NPP Fact Sheet*. Retrieved March 20, 2008 from <http://www.newpa.com/programDetail.aspx?id=94>
- Pennsylvania Economy League. (2002). *Water Quality Takes Center Stage in SWPA*. Retrieved March 5, 2008 from <http://www.ethepeople.org/static/IssuesPA/442.html>
- Pennsylvania Housing Finance Agency (PHFA). *2008 Allocation Plan*. Retrieved April 3, 2008 from <http://www.phfa.org/developers/developer/lihtc.aspx>
- Pennsylvania Office of the Governor. (2007b). *Governor Rendell Announces Support for Innovative Alternative Energy Projects; Urges Additional Funding to Keep PA Competitive*. Retrieved March 31, 2008 from [www.earthtimes.org/articles/show/news\\_press\\_release\\_199035.shtml](http://www.earthtimes.org/articles/show/news_press_release_199035.shtml).
- Pennsylvania Office of the Governor. (2007a). *Governor Rendell Announces Energy Harvest Grants; Emphasizes Importance of Investing in Alternative, Renewable Energy Sources*. Retrieved March 8, 2008 from [www.earthtimes.org/articles/show/news\\_press\\_release\\_222660.shtml](http://www.earthtimes.org/articles/show/news_press_release_222660.shtml)
- Pennsylvania State University. (2007). *Housing: Take Charge Program: University Initiatives*. Retrieved from <http://www.takecharge.psu.edu/initiatives.shtml>
- Pew Center for Global Climate Change (November 2006). *Building Solutions to Climate Change*. Arlington, VA: Pew Center. Retrieved on March 11, 2008 from <http://www.pewclimate.org/docUploads/Buildings-InBrief.pdf>
- Plumb, M. (2008). *Sustainable Raindrops: Cleaning New York Harbor by Greening the Urban Landscape*. Riverkeeper. Retrieved March 26, 2008 from [http://riverkeeper.org/special/Sustainable\\_Raindrops\\_FINAL\\_2008-01-08.pdf](http://riverkeeper.org/special/Sustainable_Raindrops_FINAL_2008-01-08.pdf)

- Plunkett, J. (September 12, 2007). *Building Pennsylvania's Energy Future: Efficiency Means Real Gains for Security, the Economy and the Environment*. Retrieved on March 10, 2008 from <http://www.pennfuture.org/UserFiles/PDFs/BuildingPennsylvaniasEnergyFutureFinalReport.pdf>
- Powers, J. (January 30, 2008). *New York City to Clean Up Waterways by Greening Roadways and Roofs: City Council Adopts New Measure for Sustainable Stormwater Management Plan*. Natural Resources Defense Council. Retrieved March 26, 2008 from <http://www.nrdc.org/media/2008/080130.asp>
- Public Works and Environmental Services Committee. (November 19, 2007). *Ordinance Title 9 & 10 Storm Water Management Site Plans and Management Practices*. Pittsburgh, PA. Retrieved March 26, 2008 from <http://legistar.city.pittsburgh.pa.us/detailreport/matter.aspx?key=9934>
- Rainwater, B. (2007). *Local Leaders in Sustainability: A Study of Green Building Programs in Our Nation's Communities*. Retrieved January 29, 2008 from [http://www.aia.org/adv\\_localleaders](http://www.aia.org/adv_localleaders)
- Rothschild & Doyno. (2008). *The River's Edge of Oakmont*. Retrieved April 1, 2008 from [http://www.rdarch.com/4\\_plan\\_oak\\_photo.html](http://www.rdarch.com/4_plan_oak_photo.html)
- Scholz-Barth, K. (2001). *Green Roofs: Stormwater Management From the Top Down*. Environmental Design and Construction. Retrieved January 21, 2008 from <http://www.edcmag.com/CDA/Archives/d568f635d8697010VgnVCM100000f932a8c0>
- Schombert, J. W. (January 26, 2008). *The Regional Wet Weather Issue*. Lecture presented for the Local Government Academy Newly Elected Official Course on Infrastructure, Robert Morris University, Moon Township, PA.
- Seattle Department of Planning and Development. (2008). *Green Building*. Retrieved January 30, 2008 from <http://www.seattle.gov/dpd/greenbuilding>
- Seattle Department of Planning and Development. (February 12, 2007). *Seattle Incentives, Technical Guidelines and Research*. Retrieved March 26, 2008 from [http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Resources/TechnicalBriefs/DPDS\\_009485.asp#incentives](http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Resources/TechnicalBriefs/DPDS_009485.asp#incentives)
- Seifert, C. (February 15, 2008). Lecture on Children's Museum of Pittsburgh. Graduate School of Public and International Affairs, University of Pittsburgh. Pittsburgh, PA.
- Shapiro, S. (2007). *Making 80% of Your Progress on 20% of Your Problems*. Retrieved on February 18, 2008 from <http://greenlaw.blogspot.com/search?q=zoning+code>
- Shockey, J. and Mountz, A. (2007). *University Demonstrates Progress in Mitigating Energy Consumption, Environmental Impact*. Retrieved from <http://live.psu.edu/story/21830>
- Smart Growth Principles Achieved: Distinctive and Attractive Places. (No date). *Smart Growth Policy Information: Chicago, Illinois*. U.S. Environmental Protection Agency. Retrieved March 27, 2008 from <http://cfpub.epa.gov/sgpdb/policy.cfm?policyid=338>
- Smuts, M. (February 21, 2008). Interview with Matt Smuts, Sustainability Coordinator for the Urban Redevelopment Authority of Pittsburgh. Pittsburgh, PA.
- Tarr, J. and Yossie, F.T. (2003). Critical Decisions in Pittsburgh Water and Wastewater Treatment in J. Tarr (Ed). *Devastation and Renewal: An Environmental History of Pittsburgh and the Region*. (pp. 77-78) Pittsburgh: United of Pittsburgh Press.
- Tassos, J. (2006). An Even Greener Plan for Affordable Housing: How States are Using the Low Income Housing Tax Credit to Advance Healthy, Efficient and Environmentally Smart Homes. *Enterprise Community Partners, Inc.*
- U.S. Department of Energy. (2007). *Energy-Efficient Products*. Retrieved December 8, 2007 from [http://www1.eere.energy.gov/femp/procurement/eep\\_compact\\_fluor\\_lamp.html - buying](http://www1.eere.energy.gov/femp/procurement/eep_compact_fluor_lamp.html - buying)
- U.S. Environmental Protection Agency. (2007). *Green Buildings*. Retrieved February 22, 2008 from <http://www.epa.gov/greenbuilding/>
- U.S. Green Building Council. (2005). *LEED for New Construction and Major Renovations v2.2*: US Green Building Council.
- U.S. Green Building Council. (2007a). *Green Schools 101*. Retrieved from <http://www.buildgreenschools.org/g101/index.html>
- U.S. Green Building Council. (2007b). *LEED for Neighborhood Development Rating System*. Retrieved February 8, 2008 from <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>
- U.S. Green Building Council. (2007c). *Save Money*. Retrieved from <http://www.buildgreenschools.org/g101/save.html>

- U.S. Green Building Council. (2008). *LEED Rating System*. Retrieved March 27, 2008 from <http://www.usgbc.org/DisplayPage.aspx?CategoryID=19>
- United Nations Environment Program (2007). *Buildings and Climate Change: Status, Challenges and Opportunities*. Paris: UNEP Sustainable Buildings and Construction Initiative. Retrieved on January 20, 2008 from <http://www.uneptie.org/pc/sbc/publications.htm>
- University of Pittsburgh: Facilities Management Division. (2007). *Sustainability and Green Initiatives*. University of Pittsburgh: Facilities Management Division.
- Urban Redevelopment Authority of Pittsburgh (URA). *Summary-April 2007*. Retrieved March 27, 2008 from <http://www.ura.org/pdfs/boardMeetings/summary-April07.pdf>
- Wagner, D. (October 2007). *Using Energy Efficiency to Create A More Sustainable Bottom Line*. Public Management. Retrieved on December 8, 2007 from
- Wal-Mart Watch (2007). *Is Walmart Really a Green Company?* Retrieved February 12, 2008 from [http://walmartwatch.com/img/blog/environmental\\_fact\\_sheet.pdf](http://walmartwatch.com/img/blog/environmental_fact_sheet.pdf)
- Weisberg, D. (2002, November 10) *Environmentalists are determined to salvage Nine Mile Run*, Pittsburgh Post Gazette.
- White S. and Walsh J. (2008). *Greener Pathways: Jobs and workforce development in the clean energy economy*. Wildfire, Nathan. Personal Communication, February 20 and 27, 2008.
- Wisby, G. (June 29, 2006). *City Hall's Spreading the Green: Will Help Fund More Planted Roofs*. Chicago Sun-Times. Retrieved March 26, 2008 from [http://www.greenroofs.com/archives/newslinks\\_archives\\_2006.htm](http://www.greenroofs.com/archives/newslinks_archives_2006.htm)
- Wolfe, T. (2002). *Growing with Less Green House Gases: State Growth Management Policies that Reduce GHG Emissions*. Washington, D.C.: National Governors Association.

## Appendix: Planning Tools

1. Smart Growth
  - a. Smart Growth Network/EPA (Smart Growth America)
    - i. Mix land uses
    - ii. Take advantage of compact building design
    - iii. Create a range of housing opportunities and choices
    - iv. Create walkable neighborhoods
    - v. Foster distinctive, attractive communities with a strong sense of place
    - vi. Preserve open space, farmland, natural beauty, and critical environmental areas
    - vii. Strengthen and direct development towards existing communities
    - viii. Provide a variety of transportation choices
    - ix. Make development decisions predictable, fair, and cost effective
    - x. Encourage community and stakeholder collaboration in development decisions
  - b. Smart Growth America
    - i. neighborhood livability
    - ii. better access, less traffic
    - iii. thriving cities, suburbs and towns
    - iv. shared benefits
    - v. lower costs, lower taxes
    - vi. keeping open space open
2. New Urbanism (Congress, 2007)
  - a. Promotes urban centers and towns within metro regions and “reconfiguring” sprawl to restore and develop neighborhoods and districts, restore and protect natural environments.
  - b. a.k.a. traditional neighborhood development
3. Neighborhood community plan (City of Austin, 2008)
  - a. Represents the views of all the stakeholders that make a up a community
  - b. Identifies neighborhood strengths and assets
  - c. Identifies neighborhood needs and concerns
  - d. Establishes goals for improving the neighborhood
  - e. Recommends specific recommendations to reach those goals
4. City comprehensive plan
  - a. PA Municipal Planning Code (PA)
    - i. Statement of community development objectives
    - ii. Plan for land use
    - iii. Plan to meet housing needs
    - iv. Plan for movement of people and goods
    - v. Plan for community facilities and utilities
    - vi. Plan for protection of natural and historic resources...
    - vii. Plan for the reliable supply of water...

- viii. Statement of interrelationships among various plan elements which may include an estimate of environmental, economic, and social consequences
  - ix. Short- and long-range implementation strategies
  - x. Statement that existing/proposed development is consistent with or can be buffered against that in contiguous municipalities
  - xi. Statement that existing/proposed development is consistent with the county comprehensive plan
  - xii. planning body and governing body must each hold one hearing
5. LEED-ND (USGBC, 2007)
    - a. smart location and linkage
    - b. neighborhood pattern and design
    - c. green construction and technology
  6. Transit Oriented Development
    - a. Compact, mixed-use developments with transit in pedestrian-friendly environments
  7. Community Benefits Agreements (Gross, 2005)
    - a. Signed contract between community organizations and developer, specifying agreed upon community benefits of a project.
    - b. "A CBA is the result of a negotiation process between the developer and organized representatives of affected communities, in which the developer agrees to shape the development in a certain way or to provide specified community benefits. In exchange, the community groups promise to support the proposed project before government bodies that provide the necessary permits and subsidies. The CBA is both a process to work towards these mutually beneficial objectives, and a mechanism to enforce both sides' promises."